



PROCEEDINGS of the International Symposium on Sustainable Development and Internationalisation of Higher Education

11 October 2019

Proceedings of the International Symposium on Sustainable Development and Internationalisation of Higher Education

Savannakhet University

2019-2020

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PART 1 Program and Abstract

Background of the Symposium

Since the end of Indochina's devastating 30-year battle in 1975, Laos, Vietnam and Cambodia have been making immense efforts to develop their respective countries, in order to catch up with the development trend of the other South-East Asian countries. As a consequence of the serious conflicts in the peninsula, there were innumerable drawbacks: a high rate of poverty, an extremely high rate of analphabetism, high mortality rates for vulnerable groups of people, low life expectancy, food insecurity, and almost non-existent public utility.

In the period of reconstruction an economic model of central planning was introduced and adopted in Laos that was characterized by collectivisation of agriculture in the form of agriculture cooperatives and nationalisation of all economic entities (state-owned farms and enterprises). After one decade, in 1986, following the trend, especially of former socialist countries, the notorious NEM policy (New Economic Mechanism or *PIANE PENG MAI*) was adopted by the Government of Laos. Market economy was introduced and a series of changes took place: decollectivisation of agriculture, privatisation of farms and enterprises, household-based production units with usufruct land ownership. Since 1995, the economy has been more and more liberalised; and the development strategy of creating a business environment that can attract domestic and foreign investments was initiated.

Comparative advantage-based economic development would be, for example, the basic principle of conceiving development any project; harnessing the country's natural resources, exploiting the mineral deposits, electricity generated from hydro-potential energy, land-linked locality advantages that are currently prioritised for development of corridors, e.g. EWEC, the Indonesia-China Corridor through Laos as a gateway to ASEAN countries, which is now being constructed, or the high speed train railway.

The need to exploit the resources sometimes becomes, however, *abusive*, thus restricting the chances of future generations. As a consequence, the economic growth has been fluctuating, i.e. could not be kept in steady pace, making Laos still lag behind its goals. The HDI ranks Laos at the lower part of a medium-income country, with the value of HDI accounting for small progress and, in some years, regress as well. It could hardly be said the development pattern adopted resulted in sustainability.

In the education sector, the first and the most prioritised strategy during the late 1970s; in the first five-year plan, was Education under the headline "EDUCATION, ONE STEP FORWARD BEFORE ALL" which was officially declared by the first Minister of Education in the new regime. All the resources were mobilised to eradicate the analphabetism of Lao people under 30 years. Nowadays, the literacy rate of Lao people is 72%. Under the Multilateral Agreement Assistance Scheme (MAS) during the 1980s, many study opportunities were offered for graduates from high schools to enroll in oversea study programs; especially in former eastern European countries including East Germany and Russia, and also in China and Vietnam.

This signifies that internationalisation has always been emphasised in the development process; improving the quality of education, especially that of vocational and higher education. Nowadays, internationalisation for Laos means to network with educational institutions in the region and globally, as well as developing study programs which are taught in foreign languages. An example of networking in the region is ASEAN University Network (AUN), and internationally, the collaborations with European universities under the ERASMUS+ programme are to strengthen the capacity for improving, in particular, the Higher Education Institutions in Laos.

This internationalisation is to help Laos achieve the Sustainable Development Goals (SDG) in the field of education – a great challenge. The SDG for Laos consists of 18 goals of which the numbers 4 and 17 relate most directly to education. SDG4, *improving the quality of teacher education*, deals with access to quality education including inclusive and equitable access, life-long learning opportunities, and

developing skills and entrepreneurship for economically active people. These are very relevant to the present issues Laos is facing. SDG17 is about the internationalisation of higher education, partnership development, capacity building and technology sharing. Indirectly, all the 18 SDGs are related to the work of Higher Education Institutions (HEIs), since the human resources who are needed to attain the SDG's goals are trained by HEIs.

The symposium on Sustainable Development and Internationalisation of Higher Education addresses these issues and is co-hosted by two Erasmus+ partners. The plenary session opens the symposium with 2-3 speakers. Then five parallel strands follow: (1) Social Development, (2) Economic Development, (3) Environmental Issues, (4) Sciences and Transition Technology and (5) Educating the Global Citizen. These strands are also co-chaired by the Erasmus+ partners.

COMMITTEES

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Mrs Bounna PHANTHAVONG	Staff of Research and Post graduate
Ms. Pavandy LUANGSENA	Staff of Research and Post graduate
Ms. Thipphavanh Nilakone	Staff of Research and Post graduate

Tentative Programme

International Symposium

“ Sustainable Development and Internationalization of Higher Education”
at Savannakhet University

11 October 2019

10 October 2019 (Thursday)		
	Arrival and Registration	
11 October 2019 (Friday)		
Time	Activities	Remarks
8 : 00 – 9 : 30	Registration of Participants	
9 : 30 – 9 : 40	Welcoming and Opening ceremony	
9 : 40 – 9 : 50	Introduce Symposium background “Sustainable Development and Internationalization of Higher Education” Assoc. Prof. Dr. Sitha Khemmarath	
9 : 50 – 10 : 30	Panel Talk Session “Sustainable Development and Internationalization of Higher Education” Moderator : Assoc. Prof. Dr. Sitha Khemmarath Panelists : Dr. Soulinhong Saykosy , Savannakhet University Prof. Dr. Isabel Martin , University of Education Karlsruhe Dr. Martin Remmele University of Education Karlsruhe Prof. Dr. Keiichi Ogawa Kobe University MC: Phetsavanh Somsivilay Rapporteur : Dr. Outhavy Vongmany	
10:30 – 10: 40	Sharing experience Napha KHOTPHOUTHONE and Thaithanavanh KEOKAISONE (sharing experience about Internationalization in Germany)	
10 :40 – 10:50	Coffee break	
10:50 – 11 : 15	Poster session	

11:15- 12:00	<p>Oral presentation (Morning session)</p> <p>Thematic speaker in each strand</p> <ul style="list-style-type: none"> - Social Development - Economics Development - Sciences and Transition Technology - Educating the Global Citizen - Environmental issues 	<p>20 minutes in each topics of each strand</p> <p>Certification to participants in each strand offer by chairman and co-chairman</p>
12:00 -13:30	Lunch break	
13:30 – 16:30	<p>Oral presentation (Continue ...)</p> <p>Thematic speaker in each strand</p> <ul style="list-style-type: none"> - Social Development - Economics Development - Sciences and Transition Technology - Educating the Global Citizen - Environmental issues 	<p>20 minutes in each topics of each strand</p> <p>Certification to participants in each strand offer by chairman and co-chairman</p>
16:30- 16:40	<p>Wrap up the event of the day</p> <p>SKU's President offer appreciate certificate to Chair and co-chair of each strand.</p> <p>Closing ceremony</p>	

The International Symposium Program

Social Development							
Morning Session 11:15- 12:00	<p>Social Development Panels :</p> <table> <tr> <td>1) Heike Mueller</td><td>Chairman</td></tr> <tr> <td>2) Dr. Phetsamone Khattiyavong</td><td>Co-Chairman</td></tr> <tr> <td>3) Chandokkham Youyabouth</td><td>Rapporteur</td></tr> </table> <p><i>Note : Thematic speakers in each topics allowed 15 minutes for presentation and 5 minutes for Q&A session, After finished afternoon session the Chairman of the strand offer the participation certificate.</i></p> <ol style="list-style-type: none"> Challenges to communication between Institutions of Higher Education in Laos and Germany: A study in cross-cultural pragmatics and intercultural learning <i>Dr. Phetsamone KHATTIYAVONG , Prof. Dr. Isabel Martin, Savannakhet University, and University of Education Karlsruhe, Laos and Germany</i> Roles Playing of Educational Institutions in Taking Care for Juvenile Offender After Released <i>Arreerat Adisaidachcharin, Thammasat University, Thailand</i> 	1) Heike Mueller	Chairman	2) Dr. Phetsamone Khattiyavong	Co-Chairman	3) Chandokkham Youyabouth	Rapporteur
1) Heike Mueller	Chairman						
2) Dr. Phetsamone Khattiyavong	Co-Chairman						
3) Chandokkham Youyabouth	Rapporteur						
Afternoon Session 13:30 – 16:30	<ol style="list-style-type: none"> Facilitating Global Dialog for Sustainable Consumption? An Overview of Virtual Exchange Formats for HE <i>Prof.Dr.Silke Bartsch, Heike Mueller, Technische Universitaet Berlin, Germany</i> Investigation of Lao Preservice science Teachers' Perception toward to use Computer Simulation in science Education of Savannakhet University Lao PDR <i>Sitsanou Phouthavong, Savannakhet University, Laos</i> 						
Economic Development							
Morning Session 11:15- 12:00	<p>Economic Development panels:</p> <table> <tr> <td>1) Prof.Dr.Silke Bartsch</td><td>Chairman</td></tr> <tr> <td>2) Assoc.Prof. Sitha KHEMMARATH</td><td>Co-Chairman</td></tr> <tr> <td>3) Khamparn Pathoumalangsy</td><td>Rapporteur</td></tr> </table> <p><i>Note : Thematic speakers in each topics allowed 15 minutes for presentation and 5 minutes for Q&A session. After finished afternoon session the Chairman of the strand offer the participation certificate.</i></p> <ol style="list-style-type: none"> The Study Marketing Strategy Compare Influencing Decision Making of Culture Traveling: Case Study Prasat Muang Tam and Phnom Rung in Buriram <i>Phuthorn kodkaew, Thonburi Rajabhat University, Thailand</i> 	1) Prof.Dr.Silke Bartsch	Chairman	2) Assoc.Prof. Sitha KHEMMARATH	Co-Chairman	3) Khamparn Pathoumalangsy	Rapporteur
1) Prof.Dr.Silke Bartsch	Chairman						
2) Assoc.Prof. Sitha KHEMMARATH	Co-Chairman						
3) Khamparn Pathoumalangsy	Rapporteur						

Educating the Global Citizen	
Morning Session 11:15- 12:00	Educating the Global Citizen Panels : 1) Prof. Dr. Isabel MARTIN

	<p>2) Dr. Bounheuang NINCHALERN Co-Chairman</p> <p>3) Dr. Somphong Chanthavong Rapporteur</p> <p><i>Note : Thematic speakers in each topics allowed 15 minutes for presentation and 5 minutes for Q&A session. After finished afternoon session the Chairman of the strand offer the participation certificate.</i></p> <ol style="list-style-type: none"> 1. Determining buffer zones for conservation planning of plant diversity, Dong Na Tard Provincial Protected Area, Lao People' Democratic Republic (Lao PDR) <i>Dr. Somphong Chanthavong, Inocencio E. Buot, Jr</i> 2. Students' perception of native insects in rice field in Laos and attitudes towards species management <i>Viengvilaiphone Botthoulath^a, Douangvilavanh Keomanivone^b, Phonesavard Sibounnavong^a, Keovongphet Phuthavong, and Martin Remmele^c</i> 3. Contribution to amphibian conservation in Laos. <i>Napha Khothphouthone, Savannakhet University, Laos</i>
<p>Afternoon Session 13:30 – 16:30</p>	<ol style="list-style-type: none"> 4. Estimation of Methane Emission from Solid waste Landfill Site, Savannakhet Province, Lao PDR. <i>Phoukham Niravanh, Chalor Jarusutthirak, Savannakhet University, Laos</i> 5. Assessment System Air Pollution PM2.5 and PM10 using Laser Dust Sensor PMS3003 <i>Phutsavanh THONGPHANH, National University of Laos, Laos</i> 6. Biochar as amendment to soil growing cassava for foliage <i>Outhomphone Senviset and T R Preston, Savannakhet University, Laos</i> 7. Land Cover Change in Thapangthong District, Savannakhet Province, Lao PDR <i>Souvanthone Douangphachanh, Savannakhet University, Laos</i> 8. Students' perception of native insects in rice field in Laos and attitudes towards species management <i>Martin Remmele, Karlsruhe University of Education, Germany</i>

SCIENCE AND TRANSITION TECHNOLOGY

Session

1. Weft Indexing for Digital Pattern Design and Weave Draft
Lathsamy Chidtavong , National University of Laos, Laos
2. Prevalence of Tick-Borne Disease for Native Cattle in Mae Ai District, Chiang Mai, Thailand
Pennapa Takam¹ Runjuan Itsararuk² Phairot Phongkidakarn³ Pattama Charerntantanakul⁴ Dante Fabros Jr.¹ Thipkamon Thikarach¹ Wilawan Ruansit¹ Pichanan Suebsaard¹ Onanong Senglao¹ Wasin Charerntantanakul^{1}*
3. Phenotypic Characterization of Double Disruption Arabidopsis Plants for Sulfate Transporters SULTR2;1 and SULTR3;5
Khamsalath Soudthedlath, Biotechnology and Ecology Institute, Ministry of Science and Technology, Laos
4. True metabolizable energy contents of bio-fuel byproduct feedstuffs in adult roosters
Dr. Bounmy Keohavong, Souphanouvong University, Laos
5. Prevalence of Tick-Borne Disease in Dogs in Doi Saket District, Chiang Mai, Thailand
Pennapa Takam , Maejo University, Chiang Mai, Thailand

Weft Indexing for Digital Pattern Design and Weave Draft

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Abstract

Traditional Lao textile is a heritage of Laos that need preservation and contribution, especially a need for technical support to improve a process of pattern design and weaving. Tam Chok (supplementary weft) is the most technique used in Laos, but all weaving processes still used traditional technique. In contrast for modern weaving, computer graphics has an important role to design a woven pattern and making weave-draft. Therefore, this paper aims to present a weft indexing approach to generate a digital weave-draft based on computer graphics principle. Mathematical property of the Tam Chok technique (supplementary weft) is a key for generating digital weave-drafts.

In weaving process normally there are two separated tasks, a design task and a weave-draft making task. Unlike other weave design approaches, our weft indexing approach facilitates those tasks; weavers can put any color to decorate their desired patterns and together defines an index of wefts simultaneously. It means that an output of the design process, weavers will get a designed pattern with indexed weft. To facilitate the second task, we investigate efficient algorithms for generating weave-drafts. We do experiment with traditional Lao patterns, a result show that our approach is well suit to the Tam Chok (supplementary weft weave). The designed patterns and generated weave-drafts are created in two standard weave file formats that can be used for digital weaving and traditional Lao hand weaving.

Keywords: supplementary weft, digital weave draft, hand weaving, digital weaving

Introduction

Hand weaving system in Laos is an old weaving tradition that uses only two types of simple wooden looms, a floor loom and a backstrap loom. The floor loom is the most widely used by Lao Tai people who are formed majority groups, the backstrap loom is only used by minority people who live in southern Laos. Weave techniques used in Lao Tai group on the floor loom are Tam Chok, Tam Mouk, Mat Mii and tapestry weave. Tam Chok is a mainly and intensively used technique, it is a compound weave between plain weave and a supplementary weft pattern weave, the plain weave is woven as ground fabric where the pattern weave uses continuous or discontinuous supplementary weft to produce patterns. The appearances of Lao Tai textiles, motifs and patterns various from region to region (D. D. Bounyavong, 1995), they play important role in religions and society. Buddhism and Shamanism are two main religions that influence creative ideas of designers as we can see from P.Cheesman in year 2009. Therefore, the investigated motifs and patterns in this research are mainly produced from Tam Chok, because this technique provides designers to enable to make complicated patterns.

Since motif's structure and pattern's composition are complex, weave-drafts have at least 50 lines while a weave-drafts for the most complicated patterns have nearly 800 lines. Contrastingly, weave-draft storing is very risky. Lao weavers store their weave-drafts in two traditional ways for reused purpose. The first common way is to store weave-drafts in a set of heddles (supplementary heddles), before finishing warp threads from a loom, weavers weave a master pattern and then leave it with its drafts on heddles, the master pattern and heddles are tied together by warp threads. When a weave-draft is needed again, the supplementary heddles are re-installed on the loom by connecting warp threads on the heddles to a new set of warp threads on the loom. Weavers can see an example pattern of the weave-draft from the master pattern and they can follow the weave-draft to weave new fabric of this pattern. Another way for reused patterns is collecting master patterns; normally this method is for keeping less complicated patterns, the master patterns are served as weave-drafts, it means that the weave-drafts are removed from heddles; weavers keep only a piece of master patterns when the patterns are needed to weave, weavers have to make a weave-draft on heddles by following the master pattern, from this method a new pattern design can be created by using one master pattern or by combining motifs and patterns from variant master pieces. The designs of patterns on the contemporary textiles today are still follow these techniques.

In textile industry, weaving processes are controlled by electronic equipment; patterns and weave-drafts are digital files, which can directly be read by electronic looms. A lot of commercial CAD software has been introduced in the textile market, but they have been developed for specific types of looms, such as electronic Jacquard looms (F. Bradbury, 1912), different machines have different and sometimes individual software but this is only possible within textile industry. There is some commercial weave design software that have been developed for both hand looms and electronic looms called shaft looms or dobby looms (T. Roberts, 1912). However, shaft looms are different from floor looms that are used in Laos and actually digital weave-drafts are created based on the type of loom used. Therefore, weave-drafts are a key to connect traditional Lao weaving techniques and modern weaving technologies; this connection is a first step to introducing a new technical tool to a society of hand weaving textile in Laos, it will help to improve the weaving process of local weavers.

Digital Design and Digital Drafting: The purpose of drafting is to find out what a pattern will look like before going to all the work of making a warp and threading the loom. The drafts are planned in various ways according to tradition or country of origin and type of loom. In Europe and United States of America (USA), a treadle loom is widely used; it is a type of floor-loom. As a result, the most found drafting techniques were based on the structure of treadle loom, such as weave-drafts provided by ("Complex weavers", 2013) and (K. Bruland, 2015). The draft of treadle loom indicates the threading of the warp, the tie-up which is a manner to tie the shafts/harnesses to the treadles, and the treadling sequence. Drafting on paper is the same method as drafting on the computer, except that the computer does it much faster with a greater degree of accuracy than the human process of producing a pattern on paper. The draft can then be printed out, so that it can be taken to the loom for handy reference when threading or treadling. The standard digital weave-drafts for the treadle loom or floor-loom are WIF file; WIF stands for Weaving Information File. It is a standard file for sharing weaving files among different weaving programs. It is simple text file that describes a weaving project. Using WIF files, weavers can electronically store and exchange weave-drafts, display them graphically with weaving software, and use them to drive computer-assisted looms. It also makes it possible to elegantly publish weave-drafts with very long repeats in the threading and treadling. The advent of this file standard opens the door for weavers and artists to share their work freely

without the limitations of particular software's file format. It also allows weavers to work with their designs using several different programs. For more detail of WIF file check in (Ralph E. Griswold, 2006) (B. K. Behera and P. K. Hari, nd).

Methodology

Digitizing Pattern-drafts and Weave-drafts: Traditional Lao textile is applied compound-weave which is a combination of pattern-weave and ground-weave. The pattern-weave defines only structure of pattern while the ground-weave for Lao textile defines structure of plain-weave that means structure of pattern can be digitized separately from ground-weave. As a result, we define pattern-drafts to be digital drafts for pattern-weave while weave-drafts are defined to be digital drafts for compound-weave. The digital file format for digitizing in this research, we are based on two common standard file formats, the WIF file with .wif extension and image file with .bmp, .jpeg and .tiff extensions and so on. To generate digital pattern-draft we used LTTieup module that is introduced by Lathsamy Chidtavong in year 2016.

We considered on semi-automatic looms named the Thread Controller Number 2 (TC2) loom (V. Vestby, nd). The observed electronic looms are selected by according to their similarity to the traditional floor-loom used in Laos. The observation concentrates on how the looms operate weave-draft and which part of weaving process the loom assists weavers. Actually, electronic looms are able to weave many kinds of fabrics, so the complexity of the weave structures depends on their given digital weave-drafts. In industrial textiles, many weave structures are developed and they are creatively applied where the combination of weave structures on the fabrics is up to creativity of designers and it depends on the capacity of the looms. However, generally the electronic looms read only binary data on the given drafts and the drafts are read row by row in order to make interlacement between warps and wefts. Therefore, to weave textiles like traditional Lao style on the electronic looms is not a big deal if we know their weaving techniques and use the suitable looms, the important thing need to provide to the looms is the right digital weave-drafts. The right digital weave-drafts mean the drafts that machines can read and can produce traditional Lao textiles on them. Weaving on the electronic loom is basically the same as weaving on the hand floor-loom, such as lifting identified warps for inserting wefts and weaving keep working forward step by step, the difference is only that every weaving step on the hand floor-loom is done by hand while on the electronic loom every weaving step is done by machine. As a result, we investigated algorithms to generate digital weave-drafts for the observed electronic looms, the algorithms are developed based on characteristics of Lao textiles and two considering points of Lao weaving technique. Firstly, traditional Lao weaving technique is always used two weave structures, a ground-weave and a pattern-weave that means we need a weave-draft to tell a machine to weave this combination structure, and secondly the most Lao textiles are colorful fabrics which are used more than one weft for pattern-weave, so weavers have to define how many wefts are intended to use during weaving. According to these requirements, our developed algorithms basically concern about pattern-weave and ground-weave, such as algorithm for generating weave-draft by separating weft's index, algorithm for adding ground weave to pattern-weave.

Separating Weft Set by Indexing: In commercial weave design software is often used color to identify weft set and used together with many image processing techniques provided in the software, so the process to get a weave-draft is complicate and weavers need much time to understand the software. Therefore, in our research we use indexing technique to assign index to each set of weft which means the same weft set can assign many colors, this technique is good for designers since design task to weave-draft generating, because they are freely able to design colorful pattern, the visualized colorful pattern will be used as guideline to weave colorful pattern on the loom while the weave-draft that generated according to assigned weft's index is a guideline to lift warps for weaving. As a result, our first algorithm is used to separate

different weft set into different line on the digital draft, the idea is that from a given digital pattern-draft, we assign weft's index on the pattern as input of the algorithm after that the algorithm will automatic separate the set of wefts regard to their defined index. The main reason of separating the set of wefts is because every single weaving steps the machine lifts warp threads for inserting weft to form woven structure, so the separated wefts in each line on the draft is a guideline to tell the machine to open a shed by lifting identified group of warps on the line. We need a digital weave-draft for semi-automatic weaving machine named TC2 loom, number of color is independent from number of weft. The machine only response to lift set of warps for opening a shed then a weaver has to float a shuttle (a weft) by herself/himself. In this case, weft indexes on a weave-draft are used for defining group of lifted warps in each weaving step, but during weaving weavers can use many wefts in one step, because floating weft is done by weavers. This drafting is good for weaving with embroidery technique or weft-face patterning technique which is a main used technique in hand-weaving for traditional Lao textile named Tam Chok. Weave-drafts are directly interpreted weaving on hand floor-loom, each line on the draft explain weaving step on the hand floor-loom. So, from graphical feature of weave-draft or image file format, weavers are easy to understand and follow the drafts. To perform algorithm, we define necessary notations as follows:

$M_{m \times n}$	is a single weave with multiple weft indexes
W	is a weave-draft with separate weft indexes
w	is row's number of weave-draft
$r[m]$	is an 1D integer array of size m, it uses to store highest weft-index of each row

Algorithm1: separate pattern draft by weft index. There are 4 steps of algorithm for separating pattern draft by weft indexing namely:

1. Find highest weft-index in each row, a pseudo code is:

```

for i=0 to i=m-1
    r[i] = 0
    for j=0 to j=n-1
        if (r[i] < M[i][j].weftIndex)
            r[i] = M[i][j].weftIndex
        end if
    else
        r[i] = 1;
    end else
end for
end for

```

2. Compute row's number of weave-draft, a pseudo code is:

```

w=0
for i=0 to i=m-1
    w = w + r[i]
end for

```

3. Define dimension of weave-draft: $W_{w \times n}$

4. Separate different weft-index in different row by checking weft-index of a single-weave matrix with highest index of each row $r[m]$, if weft-index less than highest index then separate the index into different, a pseudo code is:

```

int c=0,i=0;
while(i<w)
for j=0 to j=n-1
    for k=0 to k=r[i]-1
        //check weft-index of single-weave

        if(M[c][j].weftIndex == k+1)
            S[i+k][j] = M[c][j]
        end if
        else
            S[i+k][j] = 0
        end else
    end for
end for
i=i+r[i]
c++
end while

```

Generating Digital Weave-draft: the digital weave-draft for weaving traditional Lao textiles on semi-automatic (TC2) loom is a draft of compound-weave between pattern-weave and ground-weave, so we investigated the second algorithm for adding ground-weave to a pattern-draft, the idea on adding ground-weave is normally to loopily inserting each line of ground-weave to each line of pattern-draft. The algorithm contains two steps, the step for separating weft's index and the step for adding ground-weave to the result of the first step. To perform algorithm, we define necessary notations as follows:

$S_{m \times n}$	is a single weave with multiple weft indexes
$G_{p \times n}$	is a ground-weave
C	is a compound-weave
w	is summation all highest weft-index from each row
$r[m]$	is 1D array of size m of 2D point (x,y), where $r[m].x$ uses to store weft-index of row, $r[m].y$ use to store highest weft-index of row.
$rId[m]$	is 1D array of string of size m

Algorithm 2: adding ground-weave to pattern-draft. Steps of the algorithm are:

1. Find highest weft-index in each row, a pseudo code is:

```

for i=0 to i=m-1
    r[i].x = 0, r[i].y=0
    for j=0 to j=n-1
        if(r[i].x < S[i][j].weftIndex)
            r[i].x = S[i][j].weftIndex
            r[i].y++
        end if
        else
            r[i].x = r[i].x;
        end else
    end for
    rId[i]=r[i].x
end for

```

2. Compute summation of highest-index from all rows, a pseudo code is:

```

w=0
for i=0 to i=m-1
    w=w+r[i].y
end for

```

3. Define dimension of compound-weave: $(w+m-1, n)$

4. Generate compound-weave by assigning values of single-weave and ground-weave to the matrix of compound-weave with three different cases. The pseudo code is:

```

int addPoint, c=0, i=0
while(i<w)
    addPoint++
    if(i==0)//case1
        for j=0 to j=n-1
            int intrId=0
            for k=0 to k=r[c].y-1
                intrId = int(rId[c][k])
                //check weft-index of single-weave

                if(M[c][j].weftIndex == intrId)
                    C[i+k][j] = M[c][j]
                end if
            else
                S[i+k][j] = 0
            end else
                C[i+k][j] = G[addPoint%p][j]
            end for
        end for
    end if
else //case2
    if(r[c].y>1)
        int intrId=0
        for j=0 to j=n-1
            for k=0 to k=r[c].y-1
                intrId = int(rId[c][k])

```

```

        //check weft-index
        if (M[c][j].weftIndex == intrId)
            C[i+c+k][j] = M[c][j]
        end if
        else
            S[i+c+k][j] = 0
        end else
    end for
    if (c<m-1)
        C[i+c+r[i].y][j] = G[addPoint%k][j]
    end if
end for
else //case3
    int intrId=0
    for j=0 to j=n-1
        for k=0 to k=r[c].y-1
            intrId = int(rId[c][k])
            //check weft-index
            if (M[c][j].weftIndex == intrId)
                C[i+c+k][j] = M[c][j]
            end if
            else
                S[i+c+k][j] = 0
            end else
        end for
        if (c<m-1)
            C[i+c+r[i].y][j] = G[addPoint%k][j]
        end if
    end for
end else
end else
I = i+r[c].y
c++
end while

```

Results

The algorithm1 and algorithm2 are implemented in LTTieup module (Lathsamy Chidtavong, 2016), which we use to generate weave drafts in both WIF file and image file. The original motifs and patterns for the experiments are selected from traditional textiles which are popular designs among Lao designers. We do weaving experiment for testing our weave drafts with the electronic TC2 loom. The experiment conducted in weaving Laboratory of the faculty of textile design and clothing technology at Neiherrrein University, Germany. There are three sets of pattern-drafts, the first set was pattern-draft with single weft-index; the second set was pattern-drafts with two weft-indices and the last set was pattern-drafts with three weft-indices.

Because a structure of weave draft depends on weave type and number of weft-index defined in the draft, we prepare weave-drafts of compound-weave with different number of weft-index, such as: weave-draft with one weft-index, weave-draft with two weft-indices and weave-draft with three weft-indices.

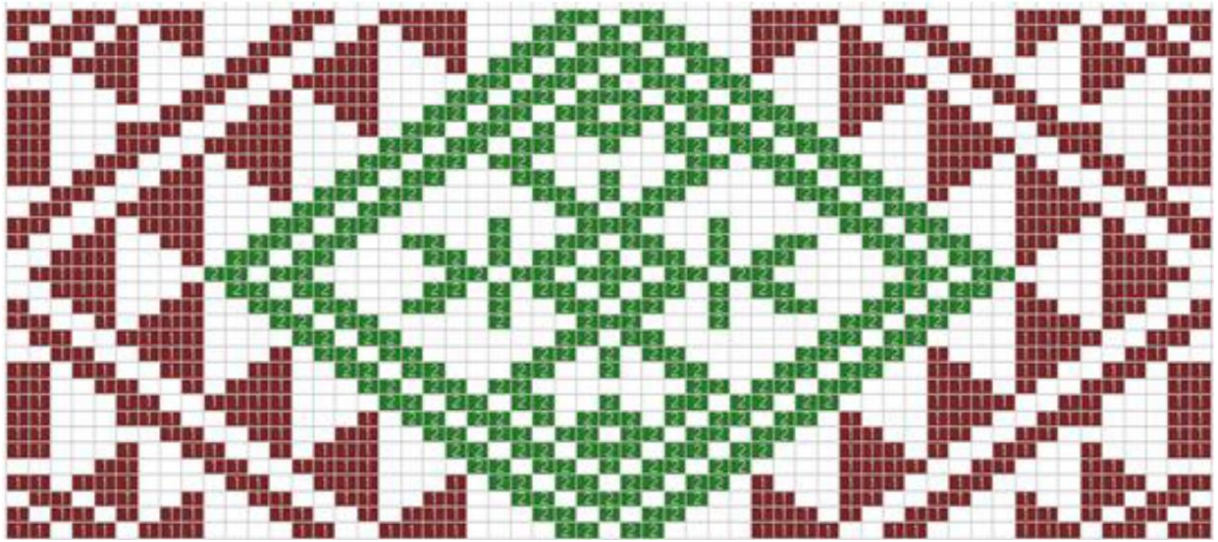


Figure 1: One-repeat *diamond* pattern with two weft-indices, before adding plain weave

Figure 1 shows one-repeat pattern-draft of *diamond* motif, the pattern-draft contains two colors and two weft-indices, the red indicates weft-index 1 and the green indicates weft-index 2. The LT-Tieup module set default value of weft-index to one, but the module provides list of indices to define multiple indices to the design. Weft-index and color-index in the LT-Tieup module are different; this property allows us to define multiple colors to the same weft-index. Actually, colors on the pattern-draft help us to design desired ornament on a fabric; weft-index is used to generate weave-draft of compound-weave. The weave-draft is generated by separating each weft-index to different line then adding line of plain weave before repeat the process to the next line of the pattern-draft. A weave simulation of the pattern-draft is shown in figure 2, it illustrates a one-repeat weave-draft of the *diamond* pattern. The red indicates weft-index 1, the green indicates weft-index 2 and the gray indicates weft of plain weave. Due to a motif of the pattern is symmetric, in the first half of the motif a line of gray is inserted after every line of green (weft-index 2), but in the second half of the motif a line of gray is inserted after every line of red (weft-index 1), excluding the last red line.

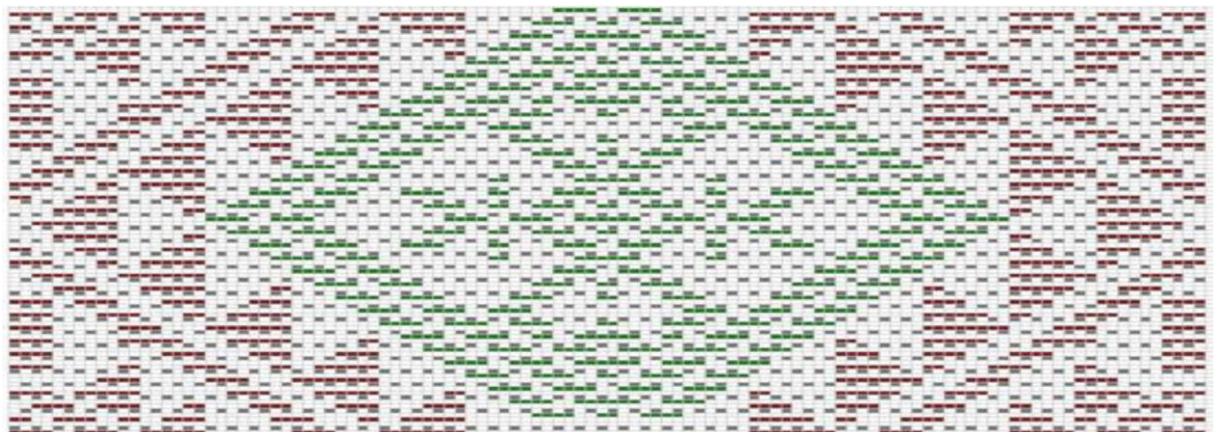


Figure 2: Weave simulation of one-repeat weave-draft of the *diamond* pattern with two weft-indices, after adding plain weave



Figure 3: Weaving result of the *diamond* patterns by TC2 loom

From weaving result shows in figure 3, we see that a woven *diamond* pattern is a colorful pattern; it is decorated with 4 weft colors. Since the TC2 loom is semi-automatic electronic loom which is hand operated machine, so we are able to use set of weft threads more than number of weft-index that defined in the weave-draft. The weft-index on the draft is only used to determine groups of lifted warps for weaving. Because we consider on traditional Lao style, we still use hand-pick decoration in weaving. Once the warps lifted we are freely to decorate on the fabric.

Discussion

The weaving results show compatibility between our digital weave-drafts and the electronic TC2 loom. The results show a variety of colorful motifs and patterns on a fabric. Because the TC2 loom is a hand operated loom, it provides various possibilities to decorate fabric; this property satisfies the characteristics of Lao textiles. The experiment focuses on weaving style of traditional Lao textile which consists of pattern-weave and ground-weave (plain weave). Therefore, a hand-pick decoration is used to weave a complicated pattern. The decoration is up to imagination of the designers even weaves the weave-drafts with few weft-indices, but we are able to produce many colorful styles. The produced fabrics look the same like fabrics that are woven on Lao floor-loom. Therefore, the results express a connection between traditional style of Lao textiles and modern weave technology. They fulfill the gap between traditional weave technique of Lao weavers and modern weave technique.

Conclusions

The research has found that the connection between hand-weaving and electronic weaving is a modern solution to preserve this culture and the key is a digital weave-draft. The digital file formats for this research are WIF and image files, which are standard formats, understandable and useable for both hand-weavers and electronic looms. For the future work, the first possibility is to investigate weaving techniques applied on backstrap looms, because the backstrap loom is a main tool used among small ethnic groups in southern Laos. The study on modern weave structures and their implementation to traditional hand-weaving is another possibility for future work. The idea is to keep appearance of traditional motifs, but woven fabric could be applied to various structures. The result would produce interesting textiles with good quality and still a traditional Lao style. An investigation on image processing techniques for extracting digital motifs from images another possibility due to characteristics of traditional design for Lao motifs, research on extracting traditional Lao motifs from images will be a challenging research project.

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References

- B. K. Behera and P. K. Hari, Woven textile Structure, Theory and Application. Woodhead Publishing Limited, Oxford, Cambridge, New Delhi.
- Complex weavers, encouraging, curiosity, exploration innovation in weaving. Retrieved from: <http://www.complex-weavers.org/>. © 2000-2013 by Complex Weavers, Inc.
- D. D. Bounyavong, *Infinite Designs: The Art of Silk*. Lao Women's Union, Vientiane 1995. ASIN: B001C4DULE
- F. Bradbury, Jacquard Mechanism and Harness Mounting. John Heywood Limited, Technical Book Depot, Manchester. F. king & Sons LTD., Halifax, Yorks. September, 1912.
- K. Bruland, a digital weaving archive with drafts, historic weaving documents, and more. Retrieved from: <http://www.handweaving.net/>. © 2004 - 2015 Kris Bruland/ Handweaving.net.
- Lathsamy Chidtavong, *Digitizing Traditional Lao Textile to Modern Weave Technique*. UK-ASAIN Innovation conference (UAIC), 25th-26th October, Vientiane, Laos. 2016.
- Ralph E. Griswold, Mathematical and Computational Topics in Weaving. September 20, 2006.
- T. Roberts, *Tappet and Dobby looms: their mechanisms and management*. Manchester, EMMOTT & Co., Limited, 65 King Street. London: 20 Bedford Street, W.C. 1912.
- V. Vestby, Digital Weaving Norway (DWN). Thread Controller 2 (TC2) digital weaving looms. Retrieved from: <http://www.digitalweaving.no/en/>

Prevalence of Tick-Borne Disease for Native Cattle in Mae Ai District, Chiang Mai, Thailand

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Abstract

Tick-borne diseases (TBDs) affect health status of native cattle in Thailand. TBDs mostly found in native cattle are anaplasmosis and theileriosis. In this study, we determined the prevalence of TBDs for native cattle in Mae Ai district, Chiang Mai, Thailand using multiplex polymerase chain reaction (mPCR) developed in our laboratory. A total of 51 blood samples were collected. The results showed that native cattle were infected by a single infection with *Anaplasma marginale* (13.73%) and *Theileria sp.* (37.25%). In addition, they were coinfecting with *A. marginale* and *Theileria sp.* (29.41%). No *Trypanosoma evansi* was found. There were 10 native cattle (19.61%) that were not infected with either blood parasites. Statistical analysis revealed that TBDs are associated with age group but not with sex.

Keywords: Tick-borne disease, mPCR, Native cattle

Introduction

Anaplasmosis and theileriosis are tick-borne diseases (TBDs) of native cattle caused by *Anaplasma marginale* and *Theileria sp.*, respectively (Bock *et al.*, 2006). Their vector, *Rhipicephalus (Boophilus) microplus* and *Rhipicephalus appendiculatus* (Jirapattharasate *et al.*, 2016, Bock *et al.*, 2006, Mans *et al.*, 2015) are widespread in tropical and subtropical regions (Jongejan *et al.*, 2004). TBDs are major problems in native cattle since they affect growth and reproductive performance and health status (Bilgic *et al.*, 2013, Firdaus *et al.*, 2013). Unlike TBDs, trypanomiasis is transmitted by biting flies and stable flies. It is caused by a protozoon *Trypanosoma evansi* which affects growth and reproductive performance as well as health status of native cattle (Desquesnes *et al.*, 2013, Nava *et al.* 2015).

Diagnostic techniques for TBDs include direct microscopic examination of peripheral blood smears, latex agglutination test, enzyme-linked immunosorbent assay (ELISA), and polymerase chain reaction (PCR) (Bilgic *et al.*, 2013). Microscopic examination is rapid and inexpensive, but it has low sensitivity. Latex agglutination test and ELISA are relatively more expensive and time-consuming. They can detect only specific antibody against the pathogens and have low sensitivity especially during early infection stage. In contrast, PCR detects DNA of the pathogens with relatively high sensitivity. It is less expensive than ELISA, but can be time-consuming.

Multiplex PCR (mPCR) is a variant of PCR in which two or more loci are simultaneously amplified in the sample reaction (Henegariu *et al.*, 1997). It has advantage over other diagnostic techniques such as high sensitivity, specificity and cost effectiveness (Ananyutthawongse *et al.*, 1999, Bilgic *et al.*, 2013).

In Thailand, there was a study of prevalence of TBDs in beef cattle in the northeastern region, i.e. Khon Kaen, Mahasarakham, and Loie provinces and northern region, i.e. Chiang Rai, Phayao, and Mae Hong Son provinces (Jirapattarasate *et al.*, 2016). However, the prevalence of TBDs in native cattle in Mae Ai district, Chiang Mai, Thailand has not yet been elucidated. Therefore, the aim of this study was to study the prevalence of *A. marginale*, *Theileria sp* and *T. evansi* in native cattle in Mae Ai district, Chiang Mai, Thailand by mPCR. In addition, the risk factors associated with TBDs were studied

Methodology

Blood sample and data collection

Blood was collected from jugular vein of 51 native cattle in Mae Ai, Chiang Mai, Thailand. Blood was placed into EDTA containing vacutainer tube, and stored in -20 °C until use. Native cattle were categorized into 4 age groups: <1 year, 1-5 years, 5-10 years and 10-20 years.

DNA Extraction

Thirty µl of whole blood samples were incubated with 1 ml of sterile distilled water for 5 min at room temperature and cell suspension was centrifuged at 8,000 rpm for 1 min at 4 °C. Then, cells were washed with sterile distilled water by centrifugation at 8,000 rpm for 1 min at 4 °C and supernatant was removed. Next, 100 µl of 5% chelex resin solution (Sigma-Aldrich, USA) and 10 µl proteinase K (10 mg/ml) (Invitrogen, USA) were added and incubated at 56 °C for 30 min. Then, it was transferred to incubator at 95 °C for 10 min and cooled in room temperature, centrifuged at 8,000 rpm for 1 min at 4 °C. Supernatant was pipetted out carefully to new microcentrifuge tube and stored at -20 °C until use.

mPCR detection of *T. evansi*, *A. marginale* and *Theileria sp*.

Primers specific for *T. evansi*, *A. marginale* and *Theileria sp*. are listed in Table 1. The mPCR reactions (25 µl) contain 15 µl of 2× Quick Taq HS Dye Mix (TOYOBO, Japan), 5 µM of each forward and reverse primers, and 1 µl of DNA template. Negative control used nuclease-free water as template. The conditions used for mPCR amplification were 94 °C (3 min), 35 cycles of 94 °C (30 s), 58 °C (30 s), and 68 °C (30 s), and 72 °C (10 min). The mPCR products were separated by gel electrophoresis on 1.5% agarose gel (Biobasic, Canada) at 120 V for 30 min in 1X TBE buffer (Biobasic, Canada) and then visualized under UV light after staining with ethidium bromide (Biobasic, Canada).

Table1: Primers for mPCR

Primer name	Parasite	Sequence	Gene	Product size	Reference
Te227F	<i>T. evansi</i>	TGCAGACGACCTGACGCTACT	<i>VSG gene</i>	227	Ravindran <i>et al.</i> , 2008
Te227R		CTCCTAGAAGCTTCGGTGTCCCT			
Am265F	<i>A. marginale</i>	GCTCTAGCAGGTTATGCGTC	<i>major surface protein-1β encoding</i>	265	Bilgiç <i>et al.</i> , 2013
Am265R		CTGCTTGGGAGAATGCACCT			
Ts815F	<i>Theileria sp.</i>	CACGCTATGTTGTCCAAGAG	<i>major piroplasm surface protein</i>	815	Tattiyapong <i>et al.</i> , 2014
Ts815R		GCAAGTGGTGAGAACTGTGCGAC			

DNA sequencing

Positive PCR products were purified by PCR clean-up and gel extraction kit (Bio-Helix, Taiwan) following the manufacturer's instructions, and then sequenced by commercial sequencing service (1st BASE DNA Sequencing Services, Malaysia). The nucleotide sequences

were analyzed by GenBank BLAST analysis in NCBI database (<https://blast.ncbi.nlm.nih.gov/Blast.cgi>).

Statistical analysis

Chi-square tests were used to compare the association of TBDs with age group and sex. $P < 0.05$ was considered statistically significant.

Results

Prevalence of *T. evansi*, *A. marginale*, and *Theileria sp.* in native cattle

Native cattle were singly infected with *A. marginale* (13.75%) and *Theileria sp.* (37.25%). In addition, they were coinfecting with *A. marginale* and *Theileria sp.* (29.41%). No *T. evansi* was detected in any cattle. There were 10 native cattle (19.61%) that were not infected with either pathogens (Table2). The highest prevalence was found in native cattle at >1-5 years of age (Table2) and female (cow and heifer) (Table3).

Table2: mPCR screening of native cattle blood samples categorized by age group.

Age (Years)	Number of mPCR positive animals (%)							No. of mPCR negative animals	Total no.
	A	T	Tr	A+T	A+Tr	T+Tr	A+T+Tr		
<1	0	8 (15.69)	0	9 (17.65)	0	0	0	4 (7.84)	21 (41.18)
1-5	7 (13.73)	10 (19.61)	0	5 (9.80)	0	0	0	3 (5.88)	25 (49.02)
5-10	0	1(1.96)	0	0	0	0	0	3 (5.88)	4 (7.84)
10-20	0	0	0	1 (1.96)	0	0	0	0	1 (1.96)
Total no.	7 (13.73)	19 (37.25)	0	15 (29.41)	0	0	0	10 (19.61)	51 (100%)

A, T, Tr indicates *A. marginale*, *Theileria sp.* and *T. evansi*, respectively.

Table3: PCR screening of native cattle blood samples categorized by sex.

Age (Years)	N	Number of mPCR positive animals (%)							No. of mPCR negative animals
		A	T	Tr	A+T	A+Tr	T+Tr	A+T+Tr	
Bull	13 (25.49)	0	8 (15.69)	0	3 (5.88)	0	0	0	2 (3.92)
Cow&Heifer	38 (74.51)	7 (13.73)	11 (21.57)	0	12 (23.53)	0	0	0	8 (15.69)
Total	51 (100)	7 (13.73)	19 (37.25)	0	15 (29.41)	0	0	0	10 (19.61)

A, T, Tr indicates *A. marginale*, *Theileria sp.* and *T. evansi*, respectively.

Sequence analysis

The positive samples from mPCR were analyzed by gene sequencing. It was found that PCR products positive for *T. evansi* showed 98.73-99.36% identity when compared with nucleotide sequences from GenBank accession No. MH649267.1, HM209054.1 and JQ030878.1. PCR products positive for *A. marginale* showed 97.21-97.69% identity when compared with nucleotide sequences from GenBank accession No. MH476205.1, KU647720.1

and KU647719.1. PCR products positive for *Theileria sp.* showed 89.67-98.94% identity when compared with nucleotide sequences from GenBank accession No. AB010703.1, AF236093.1, and AB010702.1 (Table3).

Table3: Nucleotide sequence homology of *VSG*, *major surface protein-1 β* encoding and *major piroplasm surface protein* compared to NCBI database

Homologous gene	Organism	Accession No.	BLAST Details			
			Max Score	Query Coverage (%)	Identity (%)	E-value
<i>VSG gene</i>	<i>Trypanosoma evansi</i>	MH649267.1	285	98	99.36	3e-73
<i>VSG gene</i>	<i>Trypanosoma evansi</i> isolate C6	HM209054.1	283	98	98.73%	1e-72
<i>VSG gene</i>	<i>Trypanosoma evansi</i> isolate TE CIV	JQ030878.1	281	98	98.73%	4e-72
<i>major surface protein-1β encoding</i>	<i>Anaplasma marginale</i> isolate CMVL/2017	MH476205.1	372	99	97.69	4e-99
<i>major surface protein-1β encoding</i>	<i>Anaplasma marginale</i> isolate F48e	KU647720.1	364	99	97.21	6e-97
<i>major surface protein-1β encoding</i>	<i>Anaplasma marginale</i> isolate F48a	KU647719.1	364	99	97.21	6e-97
<i>major piroplasm surface protein</i>	<i>Theileria sp.</i> isolate Kamphaeng Saen	AB010703.1	1351	96	98.94	0.0
<i>major piroplasm surface protein</i>	<i>Theileria sp.</i> Chaina(cattle)	AF236093.1	1000	98	89.90	0.0
<i>major piroplasm surface protein</i>	<i>Theileria sp.</i> isolate Easten Texas	AB010702.1	968	96%	89.67%	0.0

Risk factor analysis

Risk factor analysis revealed that TBDs were associated with age group but not with sex. (Table 4)

Table4: Risk factors associated with TBDs in dairy cattle.

Risk factor	Pearson Chi-square	
	Value	Asymp. Sig.(2-sided)
Age group	19.979	0.018
Sex	5.553	0.135

Discussion

TBDs are important disease in native cattle and are widely distributed in Thailand. Findings of this study showed that *Theileria sp.* had higher prevalence than *A. marginale* and *T. evansi*. These were similar from findings by Jirapattharasate *et al.*, 2016 and Rittisut *et al.*,

2018 who reported that *Theileria sp.* infection was the most prevalent in Thailand (as determined by molecular methods). In contrast, Ananyutthawongese *et al.*, 1999 found that *A. marginale* was more prevalent than *Theileria sp.* and *T. evansi* in beef cattle by mPCR detection in central region of Thailand.

Statistical analysis revealed that TBDs were associated with age group but not with sex. Likewise, Jirapattharasate *et al.*, 2016 reported that TBDs were not associated with either age group or sex. Further studies with larger sample sizes may be needed to draw conclusion on whether age group, sex, tick control program, farming system and previous history of tick infestation are risk factors for TBDs in native cattle.

Conclusion

This study determined the prevalence of TBDs for native cattle in Mae Ai district, Chiang Mai, Thailand using mPCR. *Theileria sp.* (37.25%) had highest prevalent, followed by *A. marginale* (13.73%) and *T. evansi* (0%). In addition, native cattle were coinfectd with *A. marginale* and *Theileria sp.* (29.41%). Statistical analysis revealed that TBDs were associated with age group but not with sex.

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References

- Ananyutthawongese, C., Saengsombut, K., Sukhumsirichat, W., Uthaisang, W., Sarataphan, N., & Chansiri, K. (1999). Detection of bovine hemoparasite infection using multiplex polymerase chain reaction. *ScienceAsia*, 25, 85-90.
- Bilgic, H. B., Karagenc, T., Simuunza, M., Shiels, B., Tait, A., & Eren, H. (2013). Development of a multiplex PCR assay for simultaneous detection of *Theileria annulata*, *Babesia bovis* and *Anaplasma marginale* in cattle. *Experimental Parasitology*, 133, 222-229.
- Bock, R. E., deVos, A. J., & Molloy, J. B. Tick-borne diseases of Cattle. (2006) Australian and New Zealand Standard Diagnostic Procedures, 1-29.
- Desquesnes, M., Holzmuller, P., Lai, D. H., Dargantes, A., Lun, Z. R., & Jittaplapong, S. (2013). *Trypanosoma evansi* and Surra: A Review and Perspectives on Origin, History, Distribution, Taxonom, Morphology, Hosts, and Pathogenic Effects. *BioMed Research International*, 2013, 1-22.
- Firdaus, F., Abdullah, J., Adamu, L., Yusuf, A., Abdul, W. H., & Abul, A. Z. (2013). Clinical management and outbreak of Babesiosis in a herd of cattle: A case. *Journal of Agricultural and Veterinary Science*, 4(4), 78-83.
- Henegariu, O., Heerama, N. A., Dlouhy, S. R., Vance, G. H., & Vogt, P. H. (1997). Multiplex PCR: Critical Parameters and Step-by-Step Protocol. *BioTechniques*, 23, 504-511.
- Jirapattharasate, C., Moumouni, P. F. A., Cao, S., Iguchi, A., Liu, M., Wang, G., & Zhou, M. (2016). Molecular epidemiology of bovine *Babesia spp.* and *Theileria orientalis* parasites in beef cattle from northern and northeastern Thailand. *Parasitology International*, 65, 62-69.
- Jongejan, F., & Uilenberg, G. (2004). The global importance of tick. *Parasitology*, 129, 3-14.
- Mans, B. J., Pienaar, R., & Latif, A. A. (2015). A review of *Theileria* diagnostics and epidemiology. *International Journal for Parasitology: Parasites and Wildlife*, 4, 104-118.
- Nava, S., Estrada-Peña, A., Petney, T., Beati, L., Labruna, M. B., Szabó, M. P., Venzal, J. M., Mastropaolo, M., Mangold, A. J., & Guglielmone, A. A. (2015). The taxonomic status of *Rhipicephalus sanguineus* (Latreille, 1806). *Veterinary Parasitology*. 208(1-2), 2-8.

- Ravindran, R., Rao, J. R., Mishra, A. K., Pathak, K. M. L., Babu, N., Satheesh, C. C., & Rahul, R. (2008). *Trypanosoma evansi* in camels, donkeys and dogs in India: comparison of PCR and light microscopy for detection—short communication. *Veterinarski Arhiv*, 78, 89–94.
- Rittisut, B., Sarkaou, P., & Na-Lamphang, K. (n.d.). Detection of blood parasites infection in native cattle in Chian Mai under the participatoy one health disease and detection project. *Journal of Agricultural Research and Extension*, 35(2), 32-45.
- Tattiyapong, M., Waiyakroot, M., Mohkeaw, K., Ngamjiteu, S. & Vongpakorn, M. (2014). Molecular characterization of *Theileria* spp. in ruminants. *Thai-NIAH eJournal*, 9(2), 1-17.

Phenotypic Characterization of Double Disruption *Arabidopsis* Plants for Sulfate Transporters SULTR2;1 and SULTR3;5

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Abstract

Sulfur (S) is an essential macronutrient for plants. Plants take up sulfur from the soil environment in the form of sulfate through the activity of sulfate transporters (SULTRs). Sulfate absorbed into root surface is carried to the vascular tissues, loaded into xylem stream, and taken up by the shoot cells where majority of sulfate is assimilated. Therefore, the process of sulfate uptake and translocation to shoots is the key steps of sulfate assimilation. SULTR2;1 and SULTR3;5 are low-affinity transporters responsible for root-to-shoot transport of sulfate in *Arabidopsis thaliana*. The simultaneous expression of SULTR2;1 and SULTR3;5 in yeast mutant lacking sulfate uptake ability increased the sulfate uptake rate three-times higher than that of SULTR2;1 single expression, suggesting SULTR3;5 stimulates the activity of SULTR2;1. To clarify their contribution in sulfate transport to shoot, we have isolated the double knockout, *sultr2;1sultr3;5*, and analyzed the sulfate uptake and distribution within the plants. Not as expected, root-to-shoot transport of sulfate was not reduced in *sultr2;1sultr3;5* compared to that in the single knockout. However, *sultr2;1sultr3;5* showed several developmental changes compared to wild-type (WT) even under sulfur sufficient conditions. *sultr2;1sultr3;5* flowered earlier than WT without any loss of plant biomass and seed yield. Early flowering phenotype, increase of plant biomass and seed yield would be beneficial for agriculture.

Keywords: *Arabidopsis thaliana*, Sulfate Transporters, Sulfur, Phenotypes.

Introduction

Sulfur (S) is an essential macronutrient for plants. Plants take up sulfur from the soil environment in the form of sulfate through the activity of sulfate transporters (SULTRs). Sulfate absorbed into root surface is carried to the vascular tissues, loaded into xylem stream, and taken up by the shoot cells where majority of sulfate is assimilated. So the process of sulfate uptake and translocation to shoots is the key steps of sulfate assimilation. Sulfate uptake and translocation to shoots were increased under sulfur deficiency (–S, Maruyama-Nakashita et al. 2015), as well as by cadmium (Cd) treatment (Yamaguchi et al. 2016). SULTR2;1 and SULTR3;5 are low-affinity sulfate transporters expressed in xylem parenchyma and pericycle cells in roots and respond for root-to-shoot transport of sulfate in *Arabidopsis*. The simultaneous expression of both SULTRs in the yeast mutant lacking sulfate

uptake exhibited three- times higher sulfate uptake activity than the single expression of *SULTR2;1* (Kataoka et al. 2004). In addition, *sultr2;1* and *sultr3;5* knockout decreased the sulfate translocation to shoots (Kawashima et al. 2011, Kataoka et al. 2004). However, sulfate transport to shoots in *sultr2;1sultr3;5* has not been analyzed.

Besides intensive studies about the functions of SULTRs, there are few reports analyzing the effects of their disruption on plant growth and development. There is a report detected the increase of seed weight and early flowering phenotype in the knockout lines of each SULTR3 (Zuber et al. 2010).

In this study, we analyzed the contribution of *SULTR2;1* and *SULTR3;5* to sulfate translocation to shoots by isolating and analyzing *sultr2;1sultr3;5* double knockout, as well as the growth and developmental phenotypes of the plant.

Methodology

Plant materials and growth conditions

Arabidopsis thaliana (cv. Columbia-0) were used. T-DNA insertion line for *SULTR2;1* (*sultr2;1*, SM_3_25663) and *SULTR3;5* (*sultr3;5*, SM_3_24050; Kataoka et al. 2004) were obtained from ABRC and homozygous lines were isolated.

Plant seeds were sterilized and grown on agar medium at 22 °C under 18h light/6h dark cycles. For sulfate uptake analysis, seedlings were grown vertically on agar medium. For –S media, sulfate concentration in the medium (1500 µM) was reduced to 15 µM by replacing the rest of MgSO₄ by the equal molar of MgCl₂. For Cd treatment, MGRL medium was supplemented with 20 µM CdCl₂. For the analysis of developmental phenotypes of plants on soil, each plant seeds were directly sown on Vermiculite. After germination, plant number was adjusted to 3 per pot and supplied with half MGRL solution twice a week under 23 °C, 24h light with 33 µmol m⁻²s⁻¹ light intensity.

Isolation of *sultr2;1sultr3;5* double knockout

Leaves of *F2* progeny between *sultr2;1* and *sultr3;5* were used for genomic DNA extraction and the candidate lines were selected by polymerase chain reaction (PCR). The candidate lines were trans-planted to the soil and the *F3* seeds were obtained. The *F3* seedlings were analyzed again by genomic PCR, and then by reverse transcription-PCR (RT-PCR) to confirm the disruption of the transcripts. The *F4* seeds were used for the experiments.

Analysis of sulfate uptake and distribution

The plant roots vertically grown on the agar media for were sunk in the liquid media containing 15 µM [³⁵S] sulfate for 1 hour. Plant roots were rinsed twice with the liquid media, and soaked for several hours. Then, plant roots and shoots were collected, weighed and extracted with 0.1 M HCl. After mixing with liquid scintillator, [³⁵S] content was analyzed using the Liquid Scintillation Counter.

Analysis of sulfur containing metabolites

The samples were washed with distilled water and dried with kitchen paper, weighed, and frozen in liquid nitrogen. After ground, the samples were extracted with 5 times of 10 mM HCl, centrifuged at 12,000 rpm, 15 min, 4°C and the supernatant was used as the extract. The extracts were diluted to 100 times with ultrapure water and analyzed sulfate content by ion

chromatograph. Cysteine and glutathione content was analyzed with HPLC after labeling with monobromobimane.

Analysis of developmental phenotypes

Shooting time was counted as the day after sowing (DAS) when the bolting became 0.5 cm tall. The rosette leaf number was counted and weight after bolting. The growth was observed every day. Plant height was measured in every 5 days after 35 DAS. Silique numbers were counted on 50 DAS. Siliques were harvested when they had turned brown but before they dropped seeds. The siliques and seeds were separated with forceps, and the seed numbers per silique and silique length were measured.

Element analysis

Carbon, hydrogen, and nitrogen contents in seeds were analyzed using elemental analyzer. Sulfur and Phosphorus content were analyzed by Inductivity Coupled Plasma Mass Spectrometry. One mg seed powder was digested with nitric acid, filled up to 1 mL and then diluted to 10 times.

Results

Isolation of *sultr2;1sultr3;5* double knockout

SULTR2;1 and *SULTR3;5* expression was not detected in *sultr2;1sultr3;5*, but were expressed in wild-type (WT), which indicated that we succeeded in getting the double mutant.

Sulfate uptake and distribution

Sulfate uptake and distribution were increased under –S compared to that under sulfate sufficiency (+S). The uptake and distribution of sulfate were not significantly different among the plant lines and also the metabolite levels under the same conditions.

The uptake and distribution of sulfate were increased by Cd treatment, but they were not significantly different among the plant lines and also the metabolite levels under the same conditions.

Developmental phenotypes and element contents

All plants grow similarly on the soil before bolting. Rosette leaf number and the fresh weight were similar among the plants. WT began bolting 25 DAS, and ended by 31 DAS. *sultr2;1* and *sultr3;5* started bolting 3 to 4 days faster than WT and completed by 26 DAS. *sultr2;1sultr3;5* bolted earliest, started at 21 DAS and completed by 25 DAS.

Plant height of *sultr2;1sultr3;5* were higher than that of WT from the beginning of bolting to the maturation, but became equal to the others finally. Lateral stems were increased in *sultr2;1sultr3;5* compared to WT, *sultr2;1* and *sultr3;5*. Stem dry weight of *sultr2;1sultr3;5* increased 25% more than that of other plant lines. *sultr2;1sultr3;5* increased total number of siliques. Although the number of siliques were increased, the silique length was lowered in *sultr2;1sultr3;5* than the others, resulted in the decreased seed numbers in a silique.

The total seed weight per plant was increased in *sultr2;1sultr3;5* twice of the others. Seed weight was not different among the plant lines. Element levels in seeds were not different among the plant lines.

Discussion

Sulfate distribution to shoots was expected to decrease in *sultr2;1sultr3;5*, as SULTR2;1 and SULTR3;5 were reported to synergistically stimulate sulfate translocation to shoots by increasing the uptake into pericycle and xylem parenchyma cells. However, sulfate distribution to shoots were neither decreased in *sultr2;1sultr3;5* under –S nor Cd treatment. Existence of other SULTRs to which contribute sulfate transport can be expected.

Unexpected but useful phenotypes have been detected in *sultr2;1sultr3;5*, such as early flowering, increase of lateral shoots and seed yields. Photoperiod and a phytohormone gibberellic acid (GA) were known to control the flowering time of plants. Lateral shoots development is controlled by phytohormones such as auxin, cytokinin and strigolacton. The connection between these phenotypes and SULTR disruption can be analyzed in near future.

Conclusions

Sulfate uptake and distribution into shoots were neither decreased in *sultr2;1sultr3;5* under –S nor Cd treatment. *sultr2;1sultr3;5* flowered earlier than WT without any loss of plant biomass and seed yield. Early flowering phenotype, increase of plant biomass and seed yield would be beneficial for agriculture.

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References

- Kataoka, T., Hayashi, N., Yamaya, T. and Takahashi, H. (2004) Root-to-shoot transport of sulfate in *Arabidopsis*: Evidence for the role of SULTR3;5 as a component of low-affinity sulfate transport system in the root vasculature. *Plant Physiology*, 136: 4198-4204.
- Kawashima, C., Matthewman, C.A., Huang, S., Lee, B.R., Yoshimoto, N., Koprivova, A., Rubio-Somoza, I., Todesco, M., Rathjen, T., Saito, K., Takahashi, H., Dalmay, T. and Sopriya, S. (2011) Interplay of SLIM1 and miR395 in the regulation of sulfate assimilation in *Arabidopsis*. *The Plant Journal*, 66: 863-876.
- Maruyama-Nakashita, A., Watababe-Takahashi, A., Inoue, E., Yamaya, T., Saito, K. and Takahashi, H. (2015) Sulfur-responsive elements in the 3'-nontranscribed intergenic region are essential for induction of *SULFATE TRANSPORTER 2;1* gene expression in *Arabidopsis* roots under sulfur deficiency. *The Plant Cell*, 27: 1279-1296.
- Yamaguchi, C., Takimoto, Y., Ohkama-Ohtsu, N., Hokura, A., Shinano, T., Nakamura, T., Suyama, A. and Maruyama-Nakashita, A. (2016) Effects of cadmium treatment on the uptake and translocation of sulfate in *Arabidopsis thaliana*. *Plant and Cell Physiology*, 57(11): 2353-2366.
- Zuber H., Davadia, J.C., Aubert, G., Aime D., Belghazi, M., Lugan, R., Heintz, D., Wirtz, M., Hell, R., Thompson, R. and Gallardo, K. (2010) The seed component of *Arabidopsis* mutants for the group 3 sulfate transporters indicates a role in sulfate translocation within developing seeds. *Plant Physiology*, 154: 913-926.

True metabolizable energy contents of bio-fuel byproduct feedstuffs in adult roosters

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Abbreviations: DDGS, distillers dried grains with soluble; CM, copra meal; PKM, palm kernel meal; JM, jatropha meal; AME, apparent metabolizable energy; AMEn, nitrogen-corrected apparent metabolizable energy; TME, true metabolizable energy; TMEn, nitrogen-corrected true metabolizable energy; CTTAR_s, coefficient of total tract apparent retentions; ANR, Apparent nitrogen retained; TNR, True Nitrogen retained; TF, tested Feedstuff; PF, physical form; E, enzyme (beta-mannanase); DM, dry matter; DMD, dry matter digestibility; N, nitrogen; CP, crude protein; EE, Ether extract; OM, organic matter; CHO, Total carbohydrate.

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ABSTRACT

Distillers dried grains with soluble (DDGS), copra meal (CM), palm kernel meal (PKM) and jatropha meal (JM) are bio-fuel byproducts, those are a valuable sources of energy as an acceptable feed ingredient for poultry. Two metabolic experiments were conducted to evaluate the metabolizable energy values, nutrient balances and coefficient of total tract apparent retentions (CTTAR_s) of nutrient contents of four feedstuffs (DDGS, CM, PKM and JM) in a randomized complete block design with a 4 × 2 factorial arrangement. Two physical forms (mash vs. pellet) of 4 feedstuffs were used in experiment 1 (Exp 1), and two levels of beta-mannanase (0% vs. 0.25%) were mixed with prepared feedstuffs (DDGS, CM, PKM and JM) in experiment 2 (Exp 2). A precision fed rooster assay was used in both Exp 1 and Exp 2, with ten adult roosters (32 wk of age) in each. All roosters were fasted for 24h, in which each prepared sample was tube fed (30g) to a rooster, and other 2 roosters were simultaneously fasted to determine endogenous nitrogen and energy losses. Whole excreta voided from both fasted and fed roosters were collected for 48h. The values of dry matter digestibility (DMD), apparent nitrogen retained (ANR), true nitrogen retained (TNR), CTTAR_s, apparent metabolizable energy (AME), AME corrected for endogenous nitrogen loss (AMEn), true metabolizable energy (TME) and TME corrected for endogenous nitrogen loss (TME_n) of the pellet form were increased ($P < 0.001$) in all treatments. This finding shown the CTTAR_s value of total carbohydrate did not affected ($P = 0.181$) by physical form. Beta-mannanase (0.25%) was improved ($P < 0.001$) the DMD, ANR, TNR, CTTAR_s, AME, AMEn, TME and TME_n contents

of DDGS, CM, PKM and JM. These data indicated that pellet and beta-mannanase (0.25%) improved nutrient availability of DDGS, PKM, CM and JM in adult rooster.

Key words: True metabolizable energy, distillers dried grains with soluble, palm kernel meal, copra meal, jatropha meal.

1. Introduction

There are several bio-fuel byproducts can supply a significant amount of energy to poultry diets, those are including distillers dried grains with solubles (DDGS), palm kernel meal (PKM), copra meal (CM), jatropha (*Jatropha curcas* L.) meal (JM). Those by-products are a valuable sources of energy as an acceptable feed ingredient for poultry (Zanu et al., 2012; Sundu et al., 2009; Akbar et al., 2009; Wang et al., 2007; Lumpkins et al., 2004). The utilization of DDGS, PKM, CM and JM as an alternative energy and protein sources for monogastric animal has been increased (Annongu et al., 2010a; Khanongnuch et al., 2006).

The metabolizable energy content of diet is well known to be improved by pellet processing (Parsons et al., 2006). There is limited research evaluating beneficial effect of pellet on nutrient availability of feedstuffs. The metabolizable energy value of DDGS in mash form is varied (Kim et al., 2008; Batal and Dale, 2006; Fastinger et al., 2006; Noll et al., 2007), but the study on metabolizable energy of CM, PKM and JM is limited. Moreover, high fiber feed ingredient is well known to supply with nutrient enhancer as well as beta-mannanase which is widely used in poultry diet. Beta-mannanase is an enzyme that could breaks down compounds of non-starch polysaccharide (NSP) including mannan, which believed to attribute the variation of nutrient availability of DDGS, PKM, CM and JM in the diets (Carrión et al., 2011; Sundu et al., 2009; Dairo and Fasuyi, 2008; Muangkeow and Chinajariyawong, 2009). In our best knowledge, the metabolizable energy contents of DDGS, PKM, CM and JM by using single ingredient with both pellet and beta-mannanase is unknown.

Therefore, to find whether mash vs pellet, and with vs without beta-mannanase treatment of DDGS, PKM, CM and JM may exert some difference on its nutrient availability. The objectives of this study is to evaluate the effect of pellet and beta-mannanase treatment on nutrient balances, coefficient of total tract apparent retentions (CTTAR_s), apparent metabolizable energy (AME), AME corrected for endogenous nitrogen loss (AME_n), true metabolizable energy (TME) and TME corrected for endogenous nitrogen loss (TME_n) contents of DDGS, PKM, CM and JM by using adult roosters bio-assay.

2. Materials and methods

2.1. Samples preparation

In experiment 1 (Exp 1), the DDGS, PKM and CM samples were obtained from the local feed company (Hanilfeed Company, Gyunggi-do 446-930, Korea). Jatropha meal was obtained from the KOLAO Company (LAOS). All feedstuffs were ground using a Shin Shin mill (model 199, Shin Shin industry machinery Co., LTD, Seoul, Korea) equipped with a 1 mm sieve as a final product of tested feedstuffs (TF) for mash form. And all other remaining of mash samples were subjected to pellet processing by using a Kahl pellet mill (Amandus Kahl, Hamburg, Germany) equipped with a ring die and a cutter to make an appropriate size of pellet (diameter: 4mm, length: 6mm) in un-steam conditioning, and temperature ($65 \pm 0.5^{\circ}\text{C}$) of pellet output was recorded, since the temperature above 65°C might be affected nutrient contents of feedstuffs. Prepared physical forms (PF) of both mash and pellet were stored in the room temperature for further forced-feeding trial.

In experiment 2 (Exp 2), beta-mannanase (E, enzyme) was purchased from the local feed company (South Korea) and stored in refrigerator (4°C) for further use. The mash of prepared samples (DDGS, PKM, CM and JM) were mixed with E at the level of 0.25%, and other mash samples of TF without E were used as a control. To avoid unexpected contamination, the mixture was done at the time before starting force-feeding trial.

2.2. Roosters and housing

Twenty Single Comb White Leghorn adult roosters 32-wk-old (average body weight: 2,602 g/bird), were randomly assigned into an individual stainless steel cages (50cm long × 40cm wide × 50cm high) with plastic tray bottoms (excreta collector) and equipped with trough feeder and nipple waterer in closed house (25.20 ± 1.30 °C). During acclimatization period, all roosters were fed with standard commercial diet and water was provided for *ad libitum* consumption. Drinking water was supplied with vitamin or stress releaser (Permasol-500, Vitamins + Amino Acid + Electrolyte, Choong Ang Biotech. CO., LTD, Korea). The roosters were raised and handled to meet the protocol approved by The Kangwon National University Animal Care and Use Committee (Republic of Korea).

2.3. TME bioassay

The TME bioassay with the rooster was done according to the method developed by Sibbald (1986) that reissued by Dudley-Cash (2009), slightly adjusted for both Exp 1 and Exp 2 as briefly in the followings:

In Exp 1, using ten roosters for each round, four for mash and four for pellet of DDGS, PKM, CM and JM (each sample for a rooster), and other 2 roosters for negative control. All the roosters were deprived of feed for 24h to ensure that their alimentary canals were empty. Cleaned plastic tray was placed under each cage for total excreta collection, time was recorded. Thirty grams (as-basis) of each prepared sample was force-fed into crop of the rooster by using a stainless steel funnel with 34.5 cm stem (external diameter: 0.9 cm, internal diameter: 0.7 cm). Another 2 roosters were simultaneously fasted to estimate endogenous nitrogen and energy losses. Excreta samples voided from both fed and fasted birds were collected quantitatively for 48h and freeze dried (at -80°C). After 10 days of acclimatization period, the same assay was repeated for to meet the total of 6 replicates for each treatment. Both TF and dried excreta samples were ground to pass through a 0.5 mm sieve and kept at room temperature for further proximate analysis.

In Exp 2, using another 10 roosters, four for TF without E, and four for TF with E (0.25% of mixture as mentioned above), and other 2 roosters for negative control. The precision steps of bioassay were carefully followed as defined in Exp 1, to meet the total of 6 replicates for each treatment.

2.4. Pellet hardness

Pellet hardness of DDGS, PKM, CM and JM were tested by using Handpi Manual Test Stand Analyser (Digital Force Gauge, Model HLD, Yueqing Handpi Instruments Co., Ltd, China) using the method described by Svihus et al. (2004). Individual pellets (10 per each feedstuff) were inserted between a pressure piston and a bar, and by increasing pressure applied manually for the piston to break the pellets, the force (*Newton*) was determined (Table 1).

2.5. Chemical analyses

In Exp 1 and Exp 2, triplicate samples of both ground TF (Table 1) and excreta samples were analyzed as described by AOAC (2006) for dry matter (DM; method 930.15), ash (method 942.05), ether extract (EE; method 920.39A), crude protein (CP; N×6.25; method 988.03) using Kjeltac analyzer (Model 2300, Foss Tecator, Sweden). Gross energy (GE) was determined using oxygen bomb calorimeter (Model 1261, Parr Corp, USA).

Table 1

Nutrient contents and pellet hardness of distillers dried grains with soluble (DDGS), copra meal (CM), palm kernel meal (PKM) and jatropha meal (JM)¹

Variable (g/kg)	DDGS	CM	PKM	JM
Dry matter	849.80	922.29	923.70	922.70
Gross energy, MJ/kg	19.54	21.08	22.41	24.22
Nitrogen	35.44	30.42	22.57	27.42
Crude protein	221.52	190.12	141.04	171.41
Ether extract	49.24	29.56	66.50	79.65
Ash	68.17	62.58	48.66	48.48
Organic matter	781.64	859.71	875.04	874.21
Total carbohydrate	510.88	640.03	667.50	623.15
Pellet hardness ² , <i>Newton</i>	24.59	87.31	105.92	42.05

¹ All analyses were conducted in triplicate.

² N = 10.

2.6. Calculations

In both Exp 1 and Exp 2, the CTTAR value was calculated using the formula described by Zhang et al. (2011). Ash value was subjected to calculate organic matter (OM) by subtraction of ash from the DM content (Kawauchi et al., 2011). Total carbohydrate (CHO) contents were calculated by subtraction (protein + fat + ash) from the DM content. Apparent nitrogen retained (ANR) was calculated by subtraction of nitrogen output [ANR (g) = (N intake (g) – N output (g))]. True nitrogen retained (TNR) was calculated by the following formula; TNR (g) = [ANR + N excreted by fasted roosters (g)]. The gross energy contents of both feedstuffs and excreta samples were subjected to calculate for the values of AME, AME_n, TME and TME_n (Sibbald, 1986; Dudley-Cash, 2009).

2.7. Statistical analyses

Nutrient balances (total nutrient intake and total nutrient output), DMD, ANR, TNR, CTTAR_s, AME, AME_n, TME and TME_n data were statistically analyzed using the MIXED procedure of SAS (Version 9.2; SAS Inst. Inc., Cary, NC, USA) in a randomized complete block design with a 4 × 2 factorial arrangement, having 6 rounds (6 replicates), each round was a blocking factor. The models included main effects of tested feedstuffs (DDGS, PKM, CM and JM) and physical form (mash or pellet: Exp 1) or E (with or without E: Exp 2), and all two way interactions. The model was: $Y_{ij} = \mu + \alpha_i + t_j + (\alpha t)_{ij} + e_{ij}$, where Y_{ij} is the observed dependent variable; μ is the overall mean; α_i is the main effect of tested feedstuffs; t_j is the main effect of physical form (Exp 1) and/or E (Exp 2); $(\alpha t)_{ij}$ is the interaction between tested feedstuffs and physical form (Exp 1) and/or E (Exp 2); and e_{ij} is the random error. Differences were considered to be significant at $P < 0.05$ using the least significant difference test as described by Steel et al. (1997). All values are expressed as treatment means with their pooled standard error of the mean (SEM).

3. Results

3.1. Nutrient balances of tested feedstuffs

In Exp 1, effects of physical form (mash vs pellet) on nutrient balances of DDGS, CM, PKM and JM are shown in Table 2. There were significant interactions between mash and pellet

of TF on nutrient balances ($P < 0.001$). Moreover, DMD, ANR and TNR of all TF were affected ($P < 0.001$) by PF. On the other hand, the DDGS and PKM digestibility was improved ($P < 0.001$) by pellet. A significant interaction was also observed on nitrogen retention for all TF, PKM and JM had marked ($P < 0.001$) impacts on ANR and TNR.

In Exp 2, as presented in Table 3, there were significant interactions between TF with and without E on nutrient balances ($P < 0.001$). Although $E \times TF$ interaction had marked ($P < 0.001$) impacts on all treatments, increasing DMD, ANR and TNR were observed in all TF of E (+) treatment.

3.2. *Coefficient of total tract apparent retentions*

In Exp 1, the CTTAR_s of nutrient contents of TF were significant interaction between mash and pellet ($P < 0.001$, Table 4). The CTTAR_s of DM, GE, N, CP, EE, ash, OM in all TF were improved ($P < 0.001$) by pellet. Excellent improvement of the CTTAR_s of all nutrient contents was observed in DDGS compared with other TF. In contrast, the CTTAR_s of CHO of all TF was not affected ($P = 0.181$) by PF.

In Exp 2, effects of E on the CTTAR_s contents of DDGS, CM, PKM and JM are shown in Table 5. Although significant ($P < 0.001$) interactions between with and without E treatment of all TF, with E treatment was indicated greater ($P < 0.001$) CTTAR_s value than the control.

3.3. *Apparent and true metabolizable energy*

In Exp 1, as noted in Table 6, pellet was improved AME, AMEn, TME and TMEn contents of DDGS, CM, PKM, and JM, resulted in a significant ($P < 0.001$) $PF \times TF$ interaction. Moreover, a comparison between mash and pellet was also performed within each TF, the contents of AME, AMEn, TME and TMEn of DDGS, CM, and JM were improved ($P < 0.001$) by pellet.

In Exp 2, as presented in Table 7, there were significant interactions between E and without E on the AME, AMEn, TME and TMEn contents of all TF, resulted in a significant ($P < 0.001$) $E \times TF$ interaction. Moreover, the AME, AMEn, TME and TMEn contents of DDGS, PKM, and JM were higher for E treatment ($P < 0.001$) than for the without E. However, poorest improvement values of AME, AMEn, TME and TMEn was observed in CM ($P < 0.001$).

4. Discussion

4.1. *Experiment 1*

The present result demonstrated that mechanical friction pellet was improved AME, AMEn, TME and TMEn values of DDGS, CM and JM, whereas, PKM did not influenced by this friction pellet processing. It is clear that several studies (Parsons, 2004; Behnke and Beyer, 2002; Behnke, 2001) have been reported in the same agreement that pellet feed is improved nutrients digestibility that led to increase growth performance and beneficial effect in poultry production, due to improving the metabolizable energy values of pelleted ingredient itself may lead to improve pelleted feed (Zelenka, 2003). It is clear from our previous study (Keohavong et al., 2012) that highest level content of non-starch polysaccharide (NSP) including mannan in the PKM as indicated in highest pellet hardness (105.92 *Newton*) that could be influenced the values of AME, AMEn, TME and TMEn. Moreover, the magnitude of ingredient itself could be influenced on the metabolizable energy values of the ingredients including DDGS, PKM, CM (Keohavong et al., 2012) and JM as well.

The requirement of ANR value by adult roosters was ranged 1.3 to 1.8 g/bird/d (Lopez and Leeson, 2007), negative value of ANR in the present result influenced by the ANR intake lower than the level of its requirement mentioned above. The present experiment was provided nitrogen intake less than that level mentioned above. This result also found that mechanical

friction pellet was improved DM digestibility of DDGS, PKM and JM, but did not affected on the DM digestibility of CM. It was observed that improving in the DM digestibility of the ingredient itself may lead to increase nutrient digestibility of the pelleted diets (Zelenka, 2003).

True metabolizable energy corrected for nitrogen (TME_n) content in DDGS has been reported varied, since NRC (1994) recommended that TME_n content in DDGS of 11.99 MJ/kg for poultry. The TME_n value of DDGS from difference sources are varies. A large variation in TME_n values of DDGS was also reported by Parsons et al. (2006), who determined the mean TME_n value of 20 DDGS samples to be 11.98 MJ/kg with a range spanning 1.87 MJ/kg. In mash form, this result found similar value of TME_n (14.98 MJ/kg) content in DDGS compared to early report by Kim et al. (2008) who determined the TME_n contents of conventionally processed DDGS with the value of 13.67 MJ/kg, that outside the range of TME_n values reported for DDGS by Batal and Dale (2006) and by Fastinger et al. (2006). Batal and Dale (2006) showed that determined TME_n contents ranged from 10.43 to 13.36 MJ/kg with a mean of 11.81 MJ/kg. The TME_n of DDGS determined by Kim et al. (2008) was within the range reported by Noll et al. (2007) after adjusting the rate of solubles addition to the DDGS. Therefore, there was no supplished data of the TME_n content in DDGS by using pelleted DDGS estimation. The present study found that mechanical friction pellet could be increased TME_n content in DDGS up to 4.95 % as compared with mash form. This result was agreed with Fastinger et al. (2006), they reported that the TME_n values of DDGS usually higher than 50 % of its gross energy content.

The TME content in PKM (12.19 MJ/kg) of this experiment was similarly with reported by Muangkeow and Chinajariyawong (2009) who demonstrated that TME content in mash PKM was 12.38 MJ/kg by using adult roosters bioassay, but the pelleted PKM estimation was not available. However, this finding was failed to find any significant difference of the metabolizable energy contents in PKM between mash vs pellet forms. In our previous research (Keohavong et al., 2012) demonstrated that TME_n content in PKM was decreased from 11.39 MJ/kg (mash form) to 10.46 MJ/kg (pellet form) by meat type rooster bioassay, which lower than our present results. In contrast, this experiment showed that TME_n content in CM was lower than our previous report (Keohavong et al., 2012), which its TME_n value ranged from 13.14 MJ/kg (mash form) to 12.22 MJ/kg (pellet form). Furthermore, the content of AME of CM was well known (Dairo and Fasuyi, 2008; Khanongnuch et al., 2006). Different species, their energy digestibility also differ. The present finding was relatively lower than previous reported by Khanongnuch et al. (2006) and Dairo and Fasuyi (2008) who showed that the AME content of CM was 13.48 MJ/kg (for broiler chicken) and 12.56 MJ/kg (for layer chicken), respectively. However, the use of Jatropha seed or kernel meal supplemented in poultry diets are well documented (Bruins, 2012; Annongu et al., 2010a; Boguhn et al., 2010; Pasaribu et al., 2010; Wina et al., 2010; Sumiati et al., 2007; Chivandi et al., 2006). So far, there was no publication on the true metabolizable energy content in JM by using adult rooster bioassay. Therefore, the impact of pellet processing on energy values of by-product plant protein ingredients could be different by its source.

Recent research had shown significant positive effects of pellet processing feed ingredients on the CTTAR_s of nutrients. Negative data on the CTTAR_s values of N, CP and ash caused by insufficient amounts of the bird's requirement, which lower total intake than their excretion. Since, protein value was calculated by N x 6.25 factor, therefore negative value of CTTAR's protein caused by negative CTTAR's nitrogen. Generally, adult cockerel required 1.3 to 1.8 g/bird/d of their nitrogen retention (Lopez and Leeson, 2007). It is well established that CTTAR of feed ingredient is dependent not only on feed sources but also on the chemical compositions of feed ingredient (Zhang et al., 2011). The bioassay using for this experiment was carried out every 10 days. It was therefore possible to carry out assays on the same group of birds every 10 days with no apparent effect on their well-being. During the experiments,

roosters showed no signs of discomfort and weight loss between the feed-deprived birds and the fed birds. Yalcin and Onol (1994) reported that feed deprived 2.5 kg-cockerels excreted 5.0 ± 0.31 g during 48 h without feed, which similar to the present study that feed deprived roosters weighing 2.34 kg/bird voided on average 6.31 ± 0.79 g of dry excreta during the 48 h collection periods of the experiment.

In conclusion, the data from this study provide some evidence that DDGS, PKM, CM and JM of both mash and pellet forms could be a good alternative feed ingredient sources to supply the energy requirements for chicken diets. Pellet processing improved the AME, AME_n, TME and TME_n values of DDGS, CM and JM, but did not improve that of PKM. This study can be said that the DM digestibility of DDGS, PKM and JM could be improved by pellet processing, whereas, the CM did not affected by this mechanical friction process. This study highlights the opportunity to improve nutrient availability of the DDGS, PKM, CM and JM through manipulation of physical forms. To explain the variation of the CTTAR_s values, the mechanism of this action still needs further research.

4.2. Experiment 2

Present results show that the TME_n content in DDGS had similar trend to the previous reported (Fastinger et al., 2006). Usually, the TME_n of DDGS is close to 60 % of its gross energy content, similar to the relationship between gross energy and TME_n in other protein-rich ingredients, such as soybean meal. Fastinger et al. (2006) showed that both gross energy and TME_n contents of DDGS were 20.51 and 12.02 MJ/kg, respectively. These values suggest that using growing broiler chickens, the gross and metabolizable energy contents of DDGS from fuel-ethanol production to be 19.77 and 9.99 MJ/kg, respectively. A large variation in TME_n values of DDGS was also reported by Parsons et al. (2006), who determined the mean TME_n value of 20 DDGS samples to be 11.98 MJ/kg with a range spanning 1.99 MJ/kg. A TME_n value of 11.93 MJ/kg for DDGS, based on a survey of published TME_n values. This value was about 4% lower than the TME_n value determined for the same DDGS sample using cockerels, similar to the relationship between apparent and TME_n in corn grain. Present results has also show that mannanase treatment could be improved the TME_n value of PKM, CM and JM up to 55.10 %, 53.22 % and 52.26 % of its gross energy content, respectively. A poorest AME content of PKM was known, the modern technologies have been developed in palm oil industry, and PKM product was produced with 9.45 MJ/kg of its metabolizable energy value (Sundu et al., 2009). This modern technology has been consistently developed for improvement of both oil/biodiesel and its by-product. That may cause the level of metabolizable energy of PKM has been increased up to 11.68 MJ/kg in three years later (Dairo and Fasuyi, 2008). Therefore, the oil extraction processes and the oil content in the origin feedstuffs may affect this by-product (PKM) that producing varies in metabolizable energy values. However, the different ages and/or strain of birds probably also contributes to the difference levels of the metabolizable energy (Sundu et al., 2009). So far, there was no study on the TME and/or TME_n values of CM. The true metabolizable energy study for CM is limited, but there are some studies have been evaluated on the ME and/or AME values of CM for poultry (Dairo and Fasuyi, 2008; Khanongnuch et al., 2006). Currently, Dairo and Fasuyi (2008) showed that the metabolizable energy content of CM by layer chicken was 12.56 MJ/kg. The present finding was relatively lower than previous reported by Khanongnuch et al. (2006), who showed that metabolizable energy content of CM by broiler chicken was 13.48 MJ/kg. As well known that metabolizable energy is the digestible energy minus the losses of energy through the urinary nitrogen, to find the true metabolizable energy is needs to correct for nitrogen losses. Differences in protein and fat contents of CM depending on the CM extraction processes and its coconut origin may lead to varies in the TME and/or TME_n values of CM. By far, no study using JM itself (single ingredient) to evaluate its metabolizable energy, therefore both apparent and true metabolizable energy values of Jatropha meal itself are unknown. Some investigations using JM supplemented

in the diet for the ME estimation. The detoxified *Jatropha* meal has been well documented vary levels in poultry diet supplementation, and it could be used up to 20% in finisher broiler diets without affecting on the growth performance and its metabolizable energy ranged between 10.48 to 13.19 MJ/kg (Sumiati et al., 2007).

In the conclusion, it can be said that the energy content in DDGS, PKM, CM and JM could be used efficiently by roosters in a mannanase treatment group, and highest value was observed on the DDGS forced-fed birds. Therefore, it can be suggested that mannanase supplementation with 0.25% is would be recommended to improve metabolizable energy contents in DDGS, PKM, CM and JM for poultry. Further research must be undertaken.

Table 2

Experiment 1: Effects of physical forms (mash vs pellet) on nutrient balances of distillers dried grains with soluble (DDGS), copra meal (CM), palm kernel meal (PKM) and jatropha meal (JM)

Variable	DDGS		CM		PKM		JM		Tested feedstuffs (TF)				Physical forms (PF)		SEM ¹	P-value		
	Mash	Pellet	Mash	Pellet	Mash	Pellet	Mash	Pellet	DDGS	CM	PKM	JM	Mash	Pellet		PF	TF	PF×TF
Total nutrient intake (g)																		
Dry matter	25.18 ^h	25.81 ^g	27.31 ^e	28.03 ^b	26.90 ^f	28.52 ^a	27.56 ^d	27.80 ^c	25.49 ^b	27.67 ^a	27.71 ^a	27.68 ^a	26.74 ^b	27.54 ^a	0.52	<0.001	<0.001	<0.001
Gross energy, MJ	0.48 ^h	0.52 ^g	0.55 ^f	0.62 ^d	0.58 ^e	0.67 ^b	0.66 ^c	0.68 ^a	0.50 ^d	0.58 ^c	0.62 ^b	0.67 ^a	0.57 ^b	0.62 ^a	0.03	<0.001	<0.001	<0.001
Nitrogen	0.93 ^a	.088 ^b	0.83 ^d	0.86 ^c	0.57 ^h	0.68 ^g	0.78 ^e	0.73 ^f	0.90 ^a	0.81 ^b	0.63 ^d	0.76 ^c	0.78	0.79	0.05	0.437	<0.001	<0.001
Crude protein	5.78 ^a	5.51 ^b	5.16 ^d	5.36 ^c	3.60 ^h	4.23 ^g	4.89 ^e	4.60 ^f	5.65 ^a	5.26 ^b	3.92 ^d	4.74 ^c	4.86	4.92	0.30	0.411	<0.001	<0.001
Ether extract	0.80 ^g	1.72 ^d	0.58 ^h	1.06 ^f	1.62 ^e	2.08 ^c	2.24 ^a	2.17 ^b	1.26 ^c	0.82 ^d	1.85 ^b	2.21 ^a	1.31 ^b	1.76 ^a	0.31	<0.001	<0.001	<0.001
Crude ash	1.69 ^d	1.79 ^b	1.44 ^e	2.03 ^a	0.10 ^f	1.72 ^c	0.10 ^f	1.69 ^d	1.74 ^a	1.73 ^a	1.36 ^b	1.35 ^b	1.28 ^a	1.81 ^a	0.19	<0.001	<0.001	<0.001
Organic matter	19.45 ^g	20.41 ^f	23.42 ^d	24.16 ^c	23.14 ^e	25.38 ^a	24.32 ^b	24.07 ^c	19.93 ^c	23.79 ^b	24.26 ^a	24.20 ^a	22.58 ^b	23.51 ^a	0.89	<0.001	<0.001	<0.001
Total carbohydrate	12.87 ^f	13.18 ^e	17.67 ^c	17.74 ^c	17.93 ^b	19.07 ^a	17.19 ^d	17.31 ^d	13.03 ^d	17.71 ^b	18.50 ^a	17.25 ^c	16.42	16.83	0.87	0.106	<0.001	<0.001
Total nutrient output (g)																		
Dry matter	17.21 ^d	15.98 ^e	21.99 ^c	22.76 ^{bc}	24.12 ^a	24.11 ^a	23.29 ^{ab}	22.29 ^{bc}	16.59 ^c	22.38 ^b	24.12 ^a	22.79 ^b	21.65	21.29	2.53	0.147	<0.001	<0.001
Gross energy, MJ	0.30 ^e	0.31 ^e	0.42 ^d	0.46 ^{bc}	0.47 ^{ab}	0.49 ^a	0.44 ^{cd}	0.43 ^d	0.31 ^c	0.44 ^b	0.48 ^a	0.44 ^b	0.41 ^b	0.42 ^a	0.05	0.050	<0.001	<0.001
Nitrogen	1.14 ^c	1.15 ^c	1.12 ^c	1.13 ^c	1.17 ^c	1.04 ^d	1.68 ^a	1.41 ^b	1.14 ^b	1.13 ^b	1.11 ^b	1.55 ^a	1.28 ^a	1.18 ^b	0.16	<0.001	<0.001	<0.001
Crude protein	7.10 ^c	7.18 ^c	7.01 ^c	7.07 ^c	7.31 ^c	6.49 ^d	10.50 ^a	8.84 ^b	7.14 ^b	7.04 ^b	6.90 ^b	9.67 ^a	7.98 ^a	7.39 ^b	0.02	<0.001	<0.001	<0.001
Ether extract	0.15 ^g	0.22 ^e	0.47 ^d	0.57 ^c	0.77 ^b	0.84 ^a	0.06 ^h	0.18 ^f	0.19 ^c	0.52 ^b	0.80 ^a	0.12 ^d	0.36 ^b	0.45 ^a	0.13	<0.001	<0.001	<0.001
Crude ash	5.52 ^b	3.53 ^f	5.81 ^b	4.73 ^d	5.10 ^c	4.10 ^e	5.77 ^b	8.53 ^a	4.53 ^c	5.27 ^b	4.60 ^c	7.15 ^a	5.55 ^a	5.22 ^b	0.09	0.002	<0.001	<0.001
Organic matter	11.69 ^f	12.44 ^f	16.17 ^d	18.04 ^c	19.02 ^b	20.03 ^a	17.51 ^c	13.77 ^e	12.06 ^d	17.11 ^b	19.52 ^a	15.64 ^c	16.10	16.07	2.15	0.898	<0.001	<0.001
Total carbohydrate	4.43 ^g	5.04 ^f	8.69 ^d	10.40 ^c	10.93 ^b	12.70 ^a	6.96 ^e	4.75 ^{fg}	4.74 ^d	9.54 ^b	11.81 ^a	5.85 ^c	7.75 ^b	8.22 ^a	1.60	0.028	<0.001	<0.001
DMD (%), Apparent nitrogen retained (ANR) and True nitrogen retained (TNR)																		
DMD	31.67 ^b	38.09 ^a	19.48 ^c	18.78 ^c	10.35 ^d	15.42 ^c	15.50 ^c	19.82 ^c	34.88 ^a	19.13 ^b	12.88 ^c	17.66 ^b	19.25 ^b	23.02 ^a	8.73	<0.001	<0.001	<0.001
ANR	-0.21 ^a	-0.27 ^{ab}	-0.30 ^{bc}	-0.27 ^{ab}	-0.60 ^d	-0.36 ^c	-0.90 ^f	-0.68 ^e	-0.24 ^a	-0.29 ^b	-0.48 ^c	-0.79 ^d	-0.50 ^b	-0.39 ^a	0.17	<0.001	<0.001	<0.001
TNR	0.60 ^a	0.54 ^{ab}	0.51 ^{bc}	0.54 ^{ab}	0.22 ^d	0.45 ^c	-0.09 ^f	0.13 ^e	0.57 ^a	0.53 ^b	0.33 ^c	0.02 ^d	0.31 ^b	0.42 ^a	0.17	<0.001	<0.001	<0.001

^{abcde fgh} Means with different superscripts within a row of each classification (PF or PF×TF interaction) are significantly ($P < 0.05$) different.

¹ SEM, total standard error of means.

Table 3

Experiment 2: Effects of beta-mannanase (enzyme) on nutrient balances of distillers dried grains with soluble (DDGS), copra meal (CM), palm kernel meal (PKM) and jatropha meal (JM)

Variable	DDGS		CM		PKM		JM		Tested feedstuffs (TF)				Enzyme (E)		SEM ¹	P-value		
	E (-)	E (+)	E (-)	E (+)	E (-)	E (+)	E (-)	E (+)	DDGS	CM	PKM	JM	-	+		E	TF	E×TF
Total nutrient intake (g)																		
Dry matter	25.19 ^e	25.19 ^e	27.29 ^b	27.22 ^b	26.75 ^c	26.47 ^d	27.50 ^a	27.27 ^b	25.19 ^d	27.25 ^b	26.61 ^c	27.38 ^a	26.68 ^a	26.54 ^b	0.40	0.006	<0.001	<0.001
Gross energy, MJ	0.57 ^f	0.57 ^f	0.60 ^e	0.60 ^e	0.64 ^c	0.63 ^d	0.72 ^a	0.71 ^b	0.57 ^d	0.60 ^c	0.64 ^b	0.71 ^a	0.63	0.63	0.02	0.356	<0.001	<0.001
Nitrogen	1.10 ^a	1.10 ^a	0.91 ^b	0.90 ^c	0.64 ^f	0.63 ^g	0.85 ^d	0.84 ^e	1.10 ^a	0.91 ^b	0.63 ^d	0.81 ^c	0.87	0.87	0.06	0.524	<0.001	<0.001
Crude protein	6.89 ^a	6.89 ^a	5.67 ^b	5.65 ^c	3.99 ^f	3.94 ^g	5.31 ^d	5.27 ^e	6.89 ^a	5.66 ^b	3.97 ^d	5.29 ^c	5.46	5.44	0.36	0.685	<0.001	<0.001
Ether extract	0.80 ^g	1.68 ^d	0.58 ^h	1.03 ^f	1.60 ^e	1.93 ^c	2.24 ^a	2.13 ^b	1.24 ^c	0.81 ^d	1.77 ^b	2.18 ^a	1.31 ^b	1.69 ^a	0.27	<0.001	<0.001	<0.001
Crude ash	1.69 ^c	1.79 ^b	1.44 ^f	2.03 ^a	0.99 ^h	1.73 ^c	1.00 ^g	1.70 ^d	1.74 ^a	1.74 ^a	1.36 ^b	1.34 ^b	1.28 ^b	1.81 ^a	0.18	<0.001	<0.001	<0.001
Organic matter	23.50 ^g	23.40 ^h	25.83 ^b	25.19 ^e	25.76 ^c	24.74 ^f	26.51 ^a	25.58 ^d	23.45 ^d	25.52 ^b	25.25 ^c	26.04 ^a	25.40 ^a	24.73 ^b	0.52	<0.001	<0.001	<0.001
Total carbohydrate	15.81 ^g	14.83 ^h	19.60 ^b	18.51 ^e	20.17 ^a	18.86 ^d	18.96 ^c	18.18 ^f	15.32 ^d	19.06 ^b	19.52 ^a	18.57 ^c	18.63 ^a	17.60 ^b	0.77	<0.001	<0.001	<0.001
Total nutrient output (g)																		
Dry matter	18.58 ^d	15.13 ^e	20.99 ^{bc}	20.55 ^c	23.39 ^a	21.31 ^{bc}	23.01 ^a	21.66 ^b	16.86 ^c	20.77 ^b	22.35 ^a	22.33 ^a	21.49 ^a	19.66 ^b	2.21	<0.001	<0.001	<0.001
Gross energy, MJ	0.34 ^e	0.29 ^f	0.40 ^{cd}	0.39 ^d	0.46 ^b	0.42 ^c	0.50 ^a	0.46 ^b	0.31 ^d	0.40 ^c	0.44 ^b	0.48 ^a	0.42 ^a	0.39 ^b	0.05	<0.001	<0.001	<0.001
Nitrogen	0.99 ^a	0.65 ^d	0.97 ^a	0.84 ^c	0.92 ^b	0.83 ^c	0.90 ^b	0.85 ^c	0.82 ^c	0.91 ^a	0.87 ^b	0.87 ^b	0.95 ^a	0.79 ^b	0.10	<0.001	<0.001	<0.001
Crude protein	6.21 ^a	4.07 ^d	6.06 ^a	5.24 ^c	5.74 ^b	5.17 ^c	5.62 ^b	5.29 ^c	5.14 ^c	5.65 ^a	5.46 ^b	5.46 ^b	5.91 ^a	4.94 ^b	0.60	<0.001	<0.001	<0.001
Ether extract	0.07 ^e	0.05 ^f	0.03 ^g	0.02 ^h	0.10 ^c	0.09 ^d	0.22 ^a	0.17 ^b	0.06 ^c	0.02 ^d	0.09 ^b	0.20 ^a	0.11 ^a	0.08 ^b	0.04	<0.001	<0.001	<0.001
Crude ash	0.20 ^c	0.15 ^e	0.20 ^c	0.28 ^a	0.16 ^d	0.25 ^b	0.16 ^d	0.25 ^b	0.17 ^c	0.24 ^a	0.21 ^b	0.20 ^b	0.18 ^b	0.23 ^a	0.04	<0.001	<0.001	<0.001
Organic matter	18.39 ^d	14.98 ^e	20.79 ^{bc}	20.27 ^c	23.23 ^a	21.06 ^{bc}	22.85 ^a	21.41 ^b	16.69 ^c	20.53 ^b	22.14 ^a	22.13 ^a	21.31 ^a	19.43 ^b	2.18	<0.001	<0.001	<0.001
Total carbohydrate	12.11 ^d	10.87 ^e	14.70 ^c	15.02 ^c	17.39 ^a	15.80 ^b	17.00 ^a	15.95 ^b	11.49 ^c	14.86 ^b	16.60 ^a	16.47 ^a	15.30 ^a	14.41 ^b	1.67	<0.001	<0.001	<0.001
DMD (%), Apparent nitrogen retained (ANR) and True nitrogen retained (TNR)																		

DMD	53.87 ^b	67.60 ^a	45.19 ^{de}	50.10 ^c	38.57 ^f	42.77 ^{de}	41.67 ^{fe}	46.13 ^d	60.74 ^a	47.65 ^b	40.67 ^d	43.90 ^e	44.82 ^b	51.65 ^a	8.83	<0.001	<0.001	<0.001
ANR	0.11 ^b	0.45 ^a	-0.06 ^e	0.07 ^c	-0.28 ^g	-0.20 ^f	-0.05 ^e	-0.003 ^d	0.28 ^a	0.002 ^b	-0.24 ^c	-0.03 ^b	-0.07 ^b	0.08 ^a	0.13	<0.001	<0.001	<0.001
TNR	1.04 ^b	1.38 ^a	0.86 ^e	0.99 ^c	0.65 ^g	0.73 ^f	0.88 ^e	0.92 ^d	1.21 ^a	0.93 ^b	0.69 ^d	0.90 ^c	0.86 ^b	1.01 ^a	0.13	<0.001	<0.001	<0.001

abcde^{gh} Means with different superscripts within a row of each classification (E or E×TF interaction) are significantly (P < 0.05) different.

¹ SEM, total standard error of means.

Table 4

Experiment 1: Effects of physical forms (mash vs pellet) on coefficient of total tract apparent retentions (CTTAR_s) of distillers dried grains with soluble (DDGS), copra meal (CM), palm kernel meal (PKM) and jatropha meal (JM)

Variable	DDGS		CM		PKM		JM		Tested feedstuffs (TF)				Physical forms (PF)		SEM ¹	P-value		
	Mash	Pellet	Mash	Pellet	Mash	Pellet	Mash	Pellet	DDGS	CM	PKM	JM	Mash	Pellet		PF	TF	PF×TF
Dry matter	0.32 ^b	0.38 ^a	0.19 ^c	0.19 ^c	0.10 ^d	0.15 ^c	0.15 ^c	0.20 ^e	0.35 ^a	0.19 ^b	0.13 ^c	0.18 ^b	0.19 ^b	0.23 ^a	0.09	<0.001	<0.001	<0.001
Gross energy, MJ	0.37 ^b	0.41 ^a	0.23 ^e	0.26 ^{de}	0.19 ^f	0.27 ^d	0.33 ^c	0.37 ^b	0.39 ^a	0.25 ^c	0.23 ^c	0.35 ^b	0.28 ^b	0.33 ^a	0.07	<0.001	<0.001	<0.001
Nitrogen	-0.23 ^a	-0.30 ^{ab}	-0.36 ^b	-0.32 ^b	-1.03 ^e	-0.53 ^c	-1.15 ^f	-0.92 ^d	-0.27 ^a	-0.34 ^b	-0.78 ^c	-1.03 ^d	-0.69 ^b	-0.52 ^a	0.24	<0.001	<0.001	<0.001
Crude protein	-0.23 ^a	-0.30 ^{ab}	-0.36 ^b	-0.32 ^b	-1.03 ^e	-0.53 ^c	-1.15 ^f	-0.92 ^d	-0.27 ^a	-0.34 ^b	-0.78 ^c	-1.03 ^d	-0.69 ^b	-0.52 ^a	0.24	<0.001	<0.001	<0.001
Ether extract	0.81 ^d	0.87 ^c	0.20 ^h	0.46 ^g	0.52 ^f	0.60 ^e	0.97 ^a	0.92 ^b	0.84 ^b	0.33 ^d	0.56 ^c	0.95 ^a	0.62 ^b	0.71 ^a	0.12	<0.001	<0.001	<0.001
Crude ash	-2.27 ^c	-0.97 ^a	-3.05 ^d	-1.33 ^b	-4.15 ^e	-1.38 ^b	-4.81 ^f	-4.03 ^e	-1.62 ^a	-2.19 ^b	-2.76 ^c	-4.42 ^d	-3.57 ^b	-1.93 ^a	0.84	<0.001	<0.001	<0.001
Organic matter	0.40 ^{ab}	0.39 ^b	0.31 ^c	0.25 ^d	0.18 ^e	0.21 ^e	0.28 ^{cd}	0.43 ^a	0.40 ^a	0.28 ^c	0.20 ^d	0.36 ^b	0.29 ^b	0.32 ^a	0.08	<0.001	<0.001	<0.001
Total carbohydrate	0.66 ^b	0.62 ^c	0.51 ^e	0.41 ^f	0.39 ^g	0.34 ^h	0.59 ^d	0.73 ^a	0.64 ^b	0.46 ^c	0.36 ^d	0.66 ^a	0.54	0.52	0.08	0.181	<0.001	<0.001

abcde^{gh} Means with different superscripts within a row of each classification (PF or PF×TF interaction) are significantly (P < 0.05) different.

¹ SEM, total standard error of means.

Table 5

Experiment 2: Effects of beta-mannanase (enzyme) on coefficient of total tract apparent retentions (CTTAR_s) of distillers dried grains with soluble (DDGS), copra meal (CM), palm kernel meal (PKM) and jatropha meal (JM)

Variable	DDGS		CM		PKM		JM		Tested feedstuffs (TF)				Enzyme (E)		SEM ¹	P-value		
	E (-)	E (+)	E (-)	E (+)	E (-)	E (+)	E (-)	E (+)	DDGS	CM	PKM	JM	-	+		E	TF	E×TF
Dry matter	0.54 ^b	0.68 ^a	0.49 ^{cd}	0.50 ^c	0.39 ^e	0.46 ^d	0.42 ^e	0.46 ^d	0.61 ^a	0.49 ^b	0.42 ^c	0.44 ^c	0.46 ^b	0.52 ^a	0.08	<0.001	<0.001	<0.001
Gross energy, MJ	0.41 ^b	0.50 ^a	0.34 ^c	0.35 ^c	0.29 ^d	0.35 ^c	0.31 ^d	0.36 ^c	0.45 ^a	0.34 ^b	0.32 ^c	0.33 ^{bc}	0.34 ^b	0.39 ^a	0.06	<0.001	<0.001	<0.001
Nitrogen	0.44 ^b	0.68 ^a	0.29 ^{de}	0.39 ^c	-0.01 ^g	0.12 ^f	0.26 ^e	0.32 ^d	0.56 ^a	0.33 ^b	0.05 ^d	0.29 ^c	0.24 ^b	0.38 ^a	0.14	<0.001	<0.001	<0.001
Crude protein	0.44 ^b	0.68 ^a	0.29 ^{de}	0.39 ^c	-0.01 ^g	0.12 ^f	0.26 ^e	0.32 ^d	0.56 ^a	0.33 ^b	0.05 ^d	0.29 ^c	0.24 ^b	0.38 ^a	0.14	<0.001	<0.001	<0.001
Ether extract	0.91 ^g	0.97 ^b	0.95 ^d	0.98 ^a	0.94 ^e	0.96 ^c	0.90 ^h	0.92 ^f	0.94 ^c	0.97 ^a	0.95 ^b	0.91 ^d	0.92 ^b	0.96 ^a	0.02	<0.001	<0.001	<0.001
Crude ash	0.88 ^b	0.92 ^a	0.86 ^{cd}	0.86 ^c	0.84 ^e	0.86 ^{cd}	0.84 ^e	0.85 ^d	0.90 ^a	0.86 ^b	0.85 ^c	0.85 ^c	0.86 ^b	0.87 ^a	0.02	<0.001	<0.001	<0.001
Organic matter	0.51 ^b	0.66 ^a	0.46 ^{cd}	0.47 ^c	0.37 ^f	0.43 ^{de}	0.40 ^e	0.44 ^{cd}	0.59 ^a	0.47 ^b	0.40 ^d	0.42 ^c	0.44 ^b	0.50 ^a	0.08	<0.001	<0.001	<0.001
Total carbohydrate	0.28 ^b	0.46 ^a	0.30 ^b	0.28 ^b	0.20 ^d	0.26 ^{bc}	0.17 ^d	0.22 ^{cd}	0.37 ^a	0.29 ^b	0.23 ^c	0.19 ^d	0.24 ^b	0.30 ^a	0.11	<0.001	<0.001	<0.001

^{abcdefg} Means with different superscripts within a row of each classification (E or E×TF interaction) are significantly (P < 0.05) different.

¹ SEM, total standard error of means.

Table 6

Experiment 1: Effects of physical forms (mash vs pellet) on apparent and true metabolizable energy contents of distillers dried grains with soluble (DDGS), copra meal (CM), palm kernel meal (PKM) and jatropha meal (JM)

Variable (MJ)	DDGS		CM		PKM		JM		Tested feedstuffs (TF)				Physical forms (PF)		SEM ¹	P-value		
	Mash	Pellet	Mash	Pellet	Mash	Pellet	Mash	Pellet	DDGS	CM	PKM	JM	Mash	Pellet		PF	TF	PF×TF
AME	10.60 ^b	11.44 ^a	5.14 ^f	6.34 ^e	8.09 ^d	8.43 ^d	9.98 ^c	11.06 ^{ab}	11.02 ^a	5.74 ^d	8.26 ^c	10.52 ^b	8.45 ^b	9.32 ^a	2.05	<0.001	<0.001	<0.001
AMEn	10.60 ^b	11.44 ^a	5.14 ^f	6.34 ^e	8.09 ^d	8.43 ^d	9.98 ^c	11.06 ^{ab}	11.02 ^a	5.74 ^d	8.26 ^c	10.52 ^b	8.45 ^b	9.32 ^a	2.05	<0.001	<0.001	<0.001
TME	14.98 ^b	15.72 ^a	9.18 ^f	10.27 ^e	12.19 ^d	12.30 ^d	13.98 ^c	15.03 ^b	15.35 ^a	9.72 ^d	12.24 ^c	14.50 ^b	12.58 ^b	13.33 ^a	2.13	<0.001	<0.001	<0.001
TME _n	14.97 ^b	15.71 ^a	9.18 ^f	10.27 ^e	12.19 ^d	12.30 ^d	13.98 ^c	15.03 ^b	15.34 ^a	9.72 ^d	12.24 ^c	14.50 ^b	12.58 ^b	13.33 ^a	2.13	<0.001	<0.001	<0.001

^{abcdef} Means with different superscripts within a row of each classification (PF or PF×TF interaction) are significantly (P < 0.05) different.

¹ SEM, total standard error of means.

Table 7

Experiment 2: Effects of beta-mannanase (enzyme) on apparent and true metabolizable energy contents of distillers dried grains with soluble (DDGS), copra meal (CM), palm kernel meal (PKM) and jatropha meal (JM)¹

Variable (MJ)	DDGS		CM		PKM		JM		Tested feedstuffs (TF)				Enzyme (E)		SEM	P-value		
	E (-)	E (+)	E (-)	E (+)	E (-)	E (+)	E (-)	E (+)	DDGS	CM	PKM	JM	-	+		E	TF	E×TF
AME	9.21 ^b	11.32 ^a	7.44 ^{de}	7.71 ^{cd}	6.98 ^e	8.33 ^c	8.03 ^{cd}	9.29 ^b	10.27 ^a	7.58 ^c	7.66 ^c	8.66 ^b	7.91 ^b	9.16 ^a	1.49	<0.001	<0.001	<0.001
AMEn	9.21 ^b	11.32 ^a	7.45 ^{de}	7.71 ^{cd}	6.98 ^e	8.33 ^c	8.03 ^{cd}	9.29 ^b	10.27 ^a	7.58 ^c	7.66 ^c	8.66 ^b	7.92 ^b	9.16 ^a	1.49	<0.001	<0.001	<0.001
TME	13.59 ^b	15.70 ^a	11.49 ^{de}	11.77 ^d	11.10 ^e	12.51 ^c	12.04 ^{cd}	13.34 ^b	14.65 ^a	11.63 ^c	11.80 ^c	12.69 ^b	12.06 ^b	13.33 ^a	1.51	<0.001	<0.001	<0.001
TME _n	13.59 ^b	15.70 ^a	11.49 ^{de}	11.77 ^d	11.10 ^e	12.51 ^c	12.04 ^{cd}	13.34 ^b	14.64 ^a	11.63 ^c	11.80 ^c	12.69 ^b	12.05 ^b	13.33 ^a	1.51	<0.001	<0.001	<0.001

^{abcde} Means with different superscripts within a row of each classification (E or E×TF interaction) are significantly (P < 0.05) different.

¹ SEM, total standard error of means.

References

- Akbar, E., Yaakob, Z., Kamarudin, S.K., Ismail, M., Salimon, J., 2009. Characteristic and composition of *Jatropha Curcas* oil seed from Malaysia and its potential as biodiesel feedstock. *Eur. J. Sci. Res.* 29, 396-403.
- Annongu, A.A., Joseph, J.K., Apata, D.F., Adeyina, A.O., Yousuf, M. B., Ogunjimi, K.B., 2010a. Detoxification of *Jatropha curcas* seeds for use in nutrition of monogastric livestock as alternative feedstuff. *Pakistan J. Nutr.* 9, 902-904.
- AOAC, 2006. Official Methods of Analysis, 18th ed. Off. Assoc. Anal. Chem., Arlington, VA, USA.
- Batal, A.B., Dale, N.M., 2006. True metabolizable energy and amino acid digestibility of distillers dried grains with solubles. *J. Appl. Poult. Res.* 15, 89-93.
- Behnke, K. C., 2001. Factors influencing pellet quality. *Feedtech* vol 5 no. 4 pp. 19-22.
- Behnke, K.C., Beyer, R.S., 2002. Effect of feed processing on broiler performance. VIII. International seminar on poultry production and pathology, Santiago, Chile.
- Boguhn, J., Rodehutschord, M., Makkar, H.P.S., Becker, K., 2010. Amino acid digestibility of detoxified *Jatropha* kernel meal in turkeys. Abstract book of the 13th European Poultry Conference, August 23-27, 2010 in Tours, France, *World's Poultry Science Journal* 66, Suppl. 476.
- Bruins, M E., 2012. Animal feed from *Jatropha* press-cake: feasibility study. NL Agency. Netherlands Programmes Sustainable Biomass. Report No: VPP 2011/005 (1). NL-6700 AA Wageningen.
- Carrión, S., De Blas, J. C., Méndez, J., Caídas, A., García-Rebollar, P., 2011. Nutritive value of palm kernel meal in diets for growing rabbits. *Anim. Feed Sci. Technol.* 165, 79-84.
- Chivandi, E., Erlwanger, K.H., Makuza, S.M., Read, J.S., Mtimuni, J.P., 2006. Effects of dietary *Jatropha curcas* meal on percent packed cell volume, serum glucose, cholesterol and triglyceride concentration and alpha-amylase activity of weaned fattening pigs. *Res. J. Anim. Vet. Sci.* 1, 18-24.
- Dairo, F.A.S., Fasuyi, A.O., 2008. Evaluation of fermented palm kernel meal and fermented copra meal proteins as substitute for soybean meal protein in laying hens diets. *J. Cent. European Agric.* 9, 35-44.
- Dudley-Cash, W.A., 2009. A landmark contribution to poultry science-A bioassay for true metabolizable energy in feedingstuffs. *Poult. Sci.* 88, 832-834.
- Fastinger, N.D., Latshaw, J.D., Mahan, D.C., 2006. Amino acid availability and true metabolizable energy content of corn distillers dried grains with solubles in adult cecectomized roosters. *Poult. Sci.* 85, 1212-1216.
- Kawauchi, I.M., Sakomura, N.K., Vasconcellos, R.S., de-Oliveira, L.D., Gomes, M.O.S., Loureiro, B.A., Carciofi, A.C., 2011. Digestibility and metabolizable energy of maize gluten feed for dogs as measured by two different techniques. *Anim. Feed Sci. Technol.* 169, 96-103.
- Keohavong, B., Ahammed, M., Kim, D.M., Lee, S.J., Lee, M.H., Ohh, S.J., 2012. Effect of Mash and Pellet Form on True Metabolizable Energy Values of Distillers Dried Grains with Solubles, Copra and Palm Meal by Adult Roosters. *Proceedings of the 15th AAAP Animal Science Congress*, 26-30 November 2012, Thammasat University, Rangsit Campus, Thailand. pp, 1730-1735.

- Khanongnuch, C., Sa-nguansook, C., Lumyong, S., 2006. Nutritive quality of mannanase treated copra meal in broiler diets and effectiveness on some fecal bacteria. *Int. J. Poult. Sci.* 5, 1087-1091.
- Kim, E.J., Amezcua, C.M., Utterback, P.L., Parsons, C.M., 2008. Phosphorus bioavailability, true metabolizable energy, and amino acid digestibilities of high protein corn distillers dried grains and dehydrated corn germ. *Poult. Sci.* 87, 700-705.
- Lopez, G., Leeson, S., 2007. Relevance of nitrogen correction for assessment of metabolizable energy with broilers to forty-nine days of age. *Poult. Sci.* 86, 1696-1704.
- Lumpkins, B.S., Batal, A.B., Dale, N.M., 2004. Evaluation of distillers dried grains with solubles as a feed ingredient for broilers. *Poult. Sci.* 83, 1891-1896.
- Muangkeow, N., Chinajariyawong, C., 2009. Determination of true amino acid digestibility and metabolizable energy in fermented palm Kernel meal with *Aspergillus wentii* TISTR 3075 for Chickens. *Walailak. J. Sci. Tech.* 6, 231-241.
- National Research Council., 1994. Nutrient Requirements of Poultry. (9th Ed.) National Academy Press, Washington, D.C.
- Noll, S.L., Brannon, J., Parsons, C., 2007. Nutritional value of corn distiller dried grains with solubles (DDGS): Influence of solubles addition. *Poult. Sci.* 86 (Suppl. 1), 68.
- Parsons, A.S., 2004. Effect of Grain Particle Size, Feed Form and Pellet Texture on Broiler Performance, Carcass Quality, True Metabolizable Energy, Feed Passage Time and Preference. Master Thesis, West Virginia University.
- Parsons, C.M., Martinez, C., Singh, V., Radhadkrishnan, S., Noll, S., 2006. Nutritional value of conventional and modified DDGS for poultry. *Proc. Multi-State Poult. Nutr. Feeding Conf.*, Indianapolis IN.
- Pasaribu, T., Wina, E., Tangendjaja, B., Iskandar, S., 2010. Performance of broiler chicken fed physically and chemically treated *Jatropha* (*Jatropha curcas*) seed meal. *Indonesian J. Agri.* 3, 121-126.
- Sibbald, I.R., 1986. The TME system of feed evaluation: Methodology, feed composition data and bibliography. *Animal Research Center Contribution* 85-19. Ottawa, ON, Canada.
- Sumiati., Sudarman, A., Nurhikmawati, I., Nurbaeti., 2007. Detoxification of *Jatropha curcas* meal as poultry feed. The 2nd International Symposium on Food Security, Agricultural Development and Environmental Conservation in Southeast and East Asia. Bogor, Indonesia. pp, 61-66.
- Sundu, B., Kumar, A., Dingle, J., 2009. Feeding value of copra meal for broilers. *World. Poult. Sci. J.* 65, 481-492.
- Svihus, B., Kløvstad, K.H., Perez, V., Zimonja, O., Sahlstrom, S., Schuller, R.B., Jeksrud, W.K., Prestløkken, E., 2004. Physical and nutritional effects of pelleting of broiler chicken diets made from wheat ground to different coarsenesses by the use of roller mill and hammer mill. *Anim. Feed Sci. Technol.* 117, 281-293.
- Wang, Z., Cerrate, S., Coto, C., Yan, F., Waldroup, P.W., 2007. Utilization of distillers dried grains with solubles (DDGS) in broiler diets using a standardized nutrient matrix. *Int. J. Poult. Sci.* 6, 470-477.
- Wina, E., Tangendjaja, B., Pasaribu, T., Purwadaria, T., 2010. Broiler performance fed *Jatropha curcas* seed meal detoxified by fermentation, physic and chemical treatments. *Indonesian J. Anim. Vet. Sci.* 15, 174-181.
- Yalcin, S., Onol, A.G., 1994. True metabolizable energy values of some feedingstuffs. *Br. Poult. Sci.* 35, 119-122.

- Zanu, H.K., Abangiba, J., Arthur-Badoo, W., Akparibo, A.D., Sam, R., 2012. Laying chickens' response to various levels of palm kernel cake in diets. *Int. J. Livest. Prod.* 3, 12-16.
- Zelenka, J., 2003. Effect of pelleting on digestibility and metabolisable energy values of poultry diet. *Czech J. Anim. Sci.* 48, 239-242.
- Zhang, B., Haitao, L., Zhao, D., Guo, Y., Barri, A., 2011. Effect of fat type and lysophosphatidylcholine addition to broiler diets on performance, apparent digestibility of fatty acids, and apparent metabolizable energy content. *Anim. Feed Sci. Technol.* 163, 177-184.

Prevalence of Tick-Borne Disease in Dogs in Doi Saket District, Chiang Mai, Thailand

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Abstract

Tick-borne diseases (TBDs) are health problem in dogs in tropical countries like Thailand. TBDs mostly found in dogs are babesiosis, hepatozoonosis and ehrlichiosis. In this study, we determined the prevalence of TBDs for dogs in Doi Saket district, Chiang Mai, Thailand using multiplex polymerase chain reaction (mPCR) developed in our laboratory. A total of 120 blood samples were collected. The results showed that dogs were infected by a single infection with *Babesia canis* (0.83%), *Hepatozoon canis* (40%) and *Ehrlichia canis* (1.67%). In addition, dogs were coinfecting with *B. canis* and *H. canis* (24.17%), *H. canis* and *E. canis* (3.33%), and *B. canis*, *H. canis*, and *E. canis* (3.33%). Statistical analysis revealed that TBDs are associated with sex but not with age group.

Keywords: Tick-borne disease, mPCR, Dog

Introduction

Tick borne diseases (TBDs) have global distribution in subtropical and tropical zone in the world (Bilgic *et al.*, 2013, Jirapattharasate *et al.*, 2016, Palavesam *et al.*, 2018). Thailand is a tropical country where TBDs pose major problems for canine health. TBDs are transmitted by brown dog tick (*Rhipicephalus sanguineus*) via tick salivary glands (Baneth *et al.*, 2003, Harrus *et al.*, 2011, Palavesam *et al.*, 2018). Among these diseases, canine babesiosis, canine hepatozoonosis and canine ehrlichiosis are the three most significant diseases in Thailand. Canine babesiosis and canine hepatozoonosis are caused by intracellular blood protozoa namely *Babesia canis* and *Hepatozoon canis*, respectively. Clinically, these protozoa cause fever, lethargy, progressive anemia, hemoglobinuria and death in some cases (Adaszek *et al.*, 2009, Baneth *et al.*, 2003, Lyp *et al.*, 2015). Canine ehrlichiosis caused by the intracellular rickettsia *Ehrlichia canis* is characterized by fever, depression, lymphadenomegaly and splenomegaly (Harrus *et al.*, 2011). Diagnostic techniques for TBDs detection such as traditional methods include microscopic examination of peripheral blood smears (Baneth *et al.*, 2003, Bilgic *et al.*, 2013, Harrus *et al.*, 2011, Laummaunwai *et al.*, 2014, Palavesam *et al.*, 2018). Moreover, serological detection methods such as immunofluorescent antibody test (IFAT) (Suksawat *et al.*, 2001) and enzyme linked immunosorbent assay (ELISA) are time-consuming and have low sensitivity especially in case of early stage of infection. In contrast, multiplex polymerase chain reaction (mPCR) technique is a variant of polymerase chain reaction (PCR) in which two or more loci are simultaneously amplified in the sample reaction (Chamberlain *et al.*, 1988, Henegariu *et al.*, 1997). mPCR diagnosis use differences in yielding the sequence amplicon length. Thus, mPCR have advantage such as sensitivity, specificity and cost effectiveness

higher than those of traditional methods (Ananyutthawongse *et al.*, 1999, Bilgic *et al.*, 2013, Palavesam *et al.*, 2018)

In Thailand, there was a study of prevalence of TBDs in the northeastern region, i.e. Khon Kaen province (Laummaunwai *et al.*, 2014, Sangmameedet *et al.*, 2002), Kalasin province (Piratae *et al.*, 2019), Nakornpranom province (Jusook *et al.*, 2016) and Mahasarakham province (Piratae *et al.*, 2015) and central region, i.e. Bangkok (Suksawat *et al.*, 2001). However, northern region of Thailand has not yet been elucidated with TBDs prevalence.

Therefore, the aim of this present study was to explicate the prevalence of *B. canis*, *H. canis* and *E. canis* in dogs in Doi Saket district, Chiang Mai, Thailand by mPCR. In addition, the risk factors associated with TBDs were studied.

Methodology

Blood sample and data collection

Blood was collected from cephalic vein of 120 dogs at The ARK foundation animal rescue kingdom in Doi Saket district, Chiang Mai, Thailand. Blood was placed into vacutainer tube that contained EDTA anticoagulant and stored in -20 °C until DNA extraction. Dogs were categorized into 8 age groups: <1 year, 1-2 years, 2-3 years, 3-4 years, 4-5 years, 5-6 years, 6-7 years and 7-8 years.

DNA Extraction

Thirty µl of whole blood samples were incubated with 1 ml of sterile distilled water for 5 min at room temperature and cell suspension were centrifuged at 8,000 rpm for 1 min at 4 °C. Then, cells were washed with sterile distilled water by centrifugation at 8,000 rpm for 1 min at 4 °C and supernatant was removed. Next, 100 µl of 5% chelex resin solution (Sigma-Aldrich, USA) and 10 µl proteinase K (10 mg/ml) (Invitrogen, USA) were added and incubated at 56 °C for 30 min. Then, it was transferred to incubator at 95 °C for 10 min and cooled in room temperature, centrifuged at 8,000 rpm for 1 min at 4 °C. Supernatant was pipetted out carefully to new microcentrifuge tube and stored at -20 °C until use.

mPCR detection of *B. canis*, *H. canis* and *E. canis*

Primers specific for *B. canis*, *H. canis* and *E. canis* are listed in Table 1. The mPCR reactions (20 µl) contain 10 µl of 2× Quick Taq HS Dye Mix (TOYOBO, Japan), 5 µM of each forward and reverse primers, and 1 µl of DNA template. Negative control used nuclease-free water as template. The conditions used for mPCR amplification were 94 °C (3 min), 35 cycles of 94 °C (30 s), 58 °C (30 s), and 68 °C (30 s), and 72 °C (10 min). The mPCR products were separated by gel electrophoresis on 1.5% agarose gel (Biobasic, Canada) at 120 V for 30 min in 1X TBE buffer (Biobasic, Canada) and then visualized under UV light after staining with ethidium bromide (Biobasic, Canada)

Table1: Primer sequence for mPCR used in this study.

Primer name	Parasite	Sequence	Gene	Product size	Reference
Ba103F	<i>B. canis</i>	CCAATCCTGACACAGGGAGGT	18S rRNA	619	Kan <i>et al.</i> , 2009
Ba721R		AGTGACA CCCCAGAACCCAAAGACTTTG ATTTCTCTCAAG			
Hs462F	<i>H. canis</i>	TGTGTACAAAGGGCAGGGACG	18S rRNA	462	East <i>et al.</i> , 2008
Hs462R		GCGGCTTAATTTGACTCAACA C			

Ehr1401F	CCATAAGCATAGCTGATAACC	VirB9		
	CTGTTACAA			
<i>E. canis</i>			380	Kan <i>et al.</i> , 2009
Ehr1780R	TGGATAATAAAACCGTACTAT			
	GTATGCTAG			

DNA sequencing

Positive PCR products were purified by PCR clean-up and gel extraction kit (Bio-Helix, Taiwan) following the manufacturer's instructions, and then sequenced by commercial sequencing service (1st BASE DNA Sequencing Services, Malaysia). The nucleotide sequences were analyzed by GenBank BLAST analysis in NCBI database (<https://blast.ncbi.nlm.nih.gov/Blast.cgi>)

Statistical analysis

Chi-square tests were used to compare the association of TBDs with age group and sex. P value < 0.05 was considered statistically significant.

Results

Prevalence of *B. canis*, *H. canis* and *E. canis* in dogs

Dogs were singly infected by *B. canis* (0.83%), *H. canis* (40%) and *E. canis* (1.67%). In addition, dogs were coinfectd with *B. canis* and *H. canis* (24.17%), *H. canis* and *E. canis* (3.33%), and *B. canis*, *H. canis*, and *E. canis* (3.33%) (Table2). The positive mPCR products for detected TBDs were shown in Fig.1. The highest prevalence was found in dogs at 1-2 years of age (Table2) and female (Table3).

Table2: mPCR screening of canine blood samples categorized by age group.

Age (Years)	Number of mPCR positive animals						No. of mPCR negative animals	Total no.
	B	H	E	B+H	H+E	B+H+E		
<1	0	1 (0.83%)	0	0	0	0	0	1 (0.83%)
1-2	0	14 (11.66%)	2 (1.67%)	10 (8.33%)	2 (1.66%)	3 (2.5%)	9 (7.5%)	40 (33.33%)
2-3	0	13 (10.83%)	0	6 (5%)	0	0	8 (6.66%)	27 (22.5%)
3-4	1 (0.83%)	6 (5%)	0	4 (3.33%)	1 (0.83%)	0	5 (4.16%)	17 (14.16%)
4-5	0	9 (7.5%)	0	4 (3.33%)	1 (0.83%)	1 (0.83%)	6 (5%)	21 (17.5%)
5-6	0	2 (1.66%)	0	2 (1.66%)	0	0	2 (1.66%)	6 (5%)
6-7	0	2 (1.66%)	0	2 (1.66%)	0	0	0	4 (3.33%)
7-8	0	1	0	1	0	0	0	4

	(0.83%)	(0.83%)	(3.33%)					
Total no.	1	48	2	29	4	4 (3.33%)	32	120
	(0.83%)	(40%)	(1.67%)	(24.17%)	(3.33%)		(26.66%)	(100%)

B, H, E indicates *B. canis*, *H. canis* and *E. canis*

Table3: mPCR screening of canine blood samples categorized by sex.

Sex	Number of mPCR positive animals						No. of mPCR negative animals	Total no.
	B	H	E	B+H	H+E	B+H+E		
Male	1	17	0	15	4	4	16	57
	(0.83%)	(14.17%)		(12.5%)	(3.33%)	(3.33%)	(13.33%)	(47.5%)
Female	0	31	2	14	0	0	16	63
		(25.83%)	(1.66%)	(11.67%)			(13.33%)	(52.5%)
Total no.	1	48	2	29	4 (3.33%)	4 (3.33%)	32	120
	(0.83%)	(40%)	(1.67%)	(24.17%)			(26.66%)	(100%)

Sequence analysis

The positive samples from mPCR were analyzed by gene sequencing. It was found that PCR products positive for *B. canis* showed 100% identity when compared with nucleotide sequences from GenBank accession No. LC331058.1 and HM590440.1. In addition, PCR products positive for *H. canis* showed 100% identity when compared with nucleotide sequences from GenBank accession No. MH615006.1, [KC138532.2](#) and [EU289222.1](#). PCR products positive for *E. canis* showed 98.68-99.74% identity when compared with nucleotide sequences from GenBank accession No. [CP025749.1](#), [AF546158.1](#), and [MH721030.1](#).

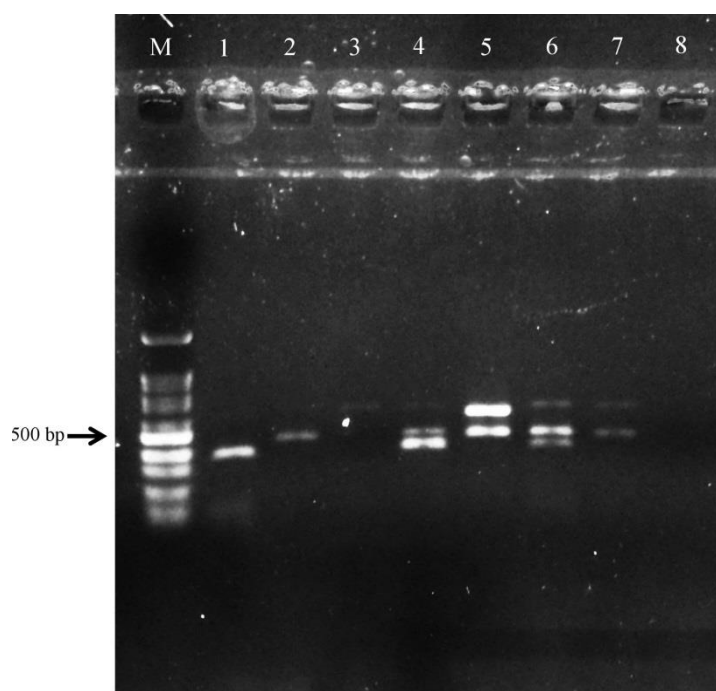


Figure1: mPCR detection of *B. canis*, *H. canis* and *E. canis*. Lane M: 100 bp DNA ladder, Lane 1: *E. canis*, Lane 2: *H. canis*, Lane 3: *B. canis*, Lane 4: *E. canis* + *H. canis*, Lane 5: *H. canis* + *B. canis*, Lane 6: *E. canis* + *H. canis* + *B. canis*, Lane 7: sample, and Lane 8: Negative control.

Risk factor analysis

Risk factor analysis revealed that TBDs were associated with sex but not with age group (Table 4)

Table4: Risk factors associated with TBDs in dogs.

Risk factor	Pearson Chi-square	
	Value	Asymp. Sig.(2-sided)
Age group	23.074	0.992
Sex	14.885	0.021

Discussion

TBDs are very important disease in dogs. They are caused by *B. canis*, *E. canis* and *H. canis* and are widely distributed in Thailand. Our findings showed that *H. canis* had higher prevalent than *E. canis* and *B. canis*. Similar to our study, Juasook *et al.*, 2016 found that *H. canis* infection had highest prevalent in Nakornpranom province. In contrast, Suksawat *et al.*, 2001 and Piratae *et al.*, 2015 found that *E. canis* was more prevalent than *B. canis* (as determined by serologic and molecular methods) in Bangkok and Mahasarakham province. Laummaunwai *et al.*, 2014 reported that *B. canis* (19.5%) was more prevalent than *E. canis* (3.0%) and *H. canis* (0%) in Khon Kaen province.

Statistical analysis revealed that TBDs were associated with sex but not with age group. On the other hand, Milanjeet *et al.*, 2014 reported that Ehrlichiosis was not associated with sex and Jirapattharasate *et al.* (2016) reported that TBDs were not associated with age group. Further studies with larger sample sizes may be needed to draw conclusion on whether sex is a risk factor for canine TBDs.

Conclusion

In conclusion, this study determined the prevalence of TBDs for dogs in Doi Saket district, Chiang Mai, Thailand using mPCR. *H. canis* (40%) had highest prevalent, followed by *E. canis* (1.67%) and *B. canis* (0.83%), respectively. Co-infection was detected with *B. canis* and *H. canis* (24.17%), *H. canis* and *E. canis* (3.33%), and *B. canis*, *H. canis*, and *E. canis* (3.33%). Statistical analysis revealed that TBDs were associated with sex but not with age group.

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References

- Ananyutthawongese, C., Saengsombut, K., Sukhumsirichat, W., Uthaisang, W., Sarataphan, N., & Chansiri, K. (1999). Detection of bovine hemoparasite infection using multiplex polymerase chain reaction. *ScienceAsia*, 25, 85-90.
- Adaszek, L., Winiarczyk, S., & Skrzypczak, M. (2009). The clinical course of babesiosis in 76 dogs infected with protozoan parasites *Babesia canis canis*. *Polish Journal of Veterinary Sciences*, 12, 81-87.
- Baneth, G., Mathew, J. S, Shkap, V., Macintire, D. K, Barta, J. R, & Ewing, S. A. (2003). Canine hepatozoonosis: two disease syndromes caused by separate *Hepatozoon spp.* *TRENDS in Parasitology*, 19, 27-31.
- Bilgic, H. B., Karagenc, T., Simuunza, M., Shiels, B., Tait, A., & Eren, H. (2013). Development of a multiplex PCR assay for simultaneous detection of *Theileria annulata*, *Babesia bovis* and *Anaplasma marginale* in cattle. *Experimental Parasitology*, 133, 222-229.
- Chamberlain, J.S., Gibbs, R.A., Ranier, J.E., Nguyen, P.N., & Caskey, C. (1988). Deletion screening of the Duchenne muscular dystrophy locus via multiplex DNA amplification. *Nucleic Acids Research*, 16, 11141-11156.

- East, M.L., Wibbelt, G., Lieckfeldt, D., Ludwig, A., Goller, K., Wilhelm, K., & Schares, G. (2008). A *Hepatozoon* species genetically distinct from *H. canis* infecting spotted hyenas in the Serengeti ecosystem, Tanzania. *Journal of Wildlife Diseases*, 44(1), 45-52.
- Harrus, S., & Waner, T. (2011). Diagnosis of canine monocytotropic ehrlichiosis (*Ehrlichia canis*): An overview. *The Veterinary Journal*, 187, 292-296.
- Henegariu, O., Heerama, N. A., Dlouhy, S. R., Vance, G. H., & Vogt, P. H. (1997). Multiplex PCR: Critical Parameters and Step-by-Step Protocol. *BioTechniques*, 23, 504-511.
- Jirapattharasate, C., Moumouni, P. F. A., Cao, S., Iguchi, A., Liu, M., Wang, G., & Zhou, M. (2016). Molecular epidemiology of bovine *Babesia spp.* and *Theileria orientalis* parasites in beef cattle from northern and northeastern Thailand. *Parasitology International*, 65, 62-69.
- Juasook, A., Boonmars, T., Sriraj, P., Aukkanimart, R., Jitjuk, T., Sudsarn, P., & Phaetkit, A. (2016). Prevalence of Tick-borne Pathogens in quarantined Dogs at Nakornpranom Animal Quarantine Station, Thailand. *Journal of Mahanakorn Veterinary Medicine*, 11(1), 1-9.
- Kledmanee, K., Suwanpakdee, S., Krajangwong, S., Chatsiriwech, J., Suksai, P., Suwannachai, P., & Sariya, L. (2009). Development of multiplex polymerase chain reaction for detection of *Ehrlichia canis*, *Babesia canis* and *Hepatozoon canis* in canine blood. *The Southeast Asian Journal of Tropical Medicine and Public Health*, 40(1), 35-39.
- Laummaunwai, P., Sriraj, P., Aukkanimart, R., Boonmars, T., Wonkchalee, N., Boonjaraspinyo, S., & Sangmanee, S. (2014). Molecular detection and treatment of tick-borne pathogens in domestic dogs in Khon Kaen, northeastern Thailand. *The Southeast Asian Journal of Tropical Medicine and Public Health*, 45(5), 1157-1166.
- Lyp, P., Adaszek, L., Furmaga, B., & Winiarczyk, S. (2015). Identification of new 18S rRNA strains of *Babesia canis* isolated from dogs with subclinical babesiosis. *Polish Journal of Veterinary Sciences*, 18(3), 573-577.
- Harkirat Singh, M., Singh, N. K., Singh, N. D., Singh, C., & Rath, S. S. (2014). Molecular prevalence and risk factors for the occurrence of canine monocytic ehrlichiosis. *Veterinarni Medicina*, 59(3), 129-136.
- Palavesam, A., Jyothimol, G., Baranidharan, G. R., Aravind, M., Ram, N. R., Bhaskaran, R. L., & Raman, M. (2018). Evaluation of multiplex PCR assay for detection of *Babesia spp.*, *Ehrlichia canis* and *Trypanosoma evansi* in dog. *Acta Tropica*, 188, 58-67.
- Piratae, S., Pimpjong, K., Vaisusuk, K., & Chatan, W. (2015). Molecular detection of *Ehrlichia canis*, *Hepatozoon canis* and *Babesia canis vogeli* in stray dogs in Mahasarakham province, Thailand. *Annals of Parasitology*, 61(3), 183-187.
- Piratae, S., Senawong, P., Chalermchat, P., Harnarsa, W., & Sae-chue, B. (2019). Molecular evidence of *Ehrlichia canis* and *Anaplasma platys* and the association of infections with hematological responses in naturally infected dogs in Kalasin, Thailand. *Veterinary World*, 12(1), 131-135.
- Sangmanee, S., Kanbutra, P., & Viriyametharoj, S. (2002). Prevalence of Blood Parasites in Dogs Examined at the KKU-Veterinary Teaching Hospital During 1994-2001. *KKU Veterinary Journal*, 12(1), 1-7.
- Shaw, S. E., Day, M. J., Birtles, R. J., & Breitschwerdt, E. B. (2001). Tick-borne infectious diseases of dogs. *TRENDS in Parasitology*, 17(2), 74-80.
- Smith, T. G. (1996). The genus *Hepatozoon* (Apicomplexa: Adeleina). *International Journal for Parasitology*, 26, 565-585.
- Suksawat, J., Xuejie, Y., Hancock, S. I., Hegarty, B. C., Nilkumhang, P., & Breitschwerdt, E. B. (2001). Serologic and molecular evidence of coinfection with multiple vector-borne pathogens in dogs from Thailand. *Journal of Veterinary Internal Medicine*, 15, 453-462.

SOCIAL DEVELOPMENT

Session

1. Challenges to communication between Institutions of Higher Education in Laos and Germany: A study in cross-cultural pragmatics and intercultural learning
Dr. Phetsamone KHATTIYAVONG , Prof. Dr. Isabel Martin, Savannakhet University, and University of Education Karlsruhe, Laos and Germany
2. Roles Playing of Educational Institutions in Taking Care for Juvenile Offender After Released
Arreerat Adisaidachcharin, Thammasat University, Thailand
3. Facilitating Global Dialog for Sustainable Consumption? An Overview of Virtual Exchange Formats for HE
Prof.Dr.Silke Bartsch, Heike Mueller, Technische Universitaet Berlin, Germany
4. Investigation of Lao Preservice science Teachers' Perception toward to use Computer Simulation in science Education of Savannakhet University Lao PDR
Sitsanou Phouthavong, Savannakhet University, Laos

Challenges to communication between Institutions of Higher Education in Laos and Germany: A study in cross-cultural pragmatics and intercultural learning

Dr. Phetsamone KHATTIYAVONG
Prof. Dr. Isabel Martin

Abstract

This study investigates two problematic and interrelated fields: 1) Why does oral communication in the workplace in Lao Institutions of Higher Education not work? (2) What are the sources of miscommunication between project partners of Savannakhet University and the University of Education Karlsruhe? The study examines the perceptions and observations of staff regarding the obstacles to effective communication at the workplace and within the Lao-German cooperation project.

The sources and causes of misunderstandings in written and oral communication between language users from maximally different cultural, linguistic, ethnic, and socio-economic backgrounds are manifold and have been the subject of research in ethnology, sociology, history, political theory, economics, cultural studies, and linguistics. Cross-cultural pragmatics is the study of the systematic differences of linguistic actions between different groups. The Lao part of this study discusses speech act theory and politeness theory (two *Western* theories) and tests their potential for explaining instances of failed communication in Laos. Speech act theory classifies language use according to purpose, e.g. apology, request, or refusal. Politeness theory is based on the concept of “face”, a much stronger concept in Asian than in European cultures.

Interviews and questionnaires will be used to collect data from 33 staff at Savannakhet University: 7 deans/vice deans, 1 director, 5 staff from the General Affairs and External Relations Office, 16 staff working for the Cooperative Unit from 7 faculties and 1 center and 4 staff from the Research and Post Graduate Office.

The German partners’ observations and documentation of communication in the project (notes, minutes, emails, whatsapps) will then add intercultural and structural perspectives, i.e. the differing concepts of time, place, obligation, work organization and work ethics (cf. cultural relativism). Owing to joint efforts on the part of individuals on both sides, the original ignorance of each others’ work conditions, life styles, and values has started to give way to a deeper understanding, tolerance, and thus better communication results. This study is a case in point.

Keywords: oral and written communication, cross-cultural pragmatics, speech act theory, politeness theory, intercultural learning, work organization, work ethics

Abstract

This study investigates two problematic and interrelated fields: 1) Why does oral communication in the workplace in Lao Institutions of Higher Education not work? (2) What are the sources of miscommunication between project partners of Savannakhet University and the University of Education Karlsruhe? The study examines the perceptions and observations of staff regarding the

obstacles to effective communication at the workplace and within the Lao-German cooperation project. The sources and causes of misunderstandings in written and oral communication between language users from maximally different cultural, linguistic, ethnic, and socio-economic backgrounds are manifold and have been the subject of research in ethnology, sociology, history, political theory, economics, cultural studies, and linguistics. Cross-cultural pragmatics is the study of the systematic differences of linguistic actions between different groups. The Lao part of this study discusses **speech act theory** and **politeness theory** (two *Western* theories) and tests their potential for explaining instances of failed communication in Laos. **Speech act theory** classifies language use according to purpose, e.g. Apology, request, or refusal. **Politeness theory** is based on the concept of “**face**”, a much stronger concept in Asian than in European cultures. Interviews and questionnaires will be used to collect data from 33 staff at Savannakhet University: 8 deans/vice deans, 5 staff from the General Affairs and External Relations Office, 16 staff working for the Cooperative Unit from 8 faculties and 4 staff from the Research and Post Graduate Office. The German partners’ observations and documentation of communication in the project (notes, minutes, emails, WhatsApp) will then add intercultural and structural perspectives, i.e. the differing concepts of time, place, obligation, work organization and work ethics (cf. **cultural relativism**). Owing to joint efforts on the part of individuals on both sides, the original ignorance of each other’s work conditions, life styles, and values has started to give way to a deeper understanding, tolerance, and thus better communication results. This study is a case in point.

Keywords: oral and written communication, cross-cultural pragmatics, speech act theory, politeness theory, intercultural learning, work organization, work ethics

I. Introduction

Communication is a learned skill. Most people are born with the physical ability to talk, but to speak and write well; these skills have to be learned and developed. Communication, both oral and written, has become such a normal part of our everyday lives that we easily take communication with each other for granted. The purpose of communication is to get your message across to other. This is a process that involves both the sender of the message and the receiver. This process leaves room for error, with messages often misinterpreted by one or more of the parties involved.

Getting your message across is paramount to progress and growth. To do this, you must understand what your message (written or oral) is, who your audience is and how it will be perceived. You must weigh the circumstances surrounding your communications, such as situational and cultural contexts. In fact, a message is successfully received and comprehended only when both the sender and the receiver perceive it in the same way.

Workplace communication is essential for teamwork. Not only does workplace communication build and maintain relationships, but it also facilitates innovation. Employees who feel comfortable with communicating tend to have ideas accepted during communication. Without workplace communication, several problems may arise (Shelley Frost, 2018). The misunderstandings in written and oral communication between language users from maximally different cultural, linguistic, ethnic, and socio-economic backgrounds are manifold and have been the subject of research in ethnology, sociology, history, political theory, economics, cultural studies, and linguistics.

The German partners' observations and documentation of communication in the project (notes, minutes, emails, WhatsApp) will serve to add intercultural and structural perspectives, i.e. the differing concepts of time, place, obligation, work organization and work ethics. However, the Lao part of this study discusses speech act theory and politeness theory (two *Western* theories) and tests their potential for explaining instances of failed communication in Laos. **Speech act theory and politeness theory highlight the cultural, linguistics, ethnic, and socio-economic factors affecting communication. Speech act theory may explain the linguistic factors while the politeness theory focuses more on the cultural, ethnic, and socio-economic variables.** For Lao learners direct requests do not pose a problem as they are the same in almost all languages. In relation to indirect requests, Lao learners may face a problem. Even though they have learned to use indirect request strategies in their mother tongue and they are part of their pragmatic competence in their native language, they are not always transferable to another language. According to Nina Daskalovska et. Al. (2016) mentioned to Blum-Kulka (1982, p. 33) points out that, "conventional indirect speech acts represent a special case of interdependence between conventions of language and conventions about the use of language." This interdependence can differ in different languages and cultures. Therefore, when learning a new language, students need to learn the strategies that are considered appropriate in that language. This is why the use of request strategies by Lao learners in Savannakhet University must be investigated. Therefore, the researchers intend to investigate two problematic and interrelated fields: (1) Why does oral communication in the workplace in Lao Institutions of Higher Education not work? (2) What are the sources of miscommunication between project partners of Savannakhet University and the University of Education Karlsruhe?

Relevant Research

Tamimi Sa'd, S. H., & Mohammadi, M. (2014) participated in a cross-sectional study of Iranian EFL learners' polite and impolite apologies stated that, successful communication is the joint product of linguistic as well the sociolinguistic competence, with the latter competence denoting appropriateness which is closely associated with politeness. The present study aimed to investigate the politeness strategies employed by Iranian EFL learners in the speech act of apology. Data were collected from 30 EFL learners who responded to a discourse completion task (DCT) which realized the speech act of apology consisted of six situations. Data analysis consisted of three phases. First, to identify the apology strategies and politeness strategies, the study followed Olshtain and Cohen's (1983) taxonomy of apology strategies and Brown and Levinson's (1987) politeness theory, respectively. Second, 90 apology utterances, comprising 50% of the total number of utterances, were assessed by two native speakers of English on a politeness Likert scale of 1=Polite, 2=Partially Polite and 3=Impolite. Finally, drawing on the native speaker assessment of (im)politeness of the apology utterances, the researchers analyzed the utterances qualitatively in terms of appropriacy and inappropriacy. The results indicated that a) Native speakers rated 27 (30%) apology utterances as polite, 40 (44.5%) as partially polite and 23 (25.5%) as impolite.; b) the most frequent apology strategies were an 'expression of regret', 'an explanation or account of the situation', 'expressing self-deficiency' and 'an offer of repair'; c) there was a significant difference between males and females with regard to their use of politeness strategies in apology; and d) the participants relied on negative and positive politeness strategies when apologizing. In conclusion, Iranian EFL learners were only partially socio-linguistically competent in apology.

Shoshana Blum-Kulka et al., (1984), studied on "Request and Apologies: A Cross-Cultural Study of Speech Act Realization Patterns (CCSARP) and the paper reports on an ongoing project

concerned with a cross-cultural investigation of speech act realization patterns. The goals of the project are to compare across languages the realization patterns of two speech acts—requests and apologies—and to establish the similarities and differences between native and non-native speakers' realization patterns in these two acts in each of the languages studied within the project. The theoretical and methodological framework for this investigation has been developed as a result of close collaboration among the participants of the project, who have all followed the same approach in data collection and data analysis. The paper will outline the theoretical framework for the project, present the methodology developed, and illustrate our procedures for analysis by giving examples from the data in some of the languages studied.

Nina Daskalovska et al. (2016), studied “The Use of Request Strategies by EFL Learners”. The aim of this study is to investigate the use of request strategies by English language learners in the Republic of Macedonia. The participants in the study are students of English at an intermediate level of proficiency. **The testing instruments include role-plays and discourse completion tasks.** The participants' responses were analyzed according to the classification of request strategies proposed by Blum-Kulka et al. (1989). The analysis shows that the most frequently used types of strategies in both formal and informal situations are query preparatories which belong to **the group of conventional indirect strategies.**

Objectives:

- 1) To investigate the problematic and interrelated fields of oral communication in the workplace in Lao Institutions of Higher Education not work.
- 2) To investigate the problematic and interrelated field of the sources of miscommunication between project partners of Savannakhet University and the University of Education Karlsruhe.
- 3) To examine the perceptions and observations of staff regarding the obstacles to effective communication at the workplace and within the Lao-German cooperation project

Research questions:

- 1) Why does oral communication in the workplace in Lao Institutions of Higher Education not work?
- 2) What are the sources of miscommunication between project partners of Savannakhet University and the University of Education Karlsruhe?
- 3) What are the perceptions and observations of staff regarding the obstacles to effective communication at the workplace and within the Lao-German cooperation project?

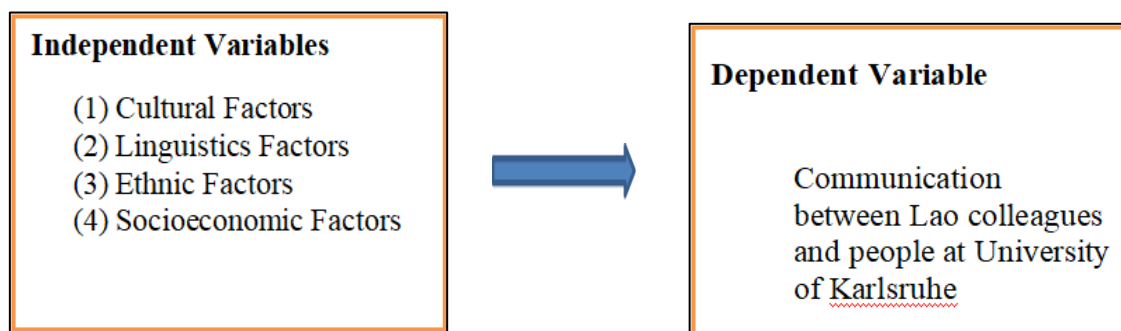
Scope of study:

The research site will be located in Savannakhet University (SKU), work plan for year 2020 from February to December. The sample population of all staff who work related to the General Affairs and External Relations Office of the SKU. The sample size comprised 35 participants in all, with a hundred (100) percent of this number coming from each of these 8 faculties and 7 offices.

Expectation outcomes

1. Get to know the reasons why oral communication in the workplace in Lao Institutions of Higher Education not works.
2. Get to know the reasons why the sources of miscommunication between project partners of Savannakhet University and the University of Education Karlsruhe.
3. Get to know the perceptions and observations of staff regarding the obstacles to effective communication at the workplace and within the Lao-German cooperation project.

Scope of research:



Problems that this paper will address:

- (1) Oral communication (speaking) does not work at SKU amongst Lao colleagues.
- (2) There is miscommunication between SKU and University of Karlsruhe; the paper will talk about the factors affecting the communication.

Theories:

Speech act theory: this theory classifies language use according to purpose (for example: apology, request and refusal)

Politeness theory: this theory based on the concept of “Face” / “Saving Face” which is culturally common in Asia and uncommon in the west.

Intercultural theory: this theory based on the identity, motivations, and representations are three theoretical factors important for intercultural communication.

Methodology

Context of the Study

This study investigates two problematic and interrelated fields: 1) Why does oral communication in the workplace in Lao Institutions of Higher Education not work? (2) What are the sources of miscommunication between project partners of Savannakhet University and the University of Education Karlsruhe? The study examines the perceptions and observations of staff regarding the obstacles to effective communication at the workplace and within the Lao-German cooperation project. The sources and causes of misunderstandings in written and oral communication between language users from maximally different cultural, linguistic, ethnic, and socio-economic backgrounds.

Research Setting

The research was conducted in the main campus of the Savannakhet University, Lao PDR. This comprised of 33 staff including, 8 deans / vice deans / directors and 5 staff from the General Affairs and External Relations Office, 16 staff working for the Cooperative Unit from 8 faculties and 4 staff from the Research and Post Graduate Office. This setting was chosen to help the researcher sample a large number of staff towards the achievement of the objectives of the study.

Population and Sample Size

The study had a sample population of all staff who work related to the General Affairs and External Relations Office of the Savannakhet University. The sample size comprised 35 participants in all, with a hundred (100) percent of this number coming from each of these 8 faculties and 7 offices. The selection of participants was done based on Krejcie and Morgan.

Estimation of sample size in research using Krejcie and Morgan is a commonly employed method. Krejcie and Morgan (1970) used the following *formula to determine sampling size*:

$$S = X^2NP(1-P)/d^2(N-1) + X^2P(1-P)$$

S = required sample size.

X² = the table value of chi-square for one degree of freedom at the desired confidence level (3.841).

N = the population size.

P = the population proportion (assumed to be .50 since this would provide the maximum sample size)

d = the degree of accuracy expressed as a proportion (.05)

Sources: Krejcie & Morgan, 1970

Based on Krejcie and Morgan's (1970) table for determining sample size, for a given population of 35, a sample size of 32 would be needed to represent a cross-section of the population.

Research Design

This qualitative and quantitative study was designed to investigate 1) Why does oral communication in the workplace in Lao Institutions of Higher Education not work? (2) What are the sources of miscommunication between project partners of Savannakhet University and the University of Education Karlsruhe?. The interviews and questionnaires were used in collecting the data.

Data Collection Technique

A structured linguistic factors and socioeconomic factors questionnaire was adopted from reviewing the theories of many authors from all over the world, as a means of data collection. This was distributed to 35 staff in Savannakhet University.

A structured cultural and ethnic factors interview was adopted from reviewing the theories of many authors from all over the world, as a means of data collection. This was distributed to 35 staff in Savannakhet University.

Instrument

The instrument used for this study was the Savannakhet University Staff, in identifying the sources and causes of misunderstandings in written and oral communication between language users from maximally different cultural, linguistic, ethnic, and socio-economic backgrounds. This instrument was modified to meet the objectives of the study. This was developed by the researchers. It consisted of **34** items which were grouped under cultural, linguistic, ethnic, and socio-economic backgrounds.

The questionnaire comprised of two sections:

Section A of the questionnaire was used to collect personal information data which included the genders, Professional Position and date as well as their work place.

Section B of the questionnaire was used to collect linguistic factors data socioeconomic factors. The linguistic factors included the biggest hurdle when speaking, writing, reading and listening to English, and a significant difference between American-English and German-English. The socioeconomic factors included furthest education of its own staff and his/her parents, place of birth, number of jobs, experience outside of Laos, resources in the Lao professional setting,

The interview comprised of two sections:

Section A of the interview was used to collect cultural factors data which included the cultural practice in Western and Lao cultures, time of Western and Lao cultures, one express to another person, someone makes mistakes, differ in terms of timeliness, culture in terms of gender, culture in terms of respect to superiors, cultures differ in terms of work ethic as well as working with Erasmus+ of Savannakhet University's staff.

Section B of the interview was used to collect ethnic factors data which included the ethnic minority, ethnic language and some sounds of ethnic language that helps and block their English language ability.

Analysis of Data

The main aim of this study was to investigate two problematic and interrelated fields: 1) Why does oral communication in the workplace in Lao Institutions of Higher Education not work? (2) What are the sources of miscommunication between project partners of Savannakhet University and the University of Education Karlsruhe?, The study examines the perceptions and observations of staff regarding the obstacles to effective communication at the workplace and within the Lao-German cooperation project. The sources and causes of misunderstandings in written and oral communication between language users from maximally different cultural, linguistic, ethnic, and socio-economic backgrounds.

References:

- Anat Bardi , Rusi Jaspal , Ela Polek and Shalom H. Schwartz (2014). Values and Identity Process Theory: theoretical integration and empirical interactions. Chapter · January 2014
DOI: 10.1017/CBO9781139136983.013
- Austin, J. L. (1962). How to do things with words. Cambridge: Harvard University Press.
- Brown, P., & Levinson, S. (1987). *Politeness: Some universals in language use*. Cambridge, England: Cambridge University Press.
- Derek Hook, Bradley Franks and Martin Bauer. (2011). Communication, Culture and Social Change: The Social Psychological Perspective. [http://eprints.lse.ac.uk/35983/1/Representations,_identity_and_resistance_in_communication \(LSERO\).pdf](http://eprints.lse.ac.uk/35983/1/Representations,_identity_and_resistance_in_communication_(LSERO).pdf).
- Dra. Margret Steixner Baumeistergasse 80/1 1160 Wien intercultural-perspectives.com/en
© 2019-2020 Miami University. All rights reserved.
- Ellis, R. (2012). *The study of second language acquisition*. USA: Oxford University Press.
- Erich Toll (2016). Cultural Differences in the Workplace: Perceptions of Time. bigworldsmedia
- Félix-Brasdefer, J. C. (2004). Interlanguage refusals: Linguistic politeness and length of residence in the target community. *Language Learning*, 54(4), 587-653. Retrieved from <http://ezproxy.mnsu.edu/login?url=http://search.proquest.com/docview/85612353?accountid=12259>
- Financial Dictionary. (2005). Work Organization. <https://financial-dictionary.thefreedictionary.com/work+organization>
- Gass, S., & Houck, N. (1999). *Interlanguage refusals: A cross cultural study of Japanese-English*. Berlin: Mouton de Gruyter.
- Georgia Piedmont Technical College. (2020). Work Ethics. <https://www.gptc.edu/compliance-notices/work-ethics/>
- Glossary. (2020). Mutuality of obligation. [https://uk.practicallaw.thomsonreuters.com/0-200-3365?transitionType=Default&contextData=\(sc.Default\)&firstPage=true&bhcp=1](https://uk.practicallaw.thomsonreuters.com/0-200-3365?transitionType=Default&contextData=(sc.Default)&firstPage=true&bhcp=1)
- H.A. Simon. (2001). Organizations. *International Encyclopedia of the Social & Behavioral Sciences*.
- Hiroko Tsuiki Moaveni . (2014). A Study of Refusal Strategies by American and International Students at an American University. Minnesota State University - Mankato.
- Hiroko Tsuiki Moaveni . (2014). Politeness. A Study of Refusal Strategies by American and International Students at an American University. Minnesota State University - Mankato.
- International Organization for Migration (IOM). (2019). Lao People's Democratic Republic. <https://www.iom.int/countries/lao-peoples-democratic-republic>. (online o 17
- Janaína Maria Bueno & Maria Ester de Freitas. (2018). Social representations. Social representations in intercultural context: the daily life of three Brazilian subsidiaries of multinational companies. ARTICLE. Cad. EBAPE.BR vol.16 no.1 Rio de Janeiro Jan./Mar. 2018.
- James H. Liu (2013). *Intercultural Theory*. Victoria University of Wellington

- Lao language Structure, Writing and Alphabet. © 2014 - 2020. Must Go Inc. All rights reserved. California: CST #2123223-40. <https://www.mustgo.com/worldlanguages/lao>.
- Lao script or Akson Lao. https://en.wikipedia.org/wiki/Lao_script.
- Margret Steixner Intercultural perspectives & Ndurance Intercultural training, coaching and research, Austria Inter-cultural.perspectives@gmail.com; msteixner@ndurance.at
- . Manfred Krifka April 1, 1999) Group Interaction under Threat and High Workload: Linguistic Factors. Department of Linguistics, University of Texas at Austin.
- My Accounting Course. (2020). What Is Work Ethic?. <https://www.myaccountingcourse.com/accounting-dictionary/work-ethic>
- National Geographic. Concept of Place. https://www.nationalgeographic.org/topics/resource-library-concept-place/?q=&page=1&per_page=25 (online on 17 April 2020).
- Nina Daskalovska, Biljana Ivanovska, Marija Kusevska & Tatjana Ulanska (2016). The Use of Request Strategies by EFL Learners. *Goce Delcev University, Stip, Republic of Macedonia*.
- Oson Dumartins. (2020). Work Obligation. <https://brainly.com/question/14670722>. (Online, 2 May, 2020).
- Shoshana Blum-Kulka and Elite Olshtain (1984) *Requests and Apologies: A Cross-Cultural Study of Speech Act Realization Patterns (CCSARP)*.
- Stanford Encyclopedia of Philosophy. (2007). The Mind/Brain Identity Theory. <https://plato.stanford.edu/entries/mind-identity/>
- Tamimi Sa'd & Mohammad. (2014). A cross-sectional study of Iranian EFL learners' polite and impolite apologies. *Journal of Language and Linguistic Studies*, 10(1) (2014) 119–136
- Tamimi Sa'd, S. H., & Mohammadi, M. (2014). A cross-sectional study of Iranian EFL learners' polite and impolite apologies. *Journal of Language and Linguistic Studies*, 10(1), 119-136.
- The Information Philosopher. (2000). Mind-Body Identity Theory. https://www.informationphilosopher.com/knowledge/identity_theory.html. Online 12 January, 2000.
- Trilok Sharma (2015), What are some examples of "cultural perspective"?. <https://www.quora.com/What-are-some-examples-of-cultural-perspective>.
- Wikipedia. (2020). Germany. <https://en.wikipedia.org/wiki/Germany>. (Online, 14 April 2020).
- Wikipedia. (2020). Obligation. <https://en.wikipedia.org/wiki/Obligation>. (Online, 13 March 2020).

Roles Playing of Educational Institutions in Taking Care for Juvenile Offender After Released

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Abstract

This article aims to present Roles Playing of Educational Institutions in Taking Care for Juvenile Offender After Released. The data were collected via the ideas and direct experience of the author who has been working as a social worker in juvenile justice system both in Juvenile Observation and Protection Center and Juvenile Vocational Training Center. From lesson learned. The Individual Routing Counselor (IRC) of the Department of Juvenile Observation and Protection at the Individual Development Program Ministry of Justice, this article contains findings about (1) the situation of Juvenile Offender After Released to further education. (2) the promotion of education and careers for Juvenile Offender of the Department of Juvenile Observation and Protection (3) the role playing of educational institutions and assistance to juveniles of past offenses (4) the preparation process before releasing juvenile (5) the Co-ordination the network of educational institutions for caring and supporting after released (6) the Monitoring of Juvenile after released by using the implementation a development program and treatment system for children and youth-specific remedies for individual seamlessness (IRC) with suggestions guidelines for the development of the role playing of educational institutions in caring for juvenile offender after released in order to be a guideline for prevention and solution of recidivism in juvenile.

Keywords: Educational Institutions, the preparation process before releasing juvenile, Juvenile Offender After Released

Introduction

Nowadays, juvenile delinquency problem is one of the problems that Thai society should be concerned since such problems getting more violent and increasing. People in society are aware of from the news in various media which found that the offender has involved children and youth or the offender himself. Both public and private organization involved in this matter have given importance to and developed preventive and problem-solving work. However, it still found that the problem of juvenile delinquency has not diminished, and juvenile delinquency continues after release.

The author, as has worked as a social worker for 14 years in both the observation and Protection Center and youth training center viewed that prevention and solution of juvenile delinquency is a huge challenge Government agencies cannot solve the problem of only one organization. It is necessary to have cooperation network partners in all sectors including government, private and civil society in preventing and solving problems. The most importantly, people in society

must focus on the problem of children and youth as a problem for everyone. They must understand the problem and be ready to give children and youth the wrongdoing to return to society.

Methodology

This article aims to present Roles Playing of Educational Institutions in Taking Care for Juvenile Offender After Released. The data were collected via the ideas and direct experience of the author who has been working as a social worker in juvenile justice system both in Juvenile Observation and Protection Center and Juvenile Vocational Training Center. from lesson learned. The Individual Routing Counselor (IRC) of the Department of Juvenile Observation and Protection at the Individual Development Program Ministry of Justice, this article contains findings about (1) the situation of Juvenile Offender After Released to further education. (2) the promotion of education and careers for Juvenile Offender of the Department of Juvenile Observation and Protection (3) the role playing of educational institutions and assistance to juveniles of past offenses (4) the preparation process before releasing juvenile (5) the Co-ordination the network of educational institutions for caring and supporting after released (6) the Monitoring of Juvenile after released by using the implementation a development program and treatment system for children and youth-specific remedies for individual seamlessness (IRC) with suggestions guidelines for the development of the role playing of educational institutions in caring for juvenile offender after released in order to be a guideline for prevention and solution of recidivism in juvenile.

Results

1. The situation of Juvenile Offender After Released to further education

From the annual report of the Department of Juvenile Observation and Protection Ministry of Justice found that statistics of recidivism among children and youth across the country is a tendency for more repeat offenses by comparison since 2017 2009-2015. It is found that in 2009, repeated offenses were 13.57% in 2010, representing 12.62% in 2011, accounting for 15.86% in 2012, representing 12.03% in 2013, representing 18.63% in 2014, representing 20.50% year 2015 accounting for 19.03 percent.

Table of number and percentage of juvenile delinquency cases compared to cases prosecuted by observation centers nationwide from 2011-2015

	B.E.				
	2011	2012	2013	2014	2015
Total number of arresting cases	35,049	34,276	36,763	36,537	33,121
Number of cases of repeated offenses	5,559	4,125	6,849	7,490	6,302
Percentage of cases in which the offender was repeated	15.86	12.03	18.63	20.50	19.03

Source: Case Statistics Report Department of Juvenile Observation and Protection

Follow-up on recidivism shows that the duration of most repeated juvenile delays is within 12 months after the release. According to Sinder's studies (Snyder, 1998) referenced in Wirada Wangrattana, 2000) shows that 91 percent of repeat offenders will repeat the same offense at that time and (Melzner & Weil, 1993, cited in Suphaphong Thongrat, 1988). 59 percent of those released or punished by the behavior correction institutions Of Massachusetts during the year 1959 returned to this institution again. In which one returned, in violation of the rules or promises of parole, the rest returned by the new offense. As for the Utha state report, 49 percent of respondents reported self-report committed another offense in the period of 6 - 12 months (Andrew, Reed & Randall, 2000, quoted in Angkhana Bunsit, 2002) And from a long-term study of 5 years to examine the release of children and young people a report from the Oregon Youth Control Center returned to the community, found that within 12 months, 40 percent of youths returned to this place of control and only 47 percent had jobs and were in the school system within 6 months after their release. The youngsters who have worked and are in the school system for 12 months continuously do not return to this youth control place.

After studying the education of juvenile delinquents, it was found that the education levels number one is Junior high school level, the second is the upper and lower secondary level which is the primary level and the last one is uneducated. Moreover, when studying the problems of decision making dropout among Thai students nowadays which is one of the problems that government agencies especially educational institutions working to fix the problem in which society may consider students who drop out may be due to problems in the family, poor bored and stressed about studying in class, addicted to games, addicted to friends, evacuation as parents have family problems, adaptation in the school, helping family, unwanted marriage or pregnancy Illness or accident, brawl, drug addiction, being arrested or have a lawsuit.

According to the data of dropout students from OBEC since the academic year 2005-2014, it was found that the causes of dropout were two important changes: during 2005-2008, the problems that had a high proportion to dropout was a poor position, migration followed by parents having family problems, having problems, adjusting to marriage and providing money and facilities to family. Nevertheless, during the year 2009-2014 the cause of dropout changed from the original which is a problem of migration as according to parents having trouble adjusting, having family problems, must find a family, marry, and poor. From the information, it says that each student dropped out because of various reasons. However, the real reason causing students to drop out may result from multiple problems combined. The cause of the big problems may be divided into 3 causes which are 1. from themselves, 2. from family, and 3. from school, each of which causes each other to make the problem more serious.

At that individual level, some of the children that drop out live life without a goal and are likely to cause problems for society such as drugs and organized crime. According to information from Mrs. Ticha Na Nakorn, director of the Center for Training of Children and Youth Ban Kanchanapisek said that in 2005 there were about 36,000 children and youth entering the Observation and Protection Center nationwide, most of them being junior high school students. Nationally, Thailand invests in education with a high budget allocation each year in order to improve the quality of human resources. However, the results are not satisfactory according to Dr. Warakorn Samkoset, 7 out of 10 people of the Thai labor age population only have the highest education at primary level. If looking at education as human development in the nation will affect the country's development. In the future dropout is probably one of the big problems that can lead to economic and educational waste. Including various social problems, helping all parties to support Thai children receive the highest education according to their potential is very necessary.

Therefore, the author considers that encouraging juvenile delinquents to receive further education or professional training is an important way to prepare before releasing and preventing juvenile recidivism.

2.The promotion of education and careers for Juvenile Offender of the Department of Juvenile Observation and Protection

Department of Juvenile Observation and Protection is a government department under the Ministry of Justice Principles for protection of the rights and benefits of minors according to the judgment or by orders of the court and protection. Protection rights, the welfare of children or juvenile delinquents who enter justice process during the trial and after the trial. The said procedure has 77 juvenile observation and protection centers nationwide and when the court has issued a judgment order that children or youth to get training. The juvenile training and training center will be the agency responsible for controlling, correcting, rehabilitating, rehabilitating children and youth which currently has 19 locations. When the juvenile court considers that children and youth are trained Children and youth will be sent to receive training at the Training Center. The place has the role of supervising, treating, rehabilitating, preventing, developing behavioral and child and youth welfare that the court has issued a judgment or order to attend the training and carry out community activities and collaborate for the protection of children's rights. Each youth training center has a pre-release process for children and youth. Moreover, following up and helping after release to reduce the problem of recidivism. Nonetheless, there are still limitations in the performance of both personnel and workload. Various networks both education and occupation, as well as the community which are also less involved in preparing for the release of children and youth.

3.The role playing of educational institutions and assistance to juveniles of past offenses

Regarding the prevention of offenses among students, it was found that the Department of Juvenile Observation and Protection has collaborated with various institutions to organize a project to promote and support the school together with the network to prevent behavior and wrongdoing of children and youth permanently. In collaboration with educational institutions and networks to prevent behavior problems and wrongdoing of students and students in schools by establishing a model school to prevent behavior and wrongdoing of children and youth sustainably. To achieve continuous and clear action, this project aims to reduce the number of students. Students enter the judicial process and to reduce problem behaviors of students. Students who participated in the activities in the past year 2018 have set up observation centers around the country as well as conduct joint projects with at least 6 educational institutions in every province, in which 6 educational institutions operate according to the model of at least 1 educational institution.

4.The preparation process before releasing juvenile

The preparation for children and youth who be released from the juvenile training center is to solve problems for children and youth who have problems before being released and after being released by providing social services in various fields to help or support children and youth to be able to solve problems and meet the needs of children and youth. Therefore, that children and youth are ready and able to return to their families and live normally. In terms of community preparation, found that there is still no way to work with various networks, including community activity coordinators at each training center with only 2 manpower, the social worker and psychologist. This makes it difficult to prepare work before releasing to all children and youth according to the problems and necessities if they do not work with families and partners in various networks, government, private and community networks.

In this regard, preparation for children and youth before release at the juvenile training center which are;

1. Arrange for preparation for children and youth who are due for release for children and young people who do not have any problems. Children or young people who have problems such as homelessness, relatives and need to be prepared since training.

2. Organize individual and group preparation for children and youths so that they can adjust themselves in terms of behavior, mind, emotion, and rehabilitation in various areas according to academic principles.

3. Provide solutions for children and youth who have problems before and after their release, as well as provide social services in various areas to provide assistance to children and youth who have problems especially children and young people without relatives who lack dependency or have family problems or whom who do not wish to return to the original family to have a place to live, eat, sleep, and receive the opportunity to develop skills while waiting for work or for further study, etc. as well as to prevent recidivism

4. Arrange to have preparation for the family, children and youth including providing opportunities for communities, societies, as well as various external agencies, both government and private sectors, to participate in preparing children and youth. Also provide an opportunity for the community to understand and more accept children and youth who are delinquent.

5. Mobilize the resources available in the community to solve, treat, rehabilitate, develop and help children and youth as well as to prevent juvenile delinquency. Including crime prevention.

5.The Co-ordination the network of educational institutions for caring and supporting after released

Nowadays, all departments give importance to the creation of network partners in both public and private networks and civil society. Department of Juvenile Observation and Protection is an organization that focuses on working with networks to prevent and resolve juvenile delinquency problems. Recently, it was found that the steps were taken to create network partners to support rehabilitation and rehabilitative work for children and youth both in education occupation, necessary welfare, treatment and rehabilitation of children and youth, etc. with the operation. There was a memorandum of cooperation with various organizations (MOU), both public and private, such as juvenile and family court Ministry of Labour Department of Skill Development Office of the Vocational Education Commission Office of the Permanent Secretary, Ministry of Education, Department of Mental Health, Faculty of Social Work of Thammasat University, etc. by making a memorandum of cooperation in helping issues related to children and youth as well as assigned to each observation center to prepare a memorandum of cooperation in the next level.

6.The Monitoring of Juvenile after released by using the implementation a development program and treatment system for children and youth-specific remedies for individual seamlessness (IRC)

Monitoring and assistance after release is an important process since juvenile offenders must be sent to receive training in the juvenile training center. It frees children and young people from their normal family, community and society for a period of time, depending on the severity of the nature of their offenses. While the children and youth receive training and training Family condition Community and society will inevitably change. When these children and young people are liberated,

they are not able to adapt to their families, communities and societies in the initial stages. Including some children and young people may have problems such as family problems, lack of attention, lack of love and warmth, failure family, can not get along with parents, parent cannot raise or orphaned or without relatives. As well as when children and youth return to the former social community, then may experience many problems, such as social communities do not accept them. The child is unclean. (Stigmatization) that "is brat or bad children or children are arrested for training." no job, no opportunity to continue education because of poor status, do not have a scholarship or are unable to find a place to study because the school does not accept or miss defenseless. Lack of professional knowledge resulting in unemployment which cause ability to find a job, these youth do not have a career. This is because they lack of sponsors or without a place to live, wandering in various places or inappropriate housing conditions in a vicious source such as a drug source, sources of gambling, entertainment, or fraudulent behavior. Due to various problems mentioned above, if there is no protected, monitored, cared for, resolved and assisted, these children and youth may have to go back to recidivism

For this reason, many civilized countries are aware of the danger of recidivism. Therefore, it is important to monitor children and youth after release, prevent of recidivism problems as well as provide relief to children and youth who have problems after releasing effectively. This is to prevent children and young people from returning to commit crimes repeatedly (Tassanee Lakkhana Phichanachat, Sudjit Jennopkarn and Anucha Muangyai, 2006, Nor. 19-20). Currently, the Department of Juvenile Observation and Protection a seamless individual rehabilitation program for children and youth (IRC) has been carried out in each youth and training center nationwide. To focus on reducing recidivism is a concept that develops effective guidelines for rehabilitation using the foundation 180 | behavioral interventions and programs for youth at risk that responsible for treatment, rehabilitation and juvenile delinquency. Moreover, it is an example organization that is successful in returning good children to the society of the Netherlands. In the program name "Uninterrupted Tailor made Routing", a systematic and effective rehabilitative treatment program that has been studied. The objective is to develop alternative approaches to treating children instead of detention by using communities and societies to participate in treatment and reintegration of children and youth into society. There are methods of rehabilitation that correspond to the problems and needs of each child and youth. Then, give priority to rehab rehabilitation in a designated place, equivalent to rehab rehabilitation in the community. Also focus on the connection of management by creating work processes from the beginning into the training center until releasing back to society, including establishing a follow-up system to help look after children and youth and families after returning to the community. Then focus on coordination from all relevant sectors to reduce the risk of behavioral problems and repeat offenses.

The study of the project on the development of a system for the treatment and rehabilitation of children and youths in the past seamlessly as operational research, with a duration of 3 years from September 2013 to September 2016, with the Juvenile Training Center Region 1, Rayong, as a pilot area and bringing volunteer social workers participating in the project with 6 people participated in the individual routing counselor (IRC) work area, known as an individual youth counselor or IRC for a period of 2 years. After that, in 2016, the extension of the individualized juvenile care and rehabilitation system has been seamlessly extended to each juvenile training and training center with the duty of a volunteer social worker according to the framework to participate in the said project, to perform the duty of IRC, 2 juvenile training centers. In this regard, it can be seen that at the present, the seamless development of individualized juvenile rehabilitation program (IRC) is not the only pilot training center. It also has been expanded to results in each training center for the purpose of reducing recidivism in children and youth found that children and youth participated in the project can have a

clear future plan continuing education or pursuing a career in which they are interested and receive support from families, communities, and networks that support.

Discussion

Recommendations for the development of the role of educational institutions in providing care to children and youth after releasing

1.Focusing on preventative work to reduce juvenile delinquency problems. _As the Department of observation has tried to work more proactively by collaborating with various educational institutions organize activities and educate students to be aware of social threats and prevent wrongdoing among students. Preventive work cannot do only one organization educational institutions must therefore play a very important role. That must also be prevented aside from providing various academic knowledge to develop students to be good needing to enhance life skills, to be a virtuous, ethical and volunteer spirit student, and the school must have a system to take care of individual students. In additions, when a child has a problem, must not push the child out of the system. Teachers have to re-role as a case manager to help students and work as families and communities.

2.Work to promote and develop juvenile delinquents in all aspects of education and careers

At present, the training center provides education for children and youth offenders which should have the development of teaching and learning that is of the same quality and standard as the external school in parallel with continuous basic vocational training with the goal of educating children and youth compulsory lower secondary education. For those who have completed secondary education, there are 2 options: vocational education or further education in upper secondary school. Those who are already in high school or have already finished high school can choose to study in higher education or vocational education according to the standards of the development institute skill or vocational education by connecting with the needs of the labor market and entrepreneurs. In addition, professional, academic, music and sport proficiency must be promoted as well as teachers, classrooms, media, and teaching tools are also developed. Revise the professional training that is in line with the needs of the labor market. Promotion and Create readiness for self-employed and children and young people must receive activities to develop life skills, morality, ethics and volunteer work along with teaching and learning.

3.Working to monitor and help children and youth commit crimes systematically. There should be a systematic development of child and youth care since in the past there was a separate operation Government agencies work on their own mission and have relatively little cooperation with other agencies working to help children and youth. Therefore requires collaboration government agencies, private organizations, families, communities since the acceptance process until returning to society and follow up and help after release. The development of a good system, the operators themselves must not stop to develop themselves, develop team development, organization development, network development to lead to prevention and solution to juvenile problems.

4.Creating a network of working partners to help children and youth

There is establishing cooperation with general and vocational education agencies of the government and private sectors to support educational management. Learning or vocational training for children and young people by assigning roles and clear cooperation that is ongoing from the phase of correction, treatment, rehabilitation, preparation before release and after release. It should be had created a network to promote youth employment and propel the government to see the importance of promoting employment of the person acquitted by collaborating with the Department of Corrections and the Department of Probation as a career creation center in the future.

Conclusions

The above article is only a proposal based on the work experience of the author and only a small collection of data. In order to get guidelines for working to help children and youth offenders. It is very important to brainstorm from all sectors and the work will have positive results must receive cooperation from everyone in the society.

References

- Kanueng nitwihikmat (2009). *Self-view as a return to family and society of children and youth who repeat offenses Children and Youth Training Center Master's Thesis*, Thammasat University, Faculty of Social Administration.
- Chanon Komolaman. (2014). *Study summary report of 180 organizations in Utrecht, Netherlands. Between 15-19 December 2013*. Department of Juvenile Observation and Protection.
- Tassanee Lakkhana Phichanchat, Sudjit Jannakarn, and Anucha Muangyai. (2006). *Monitoring and evaluation of children and youth after releasing from Children and Youth Training Center of the Department of Juvenile Observation and Protection*. The study report of the Department of Juvenile Observation and Protection Ministry of Justice.
- Sudjit Jennoppakarn. (2003). *Paradigm in the development of justice process for Thai children and youth. Ph.D. thesis*, Thammasat University, Faculty of Social Administration.
- Suwat Suwannika. (2005). *Social factors related to male criminal behavior: a case study: Juvenile Training and Training Center Region 2, Ratchaburi Province*. Christian University Graduate School Master of Management Degree
- Office of the Permanent Secretary, Ministry of Justice. (2017). Ministry of Justice report roadmap Budget year 2017. Ministry of Justice.
- Office of Juvenile Justice System Development. (2009). *Juvenile Pre-Release Preparation Guide*. Department of Juvenile Observation and Protection

Electronic media

Department of Juvenile Observation and Protection Annual Report, Retrieved on September 16, 2019 from <http://www.djop.go.th/images/djopimage/yaer2557.pdf>

Facilitating Global Dialog for Sustainable Consumption? An Overview of Virtual Exchange Formats for Higher Education in Food and Consumer Education

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Abstract

This paper aims at exploring existing VE formats for the implementation in HESD in the domain of Food and Consumer Education, based on the reason that pressing challenges of our time can be met through global collaboration (A/RES/69/315). Virtual exchange is, thus, introduced to the domain of Food and Consumer Education. The occasion for this is to further a Lao-German cooperation initiative in HE in order to foster students' global dialog on subjective meanings on issues of sustainable consumption in the digital age. First, approaches that can be built upon are considered in their educational contexts. Then, the results of an exploratory study are presented. For the study, an analysis grid was developed and information from the corresponding websites of ten selected VE formats were analysed through qualitative content analysis. The results show that VE formats already exist which bear potential for the use in the domain. An overview of Virtual Exchange formats in HESD is given. First findings on their similarities and differences are presented and discussed, especially in combination with content and language integrated learning. Finally, further implications are outlined, and an outlook is given.

Keywords: Virtual Exchange (VE), Higher Education for Sustainable Development (HESD), Food and Consumer Education, content and language integrated learning (CLIL)

Introduction

With globalization in the context of digitalization, daily life and consumption are changing fundamentally. As a consequence it is increasingly difficult (often even unfeasible) for individuals to grasp the conditions and consequences of their own actions related to consumption (Bartsch & Methfessel 2018). In face of pressing challenges of our times, such as resource scarcity, exploitation of people and the environment, the calls for sustainable development are growing louder (Reisch & Schmidt 2017). What is needed is a critical engagement with the social, ecological, health and economic challenges connected to one's own consumer behaviour. This requires a combination amongst consumer, sustainability and digital literacies. Education seems particularly important in fostering such and in contributing to achieving the Sustainable Development Goal (SDG) 12, "Ensure sustainable consumption and production patterns" (A/RES/69/315). However, implementing cross-cutting issues, such as sustainability and digitalization, requires a lot of support and change (Mueller-Christ 2019, p. 15). In this regard, the present situation can be described as both an era of need and of opportunity: There are common efforts to meet the challenges of our time and to achieve the SDGs. Important aspects are the internationalization of Higher Education (HE) and the technology-enabled

transformation of learning processes for a digitally marked, more sustainable future (cf. Lange & Santarius 2019).

Research and practice on Virtual Exchange and Higher Education for Sustainable Development have been increasing in the past twenty-five years. These efforts have mainly focused on one domain, such as language learning, sustainability education or media education. We argue that it is important to target the intersection. Likewise, the German Advisory Council on Global Change (WBGU) asserts that in connection with digitalization and sustainable development, both ‘blatant gaps in research’ and ‘massive deficits in action’ need to be closed (WBGU 2019, p. 7). In educational contexts especially, initiatives for such a ‘future-proof education’ are needed (WBGU 2019, p. 15). This paper is embedded in the work of the research project “Digital Storytelling for Sustainable Consumption. Developing a Toolbox for Global Exchange” (D-SDG). In this project, the aim is to bring consumer education, education for sustainable development and media education together for the first time. As this cannot be done without language, a content and language integrated learning approach is pursued.

Virtual Exchange in Higher Education

Virtual Exchange (VE) is a practice in which groups of learners from different locations or from other cultural backgrounds meet in virtual spaces in order to interact, e.g. to communicate or to engage in a joint project (O’Dowd 2018, Helm 2018a). VE is enabled by technology (Virtual Exchange Coalition 2015) and can be informed by research (EVOLVE 2018). In addition to the learner groups, educators or facilitators are usually involved in the support of VE (Helm 2018a). In summary, “[v]irtual exchange combines the deep impact of intercultural dialogue and exchange with the broad reach of digital technology” (Helm 2018a, p. 1). The concept and practice of virtual exchange are not new. For example, as early as 1988, students from 12 schools each in the USSR and in the United States were connected in the New York/Moscow Schools Telecommunications Project (NYS-MSTP) in order to bring people together and initiate the cooperative resolving of global problems. This pilot later resulted in the iEARN organization and was transferred to other contexts (Helm 2018b, cf. also for an overview of VE history).

However, the term virtual exchange has only evolved in recent years and, depending on the context, different labels prevail (O’Dowd 2018). In outlining past developments and current trends in VE, O’Dowd points out that these labels mark diverse approaches and foci. In “subject-specific virtual exchange (1): foreign language learning” (O’Dowd 2018), research and practice in the area of VE are widespread, especially in school education but also in HE (cf. also Helm 2015, Guth et al. 2014). In this community, “telecollaboration”, “Online intercultural exchange”, “e-tandem” and “teletandem” are commonly used to refer to VE. For this domain, the potential of online communication has been spotted early:

“There is little doubt that online communication is an important new tool for language teaching. Students can now share documents, texts, and ideas with their teacher or classmates 24 hours a day, from school, work, or home. They can communicate quickly, conveniently, and inexpensively with an unlimited number of native speakers or other learners of the target language all over the world. They have an instantaneous access to a wide range of target language texts, audio, and video resources from data-bases around the globe.” (Warschauer 1994, p. 14)

A common aim is to engage learners in semi-authentic communication experiences (O’Dowd 2018). These efforts usually centre around the enhancement of learners’ language skills or intercultural communicative competences (Jager et al. 2016). Communication is often bilingual (O’Dowd 2018): for example, English language learners from Germany may be paired with German language learners from the US. The communication takes place in both languages and the learners are expected to provide each other with feedback. Even though there is a big quantitative difference to VE in foreign language learning, O’Dowd identifies the discipline of business studies as another

important player in “subject-specific virtual exchange (2)”, e.g. international business and international marketing. As online communication is an essential means in today’s globalized markets, VE in business studies aims at providing students with global collaboration experiences in professional contexts (O’Dowd 2018) and thus mainly builds around HE contexts. “Global virtual teams” is the common terminology here. Furthermore, researchers and educators from other disciplines have introduced VE into their respective subject areas with a “shared syllabus approach”. The terms “Collaborative Online International Learning (COIL)” or “globally networked learning environments” prevail in this approach, especially in the US. Here, the goals range on a wide spectrum and may include enhancing intercultural competence, critical thinking, broadening perspectives or collaborating on specific subject contents (O’Dowd 2018). In addition to such educator- or researcher-led initiatives, there are several professional providers offering VE-related services or ready-made VE environments, e.g. platforms and software, program structures, databases or partner matching service (“service-provider approach”, O’Dowd 2018). They were the ones to introduce the term “virtual exchange”. These providers share the motivation to connect and engage students from all over, often in order to foster cross-cultural understanding or to work collaboratively on shared global challenges.

Encompassing these different approaches many examples of VE exist in school education, where VE is not only established in language learning but also in the field of Education for Sustainable Development. In HE especially, VE has not yet arrived in a general mainstream (O’Dowd 2013, Helm 2015). Therefore, current projects aim to mainstream VE: for instance, the project EVOLVE aims at promoting VE in HE with a focus on Europe, the initiative UNICollaboration does it at a global level, and APVEA aims at promoting VE in the Asia Pacific. In the context of the internationalization of HE, approaches also vary, e.g. from endeavours using VE for serving or expanding mobility programs (cf. Jager et al. 2016) to endeavours using VE for replacing physical mobility with Virtual Mobility. While the former is supported in the VE community, practitioners and researchers distance themselves from the latter (cf. Helm 2018a). A great challenge in establishing VE in HE is that transdisciplinary cooperation occurs little and that work is hardly exchanged among disciplines (O’Dowd 2018), not at least because of the different terminology and diverse approaches outlined above. In Germany, VE is scarcely spread in HE within the domain of Food and Consumer education. A Lao-German seminar cooperation (cf. Mueller 2018) ranks among the first efforts therein.

Virtual Exchange in Food and Consumer Education: a CLIL-approach

There are some examples in VE practice where participants are supposed to discuss consumer topics, e.g. lifestyle or food. These topics are especially relevant for sustainable development (BMU 2019). However, consumer topics need to be approached and understood both natural and cultural scientifically in order to leave a shallow surface. This may be difficult, as said practices are often rooted in other disciplines. It is precisely in this examination of daily life questions that the perspective of Food and Consumer Education must be considered. In other words, the domain should not leave VE practice and research about its innate fields to other disciplines. Furthermore, VE offers various potentials for the domain in HE. The extent to which these potentials can be realized must be verified by accompanying research with the domain. First, VE can enhance learners’ intercultural learning (Helm 2018a). This reflects one of the domain’s utmost concerns, which is enabling people to understand one’s culture as dynamic and as one of various possibilities for shaping daily life: “[o]f particular importance is learners’ capacity to view their own culture(s) in dynamic relation to another group’s perspective” (Kern et al. 2006, p. 248). This also applies to the subject learning, precisely the “specific national and cultural approach to a subject as well as to the way it is taught and learned” (de Wit 2013, para. 18). Secondly, VE has the potential to provide larger groups of people in HE with cross-cultural experiences than physical mobility has in the past and will in the future:

“[...] mobility will always be limited to a relatively small percentage of the student and staff population: higher education policies must increasingly focus on the integration of

a global dimension in the design and content of all curricula and teaching/learning processes (sometimes called “internationalisation at home”), to ensure that the large majority of learners, the 80 - 90% who are not internationally mobile for either degree or credit mobility, are nonetheless able to acquire the international skills required in a globalised world.” (European Commission 2013, p. 6)

Contexts beyond the local setting can thus be opened and provide new perspectives (Kern et al. 2006) on daily life. Thirdly, VE carries potential to change into a more cooperative teaching and learning practice and even transform formal learning (cf. Kern et al. 2006). While models of ‘traditional classrooms’ in Germany are still common, in VE educators and learners need to work together closely (cf. de Wit 2013). There are not only potentials, however, as the success of implementing a cross-cultural VE depends on a multitude of variables which, in turn, can pose challenges to cross-cultural VE, e.g. its integration into syllabi and standards, the roles of persons involved, converging or diverging purposes and aims of the VE, institutional recognition and support, academic credit for students and assessment procedures, organizational issues such as time zones, academic calendars or even limited internet access, communicative differences such as interactional style or the influence of tools used, working styles and approaches, as well as attitudes to information and communications technology (Guth et al. 2014, O’Dowd 2013, Kern et al. 2006).

As with the general application of digital media for learning, the pedagogical approach and the didactic purpose and aim must form the primacy also in the implementation of VE. For instance, VE is used to promote the negotiation of meaning (cf. Kern et al. 2006) or with the aim of enabling “[...] young people to have in-depth and meaningful cross-cultural experience [...]” (Elbeblawi 2014, para. 2). However, meaningful dialog needs language to materialize. A suiting approach, thus, would be offered in content and language integrated learning (CLIL). CLIL is “a dual-focused educational approach in which an additional language is used for the learning and teaching of both content and language” (Mehisto et al. 2008, p. 9). While CLIL is content-driven, CLIL does not mean to merely change the language of instruction in a subject (Coyle et al. 2010). Rather, students should acquire and use language skills in a communicative context for unlocking contents and discursive meanings of cognitive abstractions in interaction. In other words, an additional language is introduced to subject-matter learning in order to serve as a ‘stumbling block’ to a different understanding of subject-matter concepts (Rittersbacher 2015), i.e. content and cognition. In addition to content, communication and cognition, culture as an “awareness of self and ‘otherness’” is a cornerstone of CLIL (Coyle et al. 2010). In Europe, CLIL has been hallmarked as one way of building intercultural knowledge and understanding (Marsh 2002). Especially with regards to sustainable development, this potential could be tapped in at global level. First examples using VE for CLIL are emerging (cf. Loranc-Paszyk 2017, Deutscher 2016). However, they do not operate on the intersection of digital and sustainability transformation. Such a CLIL approach, using VE to strengthen consumer literacy in combination with sustainability and digital literacy, would extend the approaches identified by O’Dowd (2018).

Aim of the study and research questions

The aim of this study was to explore existing VE formats for the implementation in the domain of Food and Consumer Education and to provide an overview of VE formats for HESD. As stated in the introduction, this is part of a larger scheme, i. e. transdisciplinary developing an educational approach, in which sustainable consumption, educational possibilities of digitalization and aspects of language learning are not considered as additives but as synergizing parts. Therefore, the research question is: Do existing VE formats offer potential for implementing global dialog among students in HE on questions of sustainable consumption? The leading questions for this paper are:

- Where are similarities and differences in existing VE formats?
- Which organizational and formal aspects influence the selected VE formats?
- What goals and intentions are associated with the implementation of VE on the providers’ part?

Owing to a background in teacher education, it was also compared whether students of Initial Teacher Education (ITE) are targeted. Teacher educators need to prepare the teachers of tomorrow, *inter alia*, “for the diverse array of challenges which they will encounter in their classrooms”, including “foreign languages and the principles of active citizenship education”, and also enable them to “integrate online technologies into their classrooms in ways which will promote both student-centred, collaborative learning and the development of critical digital competences” (The EVALUATE Group 2019, p. 5). Consequently, the practice of and research on VE in ITE is currently trending (Jager et al. 2016, cf. also Helm 2015).

Regarding the objectives of the providers and their intentions associated with conducting VE, the intended content was of interest, i.e. whether ESD, consumer fields or SDGs play a role. Due to the specific application need outlined above, other important categories were whether the Global South is explicitly addressed in the formats and in what way people from the Global South and the Global North are meant to exchange with another.

Methodology

In order to explore existing VE formats a qualitative study design was pursued. For the method, qualitative content analysis was chosen because it attempts to systematically reduce the abundance of information provided, by separating itself early and consistently from the original text, and thus allows to structure the data on the basis of its content according to the research objective (Glaeser & Laudel 2011). Respectively, an analysis grid was developed based on preliminary theoretical considerations. This served to prepare the content of the extraction. Following the analysis grid, two persons independently collected and qualitatively assessed information on the sampled VE formats from the respective websites. Thus, the data mainly consisted of written webpage text. Partially, verbal information from videos from the websites was included to incorporate sought information. The first set of analyses was then confirmed by a third person who compared the findings. Where the findings from the first run were not equal, the original source was re-assessed. Depending on the issue at hand, in the few instances in which sampled formats revert to others, e.g. another toolbox, these were evaluated only once (there is, for instance, a close link between EVOLE and Erasmus+).

Due to the higher complexity of the question of objectives and intentions, small adaptations were made. In the first analysis step, short descriptions were compiled, which were then independently coded by two researchers. Afterwards, they discussed the content reliability of the codes as well as the findings, and consensus was found. Two formats were identified as suitable for a third analysis step. For this purpose, keywords were retrieved deductively and then used as search parameters on the original websites. Corresponding paragraphs were, again, qualitatively evaluated.

Sample

For the specific research purpose and future application needs described above, a focus on VE formats was chosen as an alternative to focus on programs, projects or specific digital tools. “Format” refers to the general plan of arrangement. Ten VE formats were chosen for the analysis, building on the recommendations of an ESD expert with experience in global VE. This delimitation was constructive, on the one hand, to include popular formats in educational practice and, on the other hand, to manage with the available resources. Only formats with descriptions in English or German were considered.

Two formats were identified which explicitly address issues related to the goal of furthering global dialog between HE students from the Global South and the Global North on sustainable consumption in the digital age. Therefore, these were further analysed.

Results and Discussion

The analyses show that the VE formats examined are foremost funded by governments, less so through foundations or companies. A greater diversity is demonstrated for the question who the providers are, i.e. government organizations, public undertakings, universities, as well as non-profit

organizations (NPOs) and non-governmental organizations (NGOs). In most cases, participation is free of charge. Only in a few cases, fees are charged for licenses or for participation in training.

Support for VE can take place at different levels, e.g. technical, linguistic, intercultural or content-wise. Preparatory activities were found to be rather common, e.g. INTENT offers guidelines for taking part; iEARN offer teachers workshops, tasks for integration into the community and for the preparation of pupils, and eTwinning offers various tools for the preparation of projects including training courses, online seminars, self-study materials and self-assessment. In contrast, postprocessing seems to be less common, e.g. including presentations of the results (e.g. [1, 2, 6]) and self-assessment (e.g. [2, 3]). During the VE, dialog facilitation may help the participants to engage and, thus, several formats offer special training (e.g. [1, 2, 5, 6, 9]).

Table 1: Overview of analysed formats

	Format	Costs	Regions	Tools
platform	iEARN [1] [https://iearn.org/] NPO/NGO: online community platform for collaborative project work worldwide	membership fees vary by country	iEARN-participating countries + individuals from global community	online collaboration centre (teacher forum, youth forum)
	Soliya [2] [https://www.soliya.net] NPO: platform for student virtual exchange	fees vary by institution	global	exchange portal (web conference application, readings +classroom activities, screen sharing, white-board, chat box, quizzes, polls, recording, playback, performance review & tracking, certificates)
program + platform	eTwinning [3] [https://www.etwinning.net/de/pub/index.htm] EU-program + government institutions: platform for schools in Europe	free of charge	European + (in eTwinningPlus) neighbouring countries	online portal (info, certificates, monitoring, news, forum, courses, chatrooms, blog, focus groups), also as smartphone app
	EPALE [4] [https://ec.europa.eu/epale/en] EU-platform for adult learning in Europe	free of charge	Europe	Messages, blogs, events, topic pages, networking-tools

	Erasmus+ Virtual Exchange [5] [https://europa.eu/youth/erasmusvirtual_en] EU-program and virtual exchange platform for young people aged 18–30	free of charge	Europe, Southern Mediterranean	exchange portal (video conferencing rooms, streaming, training resources etc.), webinars, open badges
program	Chat der Welten [6] [https://chat.engagement-global.de] Public undertaking: virtual exchange program for pupils with on-site expert facilitation	free of charge	Global South + Global North (limited to availability of regional partners)	chats (online-communication, e-mail, video messages)
organizations + projects with the aim of promoting VE	EVOLVE [7] [https://evolve-erasmus.eu/] EU-KA3-project: mainstreaming VE across disciplines in HE	free of charge	Europe and beyond	online training program
	UNICollaboration [8] [https://www.UNICollaboration.org/] Professional organization for VE in HE: platform for university educators and mobility coordinators for organizing online intercultural exchange	free of charge (voluntary membership possible)	global	platform (find partners, task databank, forum, training resources, e-portfolio)
	Sharing Perspectives [9] [https://sharingperspectivesfoundation.com] Nonprofit/non-governmental organization: providing virtual exchanges	free of charge	global	online courses, online curriculum, virtual exchange programs
	The Stevens Initiative [10] [https://www.stevensinitiative.org] Public-private-partnership: cross-cultural, virtual exchanges	funds virtual exchanges	United States of America, Middle East, North Africa	webinars, website, messaging system; works together with other formats

Persons involved

An important result to emerge from the data is that the VE participants tend to be envisaged either as young people and individuals or as learners, whereas VE initiators are addressed primarily in their functions and professional roles, e.g. as teachers, professors, administrators. This finding may sound little surprising, but it possibly carries consequences: Not addressing teachers, professors, and administrators also as learners may impede them from implementing VE or participating in VE programs at all or from taking part in professional VE training. In few cases, institutions as such are addressed. The predominant participant group consists of learner groups. Where educators are involved, they may communicate beyond the organization of the exchange and thus form a second participant group content-wise. As initiators of VE, mainly educators are considered, i.e. school teachers [1, 3, 6] or lecturers in higher education [2, 8]. Only in EPALE are the participating learners the leading group of initiators. Initiators from multiple groups are explicitly aimed at by [5, 7, 9, 10]. In almost all our sample, facilitators are involved as additional persons with expertise in setting up and conducting VE projects. They may be experienced teachers as moderators [3] or specially trained people [1, 2, 5, 6]. Additionally, some formats gear to special groups as well: preschool [3], vocational [6], adult education [4]; youth organizations [5]; further staff in educational contexts (mobility coordinators [8]; all persons working at a school, including principals, librarians etc. [3]. The special role of students in Initial Teacher Education is emphasized by the EVALUTE group which is linked to UNICollaboration (cf. The EVALUATE Group 2019). Also, eTwinning launched a respective pilot in 2012 and has started the attempt to mainstream [3] into Teacher Training from 2019 on.

Limitations to VE practice exist, nevertheless. On the one hand, formats may cater to exclusive regions by design (e.g. [3, 5]). On the other hand, practice may be a limiting factor: while there are 140 countries participating in [1], neither Lao PDR nor Germany are listed as iEARN-participating country. Connecting participants from the Global South and the Global North is generally possible and implemented in places. While most of the formats incorporate selected countries or regions in the Global South [1, 2, 3, 5, 10], only Chat der Welten declares the intention to connect participants from the Global South with participants in the Global North. Overall, practice and research with the Global South appear to be relatively uncommon. Although this interpretation should not be overstretched due to limitations of the study design, this coincides with Helm's findings where no study participants had partners in "certain geographic regions, [...] for example most African countries and also a lot of Asian countries" (Helm 2015, p. 204). The latest UNICollaboration Conference Call can be read as suggesting this, too, by explicitly inviting proposals on "virtual exchange involving learners from non-western contexts and the global South" (UNICollaboration Academic Committee 2017).

Perspectives

The results indicate that in the providers' objectives two perspectives prevail. However, this finding should not lead into the trap of 'either/or', as the two perspectives can be combined in different ways. One perspective focuses more on the global society. This concerns in particular responsibility, socio-political issues or participation. Typical statements would be:

"Our mission is to empower young people to establish more effective, cooperative, and compassionate relations within and between their societies by providing high quality global education that combines the power of dialogue with the reach of new media technologies. [...] We want to see a world with inclusive and pluralistic societies where diversity is embraced and conflicts are transformed into opportunities for collaboration and collective learning."
Retrieved from [<https://www.soliya.net/about/about-us>]

“Encouraging intercultural dialogue and increasing tolerance through online people-to-people interactions [...]”. Retrieved from [https://europa.eu/youth/erasmusvirtual/objectives_sv]

The second perspective focuses more on the individual and, hence, aims at developing digital and language skills, career advancement or employability. Typical statements would be:

“Fostering the soft skills development of students, young people and youth workers, including the practice of foreign languages and teamwork, notably to enhance employability.” Retrieved from [https://europa.eu/youth/erasmusvirtual/objectives_sv]

“Giving young people the knowledge, skills, and experiences they need to prosper in an interconnected world. The Stevens Initiative is an international effort to build career and global competence skills for young people in the United States and the Middle East and North Africa by growing and enhancing the field of virtual exchange: online, international, and collaborative learning.” Retrieved from [<https://www.stevensinitiative.org/vision/>]

Furthermore, the declared intentions connected to the tools provided aim at establishing dialogs (e.g. [1, 2, 4, 5, 6, 9]), promoting digital media (e.g. [1, 5, 10]), and differentiated skills (e.g. [1, 2, 4, 5, 9]). As was expected, ESD is not a major concern in all VE formats. However, it does occur. For example, teachers and pupils in iEARN should deal with the perspective of world improvement:

“In addition to connecting students’ learning with local issues and meeting specific curriculum needs, every project proposed by teachers and students in iEARN has to answer the question, ‘How will this project improve the quality of life on the planet?’” Retrieved from [<https://iearn.org/about>]

The keywords used for the third analysis step with the selected formats iEARN and Chat der Welten can be assigned to three categories, 1. ESD, 2. culture and food, 3. learning outcomes. Both iEARN and Chat der Welten highlight dialog at eye level between people from different contexts. In addition to education, iEARN emphasizes global networking. Chat der Welten stresses the importance of dialog and collaboration between the Global South and North in its objectives, while the focus is on global learning. Similarly, to the Fridays for Future movement and in line with the community of Global Learning, Chat der Welten argues that development is not solely a task of developing countries or the Global South:

“Vielmehr muss sich auch die Lebensweise in den Industrienationen des Globalen Nordens ändern, um nachhaltig und zukunftsfähig zu sein. Lernprozesse sind weltweit notwendig. Das

Ziel Globalen Lernens ist es, gemeinsame Wege zu finden, um unsere Welt lebenswert zu erhalten.”¹ Retrieved from [<https://chat.engagement-global.de/globales-lernen.html>]

For this, ESD-related competencies (de Haan 2010) are necessary. However, as it was not a focus of the study, the exploration does not allow to see if and how ESD-related competences are implemented in the concepts of the formats. iEARN makes references to the SDGs by displaying the SDG icons on their website and through project descriptions, reports, program evaluation, and news releases. Keywords from category 2 (culture and food) are not elaborated further on the main pages, but rather appear in project descriptions. Terms from category 3 (learning outcomes) play a subordinate role, as the global concern is in the foreground. In Chat der Welten, terms from all three categories are used equally, which corresponds to their mission statement.

Negotiating subjective meanings

Subjective meanings play an important role in our concept, since they are a way to assess (one's own) subjective theories. Rethinking one's own in comparison with others offers the potential to put unquestioned actions and behaviour to the test and possibly lead to the strengthening or changing of knowledge and routines connected to everyday life. The danger of reproducing stereotypes and negative attitudes makes it clear that this potential is not self-propelling. Helm points out that such educational aims are tied to societal and political contexts, which need to be reflected upon:

“Educators often express discomfort when faced with the political dimension of education (Pennycook, 1994/2017) and virtual exchange (Helm, 2015), but it is important to remember that ALL education is political, even maintaining the status quo. [...] Once we recognise the political dimension of our work, it becomes important to be aware of the kind of relationships it is that we are establishing, how we build these relations and the power dynamics that exist and are negotiated within them. Relations can be consciously and/or unconsciously coercive but they can also be based on principles of mutuality and reciprocity. They can be superficial and lead to banal essentialisms (Piller, 2016), reinforcing negative stereotypes and ethnocentric attitudes; but they can also be transformative, leading to a greater awareness of one's own situatedness and can open up the way to further search for encounters that will shape our knowledge and identities.” (Helm 2018b, p. 55)

For example, organizational questions, e.g. in which language should the VE project take place, are influenced by this. Recently, VE shows a tendency to shift from bilingual models to the model of lingua franca (Helm 2015, p. 199). In the former, foreign language learners communicate with native speakers. In the latter, people of diverse speech use a language that is non-native to all of them which may be less threatening. In examples from Europe, the “lingua franca” is most commonly English. However, examples include other languages, e.g. French, German, Spanish (Guth et al 2014, p. 3). Both, VE and CLIL have been proven conductible with different languages. Further, “[s]ynchronous interaction has been the predominant choice” for research on the negotiating of meaning in foreign language learning (Kern et al. 2006, p. 244). Both synchronous and asynchronous interaction offer

¹ “Rather, the way of life in the industrial nations of the Global North must also change in order to be sustainable and fit for the future. Learning processes are necessary worldwide. The goal of global learning is to find common ways to maintain our world as worth living in”, translated from the German original by the authors.

advantages (cf. Helm 2015), and the choice must be coordinated with the didactic aim. For instance, in setting up VE according to our concept, synchronous interaction might be favoured, even though it is more difficult to align with Lao-German time zones and academic calendars.

Limitations

As exploratory research, this study is limited in several ways. First, the sample included a modest sample selection, while other formats do exist. Second, the qualitative information and interpretation is subject to the researchers' bias. For example, a European perspective is mirrored in the selection of the CLIL approach and VE formats. Although the study findings can lay the groundwork to future studies, they cannot be generalized.

Conclusions

This paper aimed at exploring existing VE formats for the implementation in HESD in the domain of Food and Consumer Education. It has highlighted the importance of transdisciplinary work in educational practice and research, combining consumer education with sustainability literacy and digital literacy, and, for this, suggested a CLIL approach. The results of our study show that VE formats already exist which bear potential for the domain of Food and Consumer Education in general. However, it was shown that none of these formats brings the three areas together. Furthermore, the study indicated similarities and differences in existing VE formats, which need to be carefully reflected in the intended educational context. These findings could be useful for other researchers and practitioners who would like to implement VE in SDG contexts. For the specific concept of engaging students in HE in discussing subjective meanings of sustainable consumption in VE with partners from both the Global South and the Global North, the analysed VE formats are more or less suitable. A didactic concept is required for this purpose and, hence, marks the next step of our research.

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References

- Bartsch, S. & Methfessel, B. (2018). Zukunftsfaehige Ernaehrungsbildung in einer globalisierten Esswelt. ['Sustainable Nutrition Education in a Globalized World of Food']. *Ernaehrung im Fokus*, (09–10), 290–296. Retrieved from https://www.bzfe.de/_data/files/leseprobe_5682—_2016_eif.pdf
- BMU – Bundesministerium fuer Umwelt, Naturschutz und nukleare Sicherheit (2019). *Nationales Programm fuer nachhaltigen Konsum* ['National Programme for Sustainable Consumption'] Bonn: BMU. Retrieved from https://www.bmu.de/fileadmin/Daten_BMU/Pool/Broschueren/nachhaltiger_konsum_broschuere_bf.pdf
- Coyle, D., Hood, P. & Marsh, D. (2010). *CLIL: Content and language integrated learning*. Cambridge; New York: Cambridge University Press.

- de Haan, G. (2010). The development of ESD-related competencies in supportive institutional frameworks. *International Review of Education* 56 (2–3), 315–328. Retrieved from https://www.researchgate.net/publication/225773272_The_development_of_ESD-related_competencies_in_supportive_institutional_frameworks
- de Wit, H. (2013, June 1). COIL - Virtual mobility without commercialization. Retrieved from <https://www.universityworldnews.com/post.php?story=20130528175741647>
- Deutscher, J. (2016). Searching for telecollaboration in secondary geography education in Germany. In S. Jager, M. Kurek, & B. O'Rourke (Eds.), *New directions in telecollaborative research and practice* (pp. 321–328). Dublin; Voillans: Research-publishing.net.
- Elbeblawi, S. (2014, August 11). The Soliya Connect Program—10 Years of Building Meaningful Connections. Retrieved from <https://www.soliya.net/news/soliya-connect-program-10-years-building-meaningful-connections>
- European Commission. (2013). European higher education in the world. Communication from the commission to the European parliament, the council, the European economic and social committee and the committee of the regions. Retrieved from <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52013DC0499>
- EVOLVE – Evidence-Validated Online Learning through Virtual Exchange (2018). What is Virtual Exchange? Retrieved from <https://evolve-erasmus.eu/about-evolve/what-is-virtual-exchange/>
- General Assembly resolution 69/315, Draft outcome document of the United Nations summit for the adoption of the post-2015 development agenda, A/RES/69/315 (15 September 2015). Retrieved from <https://undocs.org/en/A/RES/69/315>
- Glaeser, J. & Laudel, G. (2011). *Life With and Without Coding. Two methods of early-stage data analysis in theory-guided qualitative research*. ZTG Discussion Paper 31/11y. Retrieved from https://www.tu-berlin.de/fileadmin/f27/PDFs/Discussion_Papers_neu/discussion_paper_-_Nr_31.pdf
- Guth, S., Helm, F., & O'Dowd, R. (2014). Telecollaborative Foreign Language Networks in European Universities: A Report on Current Attitudes and Practices. *Bellaterra Journal of Teaching & Learning Language & Literature*, 7(4), 1–14.
- Helm, F. (2018a). *Emerging identities in virtual exchange*. Research-publishing.net. Retrieved from <https://eric.ed.gov/?id=ED585082>
- Helm, F. (2018b). The long and winding road... *Journal of Virtual Exchange*, 1, 41–63. Retrieved from <https://journal.unicollaboration.org/article/view/1042>
- Helm, F. (2015). The practices and challenges of telecollaboration in Higher Education in Europe. *Language Learning & Technology*, 19(2), 197–217. Retrieved from <https://www.lltjournal.—org/item/2910>
- Jager, S., Kurek, M., & O'Rourke, B. (2016). New directions in telecollaborative research and practice: Introduction. In S. Jager, M. Kurek, & B. O'Rourke (Eds.), *New directions in telecollaborative research and practice: Selected papers from the second conference on telecollaboration in higher education* (pp. 31–48). Retrieved from <https://eric.ed.gov/?id=ED571330>
- Kern, R., Ware, P. & Warschauer, M. (2006). Crossing frontiers: New directions in online pedagogy and research. *Annual Review of Applied Linguistics*, 24, 243–260.

- Mehisto, P., Marsh, D., & Frigols, M. J. (2008). *Uncovering CLIL: Content and language integrated learning in bilingual and multilingual education*. Oxford: Macmillan.
- Mueller, H. (2018). Vegetable Stories: Erster deutsch-laotischer Austausch im Fach Alltagskultur und Gesundheit zu Lebensmittelmärkten [‘Vegetable Stories: First German-Lao Exchange on Food Markets in the Subject Culture of Daily Life and Health’]. *PH Aktuell*, (1), 10–11. Retrieved from https://www.ph-karlsruhe.de/fileadmin/user_upload/hochschule/aktuelles/pdf/18_03_PH_AKTUELL_Fruehjahrsausgabe_2018.pdf
- Mueller-Christ, G. (2019). Bildung für nachhaltige Entwicklung als Oeffnungsprozess für einen virtuellen Hochschulraum? [‘Education for sustainable development as an opening process for a virtual place in HE?’] *Synergie*, (7), 11–17. Retrieved from <https://doi.org/10.25592/issn2509-3096.007.001>
- Lange, S. & Santarius, T. (2019). Digital Literacy fuer die sozial-oekologische Transformation [‘Digital Literacy for Social-Ecological Transformation’]. *Synergie*, (7), 22–25. Retrieved from <https://doi.org/10.25592/issn2509-3096.007.003>
- Loranc-Paszyk, B. (2016). Incorporating cross-cultural videoconferencing to enhance Content and Language Integrated Learning (CLIL) at the tertiary level. In S. Jager, M. Kurek, & B. O’Rourke (Eds.), *New directions in telecollaborative research and practice* (pp. 193–201). Dublin; Voillans: Research-publishing.net.
- Marsh, D. (2002). *CLIL/EMILE. The European dimension. Actions, Trends, and Foresight Potential*. Jyvaeskylae: UniCom.
- O’Dowd, R. (2018). From telecollaboration to virtual exchange: State-of-the-art and the role of UNICollaboration in moving forward. *Journal of Virtual Exchange*, 1, 1–23. Retrieved from <https://doi.org/10.14705/rpnet.2018.jve.1>
- O’Dowd, R. (2013). Project: The INTENT Project: Integrating Telecollaborative Networks into Foreign Language Higher education. *The EUROCALL Review*, 21(1), 54–59.
- Reisch, L. A. & Schmidt, M. (2017). Nachhaltige Entwicklung [‘Sustainable Development’]. In P. Kenning, A. Oehler, L. A. Reisch, & C. Grugel (Eds.), *Verbraucherwissenschaften: Rahmenbedingungen, Forschungsfelder und Institutionen* (pp. 103–122). Wiesbaden: Springer.
- Rittersbacher, C. (2015). Mit Sprache(n) die Sache (anders) verstehen. Zum Mehrwert bilingualen Unterrichts [‘Understanding things (differently) with language(s). On the surplus of CLIL’]. *Dialog*, 2(1), 19–24. Retrieved from https://www.ph-karlsruhe.de/fileadmin/user_upload/hochschule/aktuelles/pdf/15_07_27_PHK_2015_Dialog_03_WEB_K1.pdf
- UNICollaboration Academic Committee 2018. (2017, September 4). Call for papers to the 3rd UNICollaboration conference, Krakow 2018. Retrieved from <https://my3.my.umbc.edu/system/shared/attachments/8d5fd32f09a7e595a20e32c5ebabe6ac/5d848bf7/news/000/069/943/abc8818c03e3574658e1a5dd95d2ff8d/CFP.pdf?1504700517>
- The EVALUATE Group. (2019). *Evaluating the impact of virtual exchange on initial teacher education: a European policy experiment*. Retrieved from <https://doi.org/10.14705/rpnet.2019.—29.9782490057337>

- Virtual Exchange Coalition. (2015). Media Kit. Retrieved from [http://virtualexchangecoalition.—
org/wp-content/uploads/2015/09/VirtualExchange_MediaKit-1.pdf](http://virtualexchangecoalition.org/wp-content/uploads/2015/09/VirtualExchange_MediaKit-1.pdf)
- Warschauer, M. (1996). Introduction. In M. Warschauer (Ed.), *Virtual connections: Online activities & projects for networking language learners* (2nd print, p. 14). Honolulu, Hawaii: University of Hawai'i Press.
- WBGU – German Advisory Council on Global Change (2019). *Towards Our Common Digital Future*. Retrieved from [https://www.wbgu.de/fileadmin/user_upload/wbgu/publikationen/—
hauptgutachten/hg2019/pdf/WBGU_HGD2019_S.pdf](https://www.wbgu.de/fileadmin/user_upload/wbgu/publikationen/hauptgutachten/hg2019/pdf/WBGU_HGD2019_S.pdf)

Investigation of Lao Preservice Science Teachers' Perception toward to use Computer Simulation in Science Education of Savannakhet University Lao PDR

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Abstract

The teaching of science in Lao People's Democratic Republic (Lao PDR), generally, offers conceptual ideas to students by using mathematical equations, rather than core ideas of science. The science concepts of sound wave are fundamental and important in context of science learning at all level of education, from elementary school to higher education. Unfortunately, its abstraction and difficulty influence students to produce unscientific understanding and they learn science with no motivation. According to the mentioned problem, this paper reports a two-phase study investigating the prior conceptual understanding and science motivation of pre-service science teachers, and perceptions toward simulation-based learning in science of sound wave. The participants were 35 the first-year students in Department of science, Faculty of Education, Savannakhet University, Lao PDR. In phase I, they were investigated preconception of sound wave concepts and their science motivation using 12 two-tier multiple-choice items and 25 items of the 5-point rating scale. The study found that the pre-service science teachers held many misunderstandings about sound wave and had low level of science motivation. In phase II, they were, then, examined their perceptions toward the use of computer simulation for science learning after interacting in a simulation-based inquiry learning activity and found that they expressed positive perception on the learning, where the highest perception scores were on enjoyment (E), following by perceive of usefulness (PU), perceive learning (PL), perceive of satisfaction (PS), Flow (FL), and perceive ease of use (PEU), respectively. Moreover, the qualitative results show that they were able to interact with computer simulation and learn science concepts of sound wave from the activity. The main implications of this study are the rethinking of pedagogy used for teaching science of sound wave in order to improve the conceptual understanding of pre-service science teachers, foster their science motivation, and enhance pedagogical ideas and performance on how to teach science with computer simulation.

Keywords: *Teacher education, science education, perception, understanding, sound wave.*

Introduction

In present days, many students in the world tend to learn from computer screens and use new technology to support their study. Technology was an effective tool to support teaching in classrooms (Vreman-de Olde, 2013; Srisawasdi and Sornkhatha, 2014). Computer simulations contain visualization and features for representing an authentic system or phenomenon and their large number of features have been recognized as an effective tool for teaching and learning method in science (Blake and Scanlon 2007; Wellington 2004). In addition, computer simulations are influential tools which can make unobservable phenomena being visual representation and support conceptual learning of students in science. Many researches show that computer simulations can help student reducing alternative or misconceptions, and review and improve conceptual understanding of scientific concepts (Srisawasdi and Kroothkeaw, 2014; Suits and Srisawasdi, 2013).

In the context of Lao PDR country, it is significant to use innovative learning technology for science teaching and learning, such as computer simulations. However, science teachers in Lao PDR appear to rarely use computer simulation in their classes of elementary schools, colleges and

universities, even it adds several educational values to science learning activities. In fact, science teaching in Lao PDR seems to focus on content represented on textbooks and by teachers rather than student-centered learning approach and learning science as way of knowing. In terms of science teaching, most of science teacher in Lao PDR teach science subject in class by emphasizing mathematical equations for explaining physical phenomena and lecturing theoretical science without situational and authentic contexts. In context of teacher education program at University of Savannakhet in Lao PDR, pre-service science teacher has no a positive perception to study science because science is considered to be difficult and hard to understand, due to its abstraction and complexity by nature. As such, there is a need and call for development of teaching performance pre-service Science teacher for supporting and enhancing science learning with the use of technology-enhanced learning tools such as computer simulation. In this research, the researchers conducted a two-phase study for investigating conceptual understanding of sound wave and their science motivation of the first-year pre-service science teacher, and also examining their perception toward simulation-based learning on sound wave at Department of Science, Faculty of education, Savannakhet University, Lao PDR.

Objectives

- 1) Examining conceptual understanding of sophomore preservice Science teacher at Department of Science, Faculty of Education, Savannakhet University, Lao PDR.
- 2) Examining science motivation of sophomore preservice Science teacher at Department of Science, Faculty of Education, Savannakhet University, Lao PDR.
- 3) Examining perceptions toward Simulation-based Learning of sophomore preservice Science teacher at Department of Science, Faculty of Education, Savannakhet University, Lao PDR

Literature Reviews

Many qualities of computer simulation are potentially useful for promoting conceptual development in science and inducing cognitive tools of conceptual change (Srisawasdi and Kroothkeaw, 2014). Computer simulation is promising area for conceptual change in science (Smetana and Bell, 2012). Learning with simulation is imagine feature facilitate the integrated cognitive process of new idea and new knowledge. There are important components of learning and understanding in scientific phenomena (Cook 2006; Wu and Shah 2004). However, computer simulation is grate learning in scientific and it can be an alternative way for promoting science learning and female and male students' perception in school (Srisawasdi and Panjaburee, 2015). Computer simulations which comprise visualization and features for demonstrating an authentic system or phenomena and they have a number of structures has been recognized as an effective tool for teaching and learning method in science (Blake and Scanlon 2007; Wellington 2004). Furthermore, computer simulation can help students to participate effectively in physical sciences lessons and are referenced as appropriate tools for promote student's engagement (Khan, 2011).

Computer simulation can be effective instructional practices in promoting science content knowledge and developing process skills (Smetana and Bell, 2012). However, computer simulation usage of learning in conceptual understanding about sound and in POE-base are interesting in the new idea of simulation (Kongpet, Srisawasdi, and Feungchan, 2014).

Methodology

1. Participants

The participants in this study were 35 sophomore pre-service science teachers at Department of Science, Faculty of Education, Savannakhet University, Lao PDR. In phase I, they were involved to

explore science conceptual understanding of sound wave and their motivation to learn science in the first semester of academic year 2018. After that, they were in phase II, recruited to interact with the science lessons of simulation-based learning of sound wave and examined their perceptions toward the simulation-based learning experience in another semester later.

2. Research Instruments

In phase I, the researchers aim to explore current status of teachers conceptual understanding of sound wave and their science motivation of the sophomore pre-service science. As such, the researchers used 12 of two-tier multiple-choice items to measure science conceptual understanding of sound wave, including (i) Reflection, (ii) Diffraction (iii) Refraction, (iv) Interference, (v) Speed of sound in the different medium, and (vi) Speed of sound at the different temperatures. In order to investigate their science motivation, 25 items of 5-point rating scale questionnaire measured intrinsic motivation (IM), career motivation (CM), self-efficacy (SEC), self-determination (SDT), and grade motivation (GM). In phase II, 21 items of 5-point rating scale questionnaire measured perceived learning (PL), flow (FL), enjoyment (E), perceived ease of use (PEU), perceive of usefulness (PU), and perceive of satisfaction (PS). The structure of questionnaire was obtained from Chang's (2014) and Barzilai and Blau's (2004) studies. They were translated from English version to an identical version in Thai; one expert was recruited to identify communication validity of the items. The student teachers were required to consider each possible reason for simulation-based inquiry learning how much they agree with into five scales (1-strongly disagree; 2-disagree; 3-neutral; 4-agree; 5- strongly agree). The reliability for the overall questionnaire was 0.88.

3. Data Collection and Analysis

In order to explore the conceptual understanding of sound wave and their science motivation of pre-service science teachers in the phase I, they were administered the 12 two-tier multiple-choice conceptual understanding test and the 25 items of science motivation questionnaire for 60 and 15 minutes, respectively. For the multiple-choice test, each two-tier item was scored by 1 point and total score was 12 points. The responses of students were calculated by frequency and percentage of the complete score. In terms of exploring their science motivation, the questionnaire was classified into five motivational constructs and total score for all motivational constructs was 125 points, 25 points each construct. Their responses to the questionnaire were calculated into mean and standard deviation.

In phase II, the pre-service teachers were administered the 21 items of perception questionnaire for 15 minutes after their interaction with a lesson of simulation-based science learning of sound wave in 60 minutes. The perception questionnaire classified into six perceptual constructs, and total score for all perceptual constructs was 105 points. To analyze their perception scores, percentage was utilized to indicate their perceptual status after interacting with the simulation-based science learning. Figure 1 shows a pilot implementation of simulation-based science learning of sound wave. Moreover, the pre-service science teacher was assigned to interact with simulation in dyads and each dyad was assigned to interact and collect data into an experimental work sheet.

Results

The results are divided into two phases. The results of phase I study indicate current status of the conceptual understanding of sound wave and their science motivation of pre-service science teachers. On the other hand, the evaluation of perceptions toward simulation-based science learning of sound wave of the pre-service science teachers in phase II was reported in this section.

1. Phase I: Conceptual Understanding of Sound Wave and Science motivation

1.1 Conceptual Understanding of Sound Wave

Figure 1 reports the percentage of the conceptual understanding score of pre-service science teachers classified into misunderstanding and scientific understanding on six concepts, i.e. C1- Reflection, C2- Diffraction, C3-Refraction, C4-Interference, C5- Speed of sound in the different medium, C6-Speed of sound at the different temperatures.

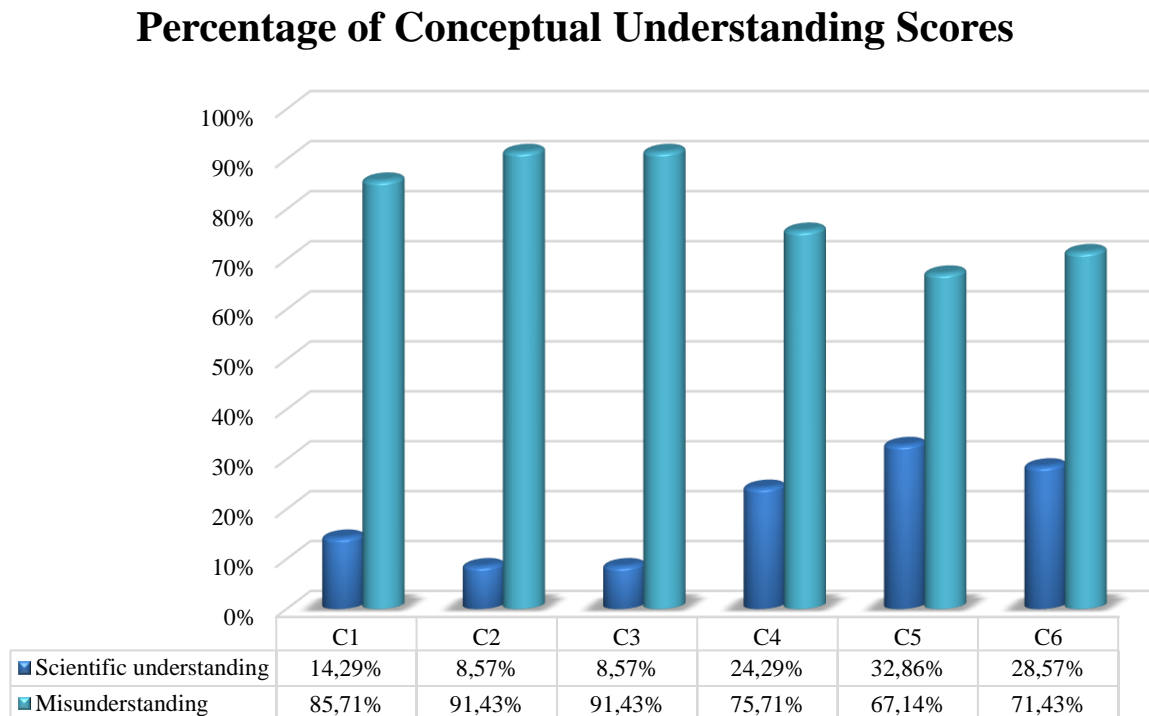


Figure 1. Percentage of pre-service science teacher's conceptual understanding scores of sound wave

In Figure 1, the highest percentage of misunderstanding was relied on C2 (91.4%), C3 (91.4%), C1 (85.7%), C4 (75.71%), C6 (71.43%) and C5 (67.14%), respectively. In addition, the percentage of misunderstanding on all concepts indicated that the pre-service Science teachers hold unscientific conceptions or understanding on science of sound wave in school science level.

1.2 Science motivation

Figure 2 displays the percentage of the science motivation scores of pre-service science teachers classified into five motivational constructs, i.e. intrinsic motivation (IM), career motivation (CM), self-efficacy (SEC), self-determination (SDT), and grade motivation (GM).

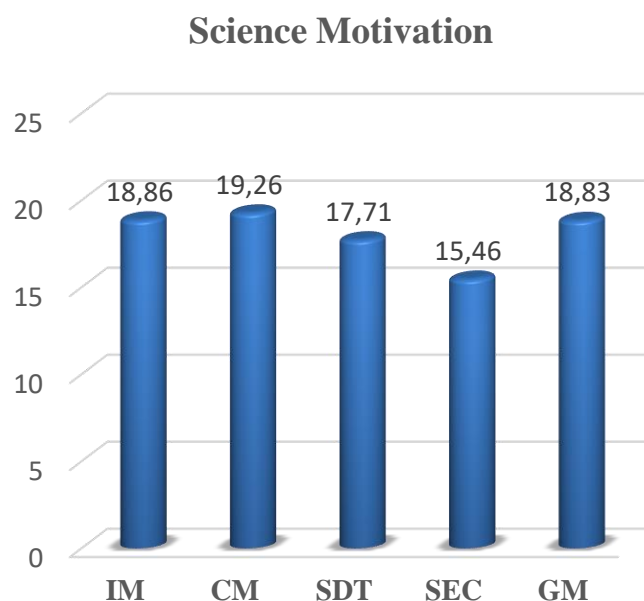


Figure 2. Mean score of science motivation

For the results of science motivation displayed in Figure 3, the highest mean score was relied on CM (19.26), IM (18.86), GM (18.83), SDT (17.71) and SEC (15.46), respectively. The Figure 3 reveals a different level of motivation on each motivational construct. This indicated that the pre-service science teachers had a high level of extrinsic motivation, i.e. CM and IM, and a middle level of intrinsic motivation, i.e. GM, SDT, and SEC, to learn science.

2. Phase II: Perceptions toward Simulation-based Learning in Science and Performance to Learn with Simulation

2.1 Perceptions toward Simulation-based Learning

To appraise the perceptions toward simulation-based science learning of sound wave of pre-service science teachers, six perceptual constructs were used to frame their perceptions. Table 1 and Figure 3 shows the percentage of their perceptions on perceived learning (PL), flow (FL), enjoyment (E), perceived ease of use (PEU), perceive of usefulness (PU), and perceive of satisfaction (PS).

Table 1: Percentage of the student teachers' perception scores

Dimension	Sample items	Percentage
Perceived learning (PL)	<ul style="list-style-type: none"> - The simulation added to my knowledge. - I learned new things from the simulation. - The simulation will help me remember the things I learned. - I have learned so much from the simulation on a computer. - 	77.57 %

Dimension	Sample items	Percentage
Flow (FL)	<ul style="list-style-type: none"> - I lost track of time when I played. - I really got into the simulation. - Playing the simulation was pleasant. - I fully concentrated on learning science through hands on computer simulation. - Learn through scientific scenarios on the computer. I cannot think of anything else that is not related at all. 	70.74%
Enjoyment (E)	<ul style="list-style-type: none"> - I enjoyed the simulation. - I had fun playing the game. - Playing the simulation was pleasant. - 	81.52%
Perceived ease of use (PEU)	<ul style="list-style-type: none"> - It is easy for me to learn how to use simulation. - The user interface of simulation is easy to use. - I can easily accomplish what I need to do in simulation. - 	70.67%
Perceived of usefulness (PU)	<ul style="list-style-type: none"> - Simulation can help me learn more effectively. - Simulation can improve my course performance. - It is useful to study the course content with simulation. - 	79.24%
Perceived satisfaction (PS)	<ul style="list-style-type: none"> - I feel comfortable to use simulation. - I enjoy the experience of using simulation. - I am willing to continue using simulation for learning in other courses. 	77.33%

Perception

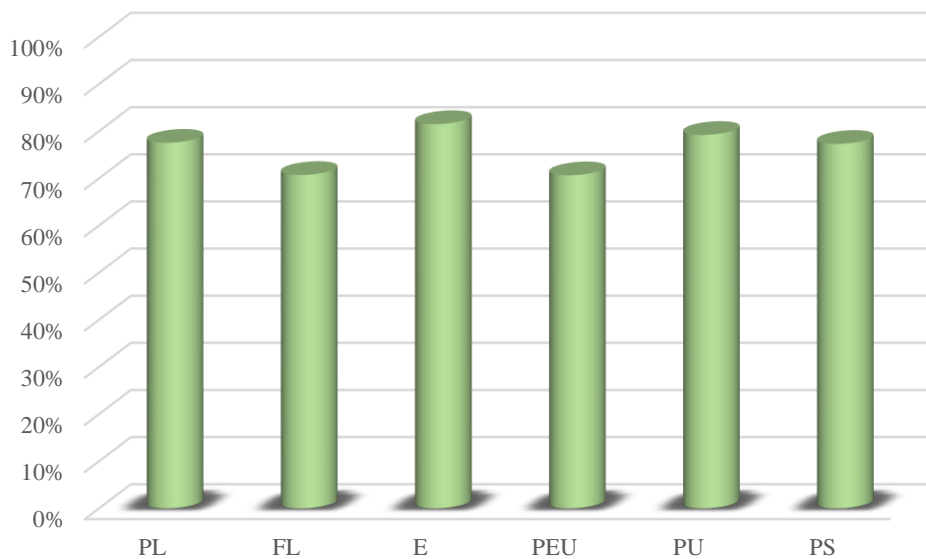


Figure 3. An illustration of pre-service science teachers' perception scores

In Figure 3, the highest percentage score of their perceptions were relied on E (81.52%), PU (79.24%), PL (77.57 %), PS (77.33%), FL (70.74%), and PEU (70.67%), respectively. The Figure 3 allows to see a positive trend of their perceptions on each perceptual construct. This represented that the pre-service science teachers had a high level of perceptions towards simulation-based learning in science of sound wave.

2.2 Performance to Learn with Simulation

The exploration of the understanding about sound wave of student teachers through the computer simulation was conducted in which six of them were asked to draw a picture concerning wave. We found that 81.79% of them could draw pictures of waves during learning with the simulation-based inquiry learning as shown in Figure 4.

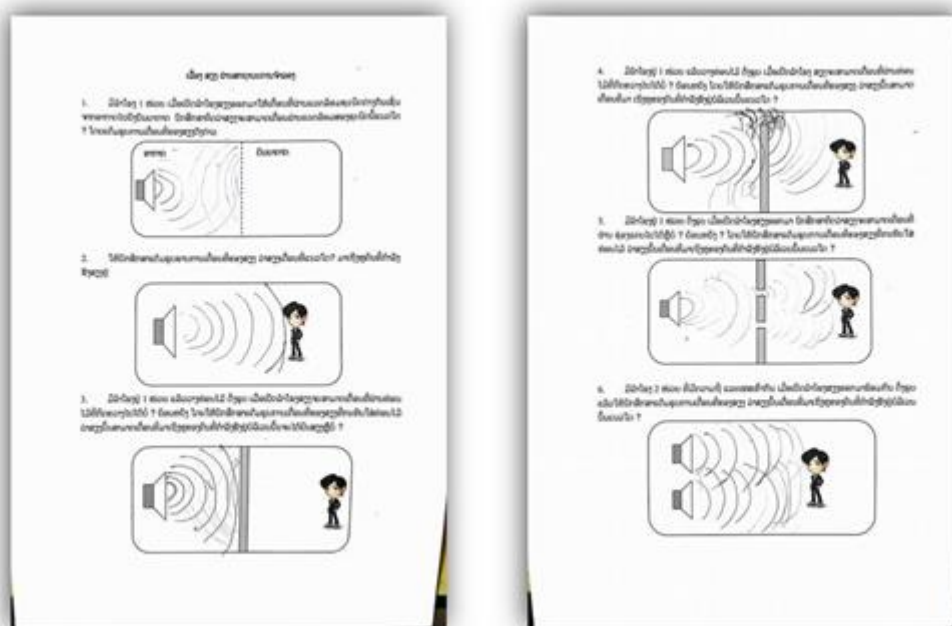


Figure 4. An example of pre-service Science teachers' conceptual understanding of sound wave

Conclusions and Future work

This two-phase study indicates current status of conceptual understanding of sound wave of pre-service science teachers of Savannakhet University, science motivation, and perceptions toward simulation-based learning with simulation. The results suggest that the pre-service science teachers held many misunderstanding or unscientific conceptions on sound wave, reflection, diffraction, refraction, interference, speed of sound in the different medium and speed of sound at the different temperatures. The results, also, indicate that they had low level of intrinsic motivation, career motivation, self-efficacy, self-determination, and grade motivation. Due to interacting with new experience of simulation-based learning, they expressed positive perception on the perceptual constructs of perceived learning, flow of experience, enjoyment, perceived ease of use, perceived usefulness, and perceived satisfaction. According to the results, the main implications of this study is the rethinking of pedagogy used for teaching science of sound wave in order to improve the conceptual understanding of pre-service science teachers and foster their science motivation. As such, a learning design of simulation-based guided inquiry approach will be implemented in a science coursework for Lao PDR pre-service science teachers. The future work is to develop a module of the approach and then implement into a real context of coursework in Lao PDR.

Acknowledgements

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References

- Barzilai, S., & Blau, I. (2014). Scaffolding game-based learning: Impact on learning achievements, perceived learning, and game experience. *Computer & Education*, 70, 65-79.
- Blake, C., & Scanlon, E. (2007). Reconsidering simulations in science education at a distance: features of effective use. *Journal of Computer Assisted Learning*, 23(6), 491-502.
- Cheng, G. (2014). Exploring students' learning styles in relation to their acceptance and attitudes towards using Second Life in education: A case study in Hong Kong, *Computer & Education*, 70 (2014), 105-115.
- Glynn, S. M., Brickman, P., Armstrong, N., & Taasooobshirazi, G. (2011). Science motivation questionnaire II: Validation with science majors and non-science majors. *Journal of Research in Science Teaching*, 48(10), 1159-1176.
- Higgins, T. E., & Spitulnik, M. W. (2008). Supporting teachers' use of technology in science instruction through professional development: a literature review. *Journal of Science Education and Technology*, 17, 511-521.
- Khan, S. (2011). New pedagogies on teaching science with computer simulations. *Journal of Science Education and Technology*, 20(3): 215-232.
- Kongpet, K., Srisawasdi, N., & Feungchan, W. (2015). Combining Context-aware Ubiquitous Learning and Computer Simulation: A Lesson Learned in Elementary Science Education. *International Conference on Computers in Education*, 23(8):236-243
- Smetana, L. K., & Bell, R. L. (2012). Computer simulations to support science instruction and learning: A critical review of the literature. *International Journal of Science Education*, 34(9), 1337-1370.
- Srisawasdi, N., & Kroothkeaw, S. (2014). Supporting Students' Conceptual Learning and Retention of Light Refraction Concepts by Simulation-based Inquiry with Dual-situated Learning Model. *Journal of Computers in Education*, 1(1), 49-79.

- Srisawasdi, N., & Panjaburee, P. (2015). Exploring effectiveness of simulation-based inquiry learning in science with integration of formative assessment. *Journal of Computers in Education*, 2(3), 323-352.
- Srisawasdi, N., & Sornkhatha, P. (2014). The effect of simulation-based inquiry on students' conceptual learning and its potential applications in mobile learning. *International Journal of Mobile Learning and Organization*, 8(1), 24-49.
- Suits, J. P. & Srisawasdi, N. (2013). Use of an interactive computer-simulated experiment to enhance students' mental models of hydrogen bonding phenomena. In J.P. Suits & M.J. Sanger (Eds.) *Pedagogic roles of animations and simulations in chemistry courses* ACS Symposium Series 1142, American Chemical Society: Washington, DC.
- Varma, K., Husic, F., & Linn, M. C. (2008). Targeted support for using technology-enhanced science inquiry models. *Journal of Science Education and Technology*, 17, 341-356.
- Vreman-de Olde, C., de Jong, T., & Gijlers, H. (2013). Learning by designing instruction in the context of simulation-based inquiry learning. *Educational Technology & Society*, 16(4), 47-58.
- Wellington, J. (2004). Using ICT in teaching and learning science. In R. Holliman and E. Scanlon (Eds.), *Mediating Science Learning through Information and Communications Technology*. London and New York: Open University Press.

ECONOMIC DEVELOPMENT

Session

1. The Study Marketing Strategy Compare Influencing Decision Making of Culture Traveling: Case Study Prasat Muang Tam and Phnom Rung in Buriram
Phuthorn kodkaew, Thonburi Rajabhat University, Thailand
2. The Relative of experience in tourism marketing and Tourist's Behavioral Intention: A case study of the old town in Ubon Ratchathani Province, Thailand
Umarin Ratree , Ubon Ratchatani Rajabhat University ,Thailand
3. Farmers' Adoption of Tobacco Production Technology in Khounkham District, Khammouane Province, Lao People's Democratic Republic.
Inta Chanthavong, Savannakhet University, Laos
4. The study of marketing factors that affect the decision to buy environmental products of Generation Y Group In Ubon Ratchathani Province
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5. Strategy for adapting to the opening up of free trade within the ASEAN Economic Community of the enterprises within the City of Phomvihane and Outhomphone in Savannakhet province.
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Faculty of Business administration
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The Study Marketing Strategy Compare Influencing Decision Making of Culture Traveling: Case Study Prasat Muang Tam and Phnom Rung in Buriram

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Abstract

The purpose of this research was to study tourists' behavior towards cultural tourism management. Prasat Hin Muang Low Buriram province To study tourists' behavior towards cultural tourism management Phanom Rung Historical Park Buriram province To study market strategies That affects cultural tourism Of Prasat Hin Muang Lue, Buriram Province and to study the market strategy That affects cultural tourism, Phanom Rung Historical Park, Buriram Province The sample group used in the study was a group of tourists, Prasat Hin Muang, 400 people, tourists group, Phanom Rung Historical Park, 400 people, using a questionnaire to collect data, a total of 800 people. Data were analyzed using the program. The statistics used are frequency, percentage, arithmetic mean Standard deviation and one-way analysis of variance F-test (ANOVA) with statistical significance level of 0.05

The study indicated that Tourists, castles, rock, low town, mostly female Aged between 20-30 years, married / living together Education Level Diploma / Diploma Occupation Trading / Private Business With income between 10,001 - 15,000 baht, mostly traveling first Use of travel vehicles is to ride a bus. With the purpose of traveling to visit field trips, study, research, know-how, just known when traveling past Most tourists have opinions about the overall marketing strategy at a high level.

Most tourists in Phanom Rung Historical Park are female. Age between 20 years of age, single status, education level, secondary school / vocational certificate, occupation, student / student Earning less than 5,000 baht, traveling for the second time, using a traveling vehicle, ie car / personal motorcycle / self-driving rental / self-chartered car, with the purpose of traveling to relax, slack Knowing from public relations media (Brochures / Posters / Television / Newspapers) Most tourists in Phanom Rung Historical Park have opinions about the overall marketing strategy at the highest level.

Keywords: Marketing Factors, consumer behavior, buying decision, green products

Introduction

In the era of borderless world, people can communicate and communicate more easily and faster. Travel and tourism is an industry that plays an important role in the prosperity, economic and social stability of Thailand. Therefore, tourists have expanded, whether traveling between countries or traveling within the country and tourism, which has created a collective business that affects business prosperity, society and tourism culture, generating income in foreign currency. Create jobs and spread prosperity into the region But under the benefits of tourism, there will also be a negative impact, such as pollution. Social and cultural changes in tourism areas Higher living costs The world situation indicates that If more people want to travel every year Will cause enormous income from tourism Countries around the world have a desire to gain this share. Therefore have to compete and

the competition tends to intensify The competitive market strategy is always different from competitors and always new.

The World Tourism Organization (WTO) predicts that the average growth rate of tourists worldwide in 2005 will be at the level of 5.5 percent (which is a lower growth rate than the year 2004, which is the year that world tourism grows significantly. Up to 10 percent) or 808 million international tourists. The growth of the tourism industry has slowed down following the global economic slowdown. The region that is expected to have significant tourism growth, including the Asia-Pacific region (+ 10%) due to tourists being interested in new tourist attractions. In the Asia Pacific region more Especially Cambodia, Vietnam, India and China with high tourist growth rates in the top regions of the region, followed by Africa region (+ 7%) America region (+ 6%) Europe region (+ 4%) and Middle East region (+ 3%) respectively

Thailand has begun to focus on tourism for more than 40 years with a vision that tourism will be an important economic branch of the country. Therefore, the policy has been planned to promote tourism and since the economic crisis that occurred in 1997, the government has accelerated to find ways to restore the status of the country. And saw that tourism from things that generated income brought foreign currency well and quickly It also helps to create jobs and distribute income to the local government. Therefore, the government is trying to push policies to promote tourism of the country.

During the past 20 years, the number of tourists traveling to Thailand has increased steadily from 2.2 million people in 1983. Over the past 4 years in 1987, the number of tourists has increased by about 1 million. At the end of the year, there are tourists. Approximately 4.2 million people, about 2 years, is the year 1990. The number of tourists passing by 4 years, tourists increase to 6 million people, 2 years later, is the year 1996 with the number of tourists. Increases up to 7.2 million people during the year 2541 to 2543 the number of tourists increased by nearly 1 million people per year since the 2544-2547 global crisis services. Therefore, affecting tourism in Thailand until in 2004, the number of tourists came in only 11.65 million people, lower than the estimate set at 12 million people. However, during the year 1984-2004, revenue from international tourists increased. Increased continuously from 27,300 million baht in 1984 to 50,000 million baht in 1987 and 3 years later, revenue increased to 100,000 million baht and increased Was 200,000 million baht in 1997, another 6 years later, increased to 300,000 million baht in 2004, with revenues of 384,000 million baht in 2005, revenue decreased to 367,000 million baht, one from the tsunami. (Santicha Ua Chongprasit, 2006: 20)

Domestic marketing strategy of the Tourism Authority of Thailand in 2005 is that the new product group is opened. Tourism in 4 types of views, including views, attractions, wonders and nature, views, adventures, views, sacred things And the perspective of living things and traditional culture (Tourism Authority of Thailand, 2005) will see that there is a focus on lifestyle travel Culture and tradition Which is related to tourism that is popular with tourists Tourism in the temple is another way for tourists to pay attention. Because this type of tourism is most closely related to Thai culture

In this study, the study selected a cultural tourism area, namely, Prasat Hin Muang Low and Prasat Khao Phanom Rung. Buriram province Which is considered a famous tourist attraction of Buriram Province But with economic and social conditions Tourism in the manner of cultural tourism in both tourist destinations is still relatively less popular compared to other places in the neighboring provinces. Based on this information, the study results in the study of comparative marketing strategies that influence cultural tourism: a case study of Prasat Hin Muang Low and Prasat Khao Phanom Rung. Buriram province To be a guideline for developing tourism and cultural tourism sites to be known and famous as well as developing to be able to be registered as a World Heritage Site in the future

Methodology

Demographic and sample boundaries.

Tourist is a group of people who come to travel for leisure. And want to experience the culture Learn history Of Prasat Hin Muang Low and Prasat Khao Phanom Rung Buriram province The total population in Buriram province is 1,541,650 people, divided into 769,670 men, 771,980 women and women (information from the Department of Local Administration, as of December 31, 2008) using accidental sampling methods. Of tourists visiting Prasat Hin Muang Low and Khao Phanom Rung Castle Which can determine the sample size by using the formula to determine the sample size of Yamane, 1973 at the 95% confidence level

The sample group consisted of 2 groups, each group of 400 people, a total of 800 people. Data analysis methods Statistics using data analysis using the program The statistics used are frequency, percentage, arithmetic mean Standard deviation and one-way analysis of variance F-test (ANOVA) with statistical significance level of 0.05

Results

Part 1 Personal information of tourists influencing traditional cultural tourism, age, status, education level, occupation and monthly income found that

1. The tourists of Prasat Hin Muang are mostly female, women between the ages of 20-30 years. The place is difficult / together. Education level Diploma / Vocational Trading / Private business Income between 10,001 - 15,000 baht

2. Phanom Rung Historical Park tourists are mostly female, under 20 years of age, single status, education level, secondary education / vocational education, students / students earning less than 5,000 baht

Part 2 Information about tourists' behaviors that influence tourism in Prasat Hin Muang Low and Phanom Rung Historical Park in Buriram Province

1. Travelers from Prasat Hin Muang, mostly traveling first Use of travel vehicles is to ride a bus. With the purpose of traveling to visit field trips, study, research, know-how, just known when traveling past

2. Most tourists in Phanom Rung Historical Park Travel to visit the second time, use the vehicle for traveling, car / private motorcycle / self-drive rental / self-chartered car, with the purpose of traveling to relax on the slack. Knowing from public relations media (Brochure / poster / television / newspaper)

Part 3 Comments on marketing strategies that influence tourism. Tourists visiting Prasat Hin Muang Low and Phanom Rung Historical Park in Buriram Province found that

1. The tourists in Prasat Hin Muang, mostly have opinions about the overall marketing strategy at a high level. Can be summarized as follows Products and services Influence on tourism of Prasat Hin Muang Low Overall at a high level But when considering each item, it was found that the influence of tourism was at a high level, which was the hospitality of the tourist attractions. Travel safety Maintaining cleanliness of tourist attractions Staff service Various facilities Information system There is a bathroom to provide proper service. Tourism activities Staff assistance And regulations related to travel, respectively

Price of products and services Influence on tourism of Prasat Hin Muang Low Overall at a high level But when considering the details, it was found that the influence of tourism was at a high level, ie, the price of the product matched the needs of tourists. Setting prices to attract tourists The appropriateness of the price of goods sold in the castle And have a clear product price tag respectively

Distribution channels Influence on tourism of Prasat Hin Muang Low Overall at a high level But when considering each item, it was found that the influence of tourism was at a high level, ie location The location of the castle is appropriate. The location of various tourist spots of the castle is appropriate. Parking lot is appropriate. Product location Tourist attractions in the castle are clean. And have a suitable transportation system for accessing tourist attractions respectively

Marketing promotion Influence on tourism of Prasat Hin Muang Low Overall at a high level But when considering each item, it was found that the influence of tourism was at a high level.

Suitability for using advertising media Suitability for public relations Creating a brand image for the castle Signs and symbols for warning And the time for the proper carnival, respectively

Physical characteristics Influence on tourism of Prasat Hin Muang Low Overall at a high level But when considering each item, it was found that the influence of tourism was at a high level, namely cultural tourism conservation. The atmosphere in the tourist attractions is shady. Environment within the castle Castle symbol And quality and service of food and beverages respectively

In the process of buying and servicing Influence on tourism of Prasat Hin Muang Low Overall at a high level However, when considering the details, it was found that the influence of tourism was at a high level, that was the selection of products that were sold appropriately. The variety of products sold and products match the needs of tourists, respectively.

Product collection Influence on tourism of Prasat Hin Muang Low Overall at a high level But when considering the details, it was found that the influence of tourism was at a high level, namely the way of making merit in various ceremonies. Impression in practice List of Buddha images and places of worship, respectively

Coordinator Influence on tourism of Prasat Hin Muang Low Overall at a high level But when considering the details, it was found that the influence on tourism was at a high level, namely contacting tourism coordination. Information service about the castle Solving tourism activity problems Communication service Travel assistance Introduction to tourist attractions And caring for tourists respectively

2. Most tourists in Phanom Rung Historical Park have opinions about the overall marketing strategy at the highest level. Can be summarized as follows

Products and services Influence on tourism in Phanom Rung Historical Park, overall at the highest level But when considering each item, it was found that the most influential factor in tourism was the cleanliness of the tourist attractions. The influence of tourism at a high level is welcome. Rules related to travel Various facilities There is a bathroom to provide proper service. Information system Staff assistance Tourism activities Suitability of tourist attractions And the safety of tourist sites respectively

Price of products and services Influence on tourism in Phanom Rung Historical Park as a whole at a high level But when considering each item, it was found that the influence of tourism was at a high level. There is a clear product price tag. Product prices match the needs of tourists. Setting prices, attracting tourists and the appropriateness of prices for products sold in the castle, respectively

Distribution channels Influence on tourism in Phanom Rung Historical Park, overall at the highest level But when considering the details, it was found that the most influential factor in tourism is parking lot is appropriate. The location of various tourist spots of the castle is appropriate. Tourist attractions in the castle are clean. The influence of tourism is at a high level, the location of the castle is appropriate. There is a suitable transportation system for accessing tourist attractions. And the place to sell products respectively

Marketing promotion Influence on tourism in Phanom Rung Historical Park, overall at the highest level However, when considering each item, it was found that the most influential factor in tourism was the appropriateness of public relations. And signs and symbols for warning The influence on tourism is at a high level, which is the appropriateness of using advertising media. Creating a brand image for the castle And the time for the proper carnival, respectively

Physical characteristics Influence on tourism in Phanom Rung Historical Park as a whole at a high level But when considering each item, it was found that the influence of tourism was at a high level. The atmosphere in the tourist attractions is shady. Quality and service of food and beverage Cultural Tourism Conservation Environment within the castle And symbols of the castle respectively

In the process of buying and servicing Influence on tourism in Phanom Rung Historical Park, overall at the highest level But when considering each item, it was found that the most influential factor in tourism was The variety of products sold reveals that the influence of tourism is at a high level. There is a selection of products that are sold appropriately and the products match the needs of tourists.

Product collection Influence on tourism in Phanom Rung Historical Park as a whole at a high level But when considering each item, it was found that the influence of tourism was at a high level. Worship Impression in practice Method of making merit in various ceremonies and places in Yom Kippur respectively

Coordinator Influence on tourism in Phanom Rung Historical Park as a whole at a high level But when considering each item, it was found that the influence on tourism was at a high level, namely helping tourists. Information service about the castle Introduction to tourist attractions Solving tourism activity problems Communication service Tourist care And coordination of tourism, respectively

Discussion

Part 1 Personal information of tourists influencing traditional cultural tourism, age, status, education level, occupation and monthly income found that

The tourists of Prasat Hin Muang are mostly female, women between the ages of 20-30 years. The place is difficult / together with many levels of education. Diploma / Diploma. Trading / private business. Income between 10,001 - 15,000 baht. Mr. Prasert Traipongchong (2003) studied and helped tourists visiting Ubon Ratchathani province. 1. Most tourists are female between 20-30 years old.

Tourist Phanom Rung Historical Park is mostly female, aged between 20 years old, the scene of the same level, secondary education / vocational certificate, occupation, students / students earn less than 5,000 baht. (2003) conducted a study and tourism tour to visit Ubon Ratchathani More than or equal to 5,000 baht per month in accordance with the research of Areewan Sermwilakul (2004) Tourism development of Phimai Historical Park, Phimai District, Nakhon Ratchasima Province, found that single status has income below 5,000 baht per month.

Part 2 Information about tourists' behaviors that influence tourism in Prasat Hin Muang Low and Phanom Rung Historical Park in Buriram Province

Tourists, castle, rock, city, mostly low First trip Use of travel vehicles is to ride a bus. With the purpose of traveling to visit field trips, study, research, know-how, just known when traveling past Which is consistent with the research of Kamontip Chupathip. The study of the factors that are important for decision making on agricultural tourism Wang Nam Khiao District Nakhon Ratchasima province found that most of the tourists visit Wang Nam Khiao District for the first time. Vehicles used for traveling are private cars, mostly traveling with families. Which is consistent with the research of Jiraporn Kongthong (1997), studying factors that encourage tourists to travel around Chong Chom Dan, Kap Choeng District, Surin Province Found that traveling by private car Which is consistent with the research of Academic Service Center of Chulalongkorn University (2003) studied research on the topic "Thai Domestic Traveler's Behavior Survey 2002 Project" with the objective of assessing the number of domestic tourists in 2002 in order to estimate the cost of domestic travel. To find the structural characteristics of Thai tourists and tourists To measure travel behavior within the country And to inquire about opinions about domestic travel plans in 2003. The results of the research show that in 2002, most Thai people preferred traveling within the country. Most of them travel to travel. The main vehicle used for traveling is private cars.

Most tourists in Phanom Rung Historical Park Travel to visit the second time, use the vehicle for traveling, ie car / private motorcycle / self-drive rental / self-chartered car, with the purpose of traveling to relax on the slack. Knowing from public relations media (Brochures / posters / television / newspapers) which correspond to the research of Areewan Sermwilakul (2004) has been studied Guidelines for Tourism Development of Phimai Historical Park, Phimai District, Nakhon Ratchasima Province Found that most tourists have visited Phimai Historical Park 2-3 times in Nakhon Ratchasima, using a private car as a traveling vehicle In accordance with the research of Kamontip Chupathip. The study of the factors that are important for decision making on agricultural tourism

Wang Nam Khiao District Nakhon Ratchasima Vehicles used for traveling are cars. The purpose of traveling to Wang Nam Khiao district to relax In accordance with the research of Jiraporn Kongthong (1997), studying factors that encourage tourists to travel around Chong Chom Dan, Kap Choeng District, Surin Province Found that traveling by private car In accordance with the research of Academic Service Center of Chulalongkorn University (2003) studied research on the topic "Thai Domestic Traveler's Behavior Survey 2002 Project" with the objective of assessing the number of domestic tourists in 2002 in order to estimate the cost of domestic travel. To find the structural characteristics of Thai tourists and tourists To measure travel behavior within the country And to inquire about opinions about domestic travel plans in 2003. The results of the research show that in 2002, most Thai people preferred traveling within the country. Most of them travel to travel. The main vehicle used for traveling is private cars. In accordance with the research of Thipsuda Damronghat (2003), study the research on the topic "Domestic tourism behavior of residents in Bangkok" in accordance with the research of Chantana Polan and the faculty (2003) found that the objective is to relax tourism. Most of them are people who live in Maha Sarakham Province. The purpose of most tourists is to come and relax.

Part 3: Information about the marketing strategies that influence tourism. Tourists visiting Prasat Hin Muang Low and Phanom Rung Historical Park in Buriram Province found that

Tourists, Prasat Hin Muang, mostly have comments about The overall marketing strategy is at a high level. Can be summarized as follows

Products and services Price of products and services Distribution channels Marketing promotion Physical characteristics In the process of buying and servicing Product collection And the coordinator Influence on tourism of Prasat Hin Muang Low Overall at a high level Consistent with the research of Supan Saeng (2002) Study of motivation factors in Nong Khai province tourism of Thai tourists The study indicated that Tourists see that tourism and service factors And the location is an incentive factor for Nong Khai tourism At a high level In accordance with the research of Areewan Sermwilakul (2004) Guidelines for Tourism Development of Phimai Historical Park, Phimai District, Nakhon Ratchasima Province Travelers pay more attention to the overall factor at a high level, namely product and service, price, location, personnel, process and physical characteristics.

Most tourists in Phanom Rung Historical Park There are opinions about the overall marketing strategy at the highest level. Can be summarized as follows

Products and services Distribution channels Marketing promotion In the process of buying and servicing Influence on tourism in Phanom Rung Historical Park, overall at the highest level In accordance with the research of Pisanu Nanawati (1999), studying research on the topic "Factors affecting the acceptance of tourists in the tourism industry" Marketing mix in terms of products (services). Travelers agree strongly with determining the appropriate travel route. Pleasant accommodation arrangement In terms of distribution channels Travelers strongly agree on providing information and news quickly. For marketing promotion Travelers strongly agree on advertising media from brochures and travel guides.

Price of products and services Physical characteristics Product collection Coordinator Influence on tourism in Phanom Rung Historical Park as a whole at a high level In accordance with the research of conformity with the research of Areewan Sermwilakul (2004) Guidelines for Tourism Development of Phimai Historical Park, Phimai District, Nakhon Ratchasima Province Travelers pay more attention to the overall factor at a high level, namely products and services. Location And physical characteristics

Conclusions

1. Personal information of tourists consists of gender, age, education level, income and different occupations. Influence on tourism of Prasat Hin Muang Low Buriram Province is different

Different sexes have opinions about marketing strategies that influence tourism. Products and services Distribution channels Physical characteristics In the process of buying and servicing In product collection and coordinator (p <0.05)

Different age, different opinions on marketing strategies in all aspects (p <0.05)

Different statuses have opinions about marketing strategies for products and services. Distribution channels Physical characteristics In the process of buying and servicing In product collection and coordinator Have different influence on tourism (p <0.05)

Education level With different opinions about marketing strategies in products and services Price of products and services Distribution channels Physical characteristics In the process of buying and servicing In product collection and coordinator Have different influence on tourism (p <0.05)

Different occupations have different opinions on marketing strategies in all aspects (p <0.05).

Different income There are opinions about the marketing strategy, price of products and services. Have different influence on tourism (p <0.05)

2. Personal information of tourists consists of gender, age, education level, income and different occupations. Influence on tourism in Khao Phanom Rung Castle Buriram Province is different

Different sex There are opinions about marketing strategies in all aspects influencing tourism. Not different (p <0.05)

Different age There are opinions about marketing strategies for products and services. Have different influence on tourism (p <0.05)

Different status, opinions about marketing strategies in all aspects have no effect on tourism (p <0.05)

Education level With different opinions about marketing strategies in products and services Price of products and services Distribution channels Physical characteristics In the process of buying and servicing In product collection and coordinator Have different influence on tourism (p <0.05)

Different occupations have opinions about marketing strategies in all aspects, influencing tourism. Not different (p <0.05)

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References

- Chiraphon Kongthong. (1997). Factors that encourage tourists to travel around Chong Chom Dan, Kap Choeng District, Surin Province. Thesis. Mahasarakham University.
- Tula Mahaphatthanon. (2004). Consumer behavior. Bangkok.
- Charunmanee. (2003). Tourism and Hospitality. Bangkok: Orawee Partnership and Companions.
- Nittaya Phensiripha. (2003). Psychology and motivation. 2nd edition, Bangkok: PW Printing.
- Chai Sompol Kunprasert. 2004. Marketing Services. Bangkok: SE-EDUCATION.
- Chanchai Ajin .(1998). Educational Administration. Bangkok. Pimpee Co., Ltd.
- Dok Aueang Chanphet. (2004). Marketing mix strategy of tourism business In the lower northeastern region: special problem study Mahasarakrm university.
- Prinlaksitonon. (1997). Psychology and consumer behavior. 3rd edition, Bangkok: Tipping Point.
- Phacharaporn Krongyut (2006) Psychology and consumer motivation. Bangkok: Bangkok Supplementary Media Center.

- Phongsathorn Kesamli. (2005). 10 cultural questions. *Tourism Journal*, Year 14, Issue 4.
- Pornchai Likitthamroj. (2002). *Psychology*. Bangkok: Pearson Ed Indochina.
- Phibun Thapapal. (2002). *Principles of Marketing: The New Age in the 21st Century*. Bangkok: Rong Nam Mit Samphan Graphic Company Limited.
- Pisanu Yuthawet. (1999). Factors affecting the acceptance of tourists in the tourism industry in Thailand. Master of Business Administration Thesis Faculty of Business Administration Dhurakij Pundit University.
- Associate Professor Chalong Sripimol Sompong. (2007). *Tourism Marketing Planning and Development*. Bangkok: Kasetsart University Press.
- Associate Professor Thanin Sinjaru. (2008). *Research and statistical analysis by SPSS. 2*. Bangkok: Business R & D
- Viwatchai Boonyapak. (1988). Case Study for Tourism Development of Lopburi Historical City. *Tourism Journal*
- Wathit Tantraporn.. (2004). A Study of Tourism Management Operations of Phimai Subdistrict Municipality, Phimai District, Nakhon Ratchasima Province. Independent study Mahasarakrm university.
- Siriwan Serirat. (1995). *Consumer behavior*. Bangkok: Publishing, Educational Development.
- Siriwan Seriratan, Sukorn Seriree, Panisa Mechinda, Ong and Orathai Lertwannawit. (1995). *Marketing strategies and strategic management by focusing on the market*. Cage Thep: Thanathach Printing.
- Siriwan Serirat. (2006) .*New Age Marketing Management*. Bangkok: Publishing, Educational Development.
- Academic Service Center of Chulalongkorn University. (2003). *State Tourism Travel Behavior Survey 2003*. Bangkok: PSU
- Santhiya Yaow. (2003). *Psychology*. Bangkok: Prosperity.
- Santichai Euachongprasit. (2006). *Strategic Tourism Management*. Bangkok: Sam Charoen Commercial.
- Seri Wongmontha. (1999). *Analysis of consumer behavior*. Bangkok: Thira Film and Sytex.
- Areewan Sermwilakul. (2004). *Guidelines for Tourism Development of Phimai Historical Park, Phimai District, Nakhon Ratchasima Province*. Master of Business Administration Mahasarakrm university.
- Alastair M. Morrison. (1996). *Hospitality and travel marketing*. 2nd: p 230.
- Burke and Resnick. (1991). *Marketing & selling the travel product*. p10 -11.
- E.Jerome McCarthy. (1987). *Basic Marketing*.p.815.
- Hawkins, best and coney .(1998). *Consumer behavior; Market surveys; Case studies; United States*. p 369 - 372.
- Mathieson and wall. (1996). *Actual observation by the researcher*. p16-17.
- Middleton Victor T.C. (1994). *Marketing in Travel and Tourism*. 2nd Oxford: Heinemann. Professional Publishing.p 11

The Relative of experience in tourism marketing and Tourist's Behavioral Intention: A Case Study of The Old Town in Ubon Ratchathani Province, Thailand

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ABSTRACT

This research aims to comments regarding the marketing mix tourism. Compare the difference Relationship marketing, experiential travel behavior of tourists and the intent to develop a marketing strategy for tourism experience. Old Town Ubon Ratchathani By using quantitative research surveyed 400 analyzes the reliability of the questionnaire. (Reliability) by means of an alpha coefficient. (Alpha-Coefficient) value of 0.948 indicates that the questionnaire with the confidence high. The size of the sample using the formula Yamane. How to choose a coincidence The statistics used to analyze data were frequency, percentage, mean, standard deviation. Statistical tests (t-test) and analysis, ANOVA (One-Way ANOVA) to determine the level of statistical significance at the 0.05 level if there are differences to analyze the differences in pairs by Scheffe method and Statistics and Pearson correlation. The research found that travelers' opinions towards the experience in tourism marketing mix and tourist's behavioral intention in the overall and at a high level. The comparison of the different elements of marketing mix between tourists and tourism revenues were different. Opinions vary every minor factor and gender, occupation, marital status, education level, respectively. Do not look for differences and travelers have different opinions on the effectiveness of marketing tourism experience all the different factors. The relations with the Presentation of service in tourism only factor that correlated strongly with the behavior of tourists, but the intention is to go in the opposite direction. Research can be defined as the target market and marketing strategy for tourism experiences to be known remember and re-visit trips.

Keywords: tourism marketing mix; Tourist's Behavioral Intention; old town in Ubon Ratchathani Province

Introduction

Tourism is an industry that has a significant role to the economic development of many countries around the world, the governments of such countries and thus the importance of enhancing the ability to scramble tournament. Market share of world tourism Especially Asian countries and ASEAN are defined marketing strategy. To draw tourists to travel around the world in their increase. The mission is a mission of tourism. Merged in harmony with the country's development in all its dimensions. Therefore, determining the development strategy of the country. Has integration of tourism as part of economic development. If any country has a plan Clear national development strategy On the basis of strong economic Good infrastructure There is an abundance of natural resources Personnel and tourism potential by then. It is crucial to boost the country's competitive advantage in tourism development and its ability to grow steadily.

Current trends in tourism most visitors to focus on the pursuit of experiences beyond the traditional tourism in general. People want to experience the culture and local traditions truly over visiting sights alone, which is a form of tourism that is gaining popularity is very high at present. Demonstrating the importance of developing new forms of tourism and the allocation of a package tour with a travel experience that meets the needs of tourists, by collaborating with local communities. Also known as "Marketing tourism experience" for example, the TAT is promoting tourism themed "Local Experience" or the local tourism experience. Focused experience to help develop the direction of travel accordingly. Meet the needs of today's traveler, such as community tourism Phuket Old Town " and the old town of Songkhla province, which has a history of over 200 years and lived by the old buildings and houses unique architectural diversity. Whether the Chinese architectural buildings. Sino-European architecture architectural mix And contemporary architecture This makes the old town of Songkhla. As a learning architecture, culture and way of life of the well

Ubon Ratchathani, a province in the east, the potential for tourism and nature. Culture and tradition History and art based on the amount of revenue from the increased tourist numbers are positive, both in Thailand and overseas to demonstrate the potential of tourism, especially in the provinces. With revenues increasing from the year 2559 in the year 2560 rose to 7.81 percent tourism in the province of Ubon Ratchathani, focused on creative tourism experiences. This place is "The old commercial district of Ubon city" known as. "Old Town" this place is a beautiful old building. To remain with so many restaurants to eat at in the past, this is to be a center of trade. A port for shipping, making this bustling neighborhood. But later on the road to greater economic development. Thus building a bridge to connect between the free and democratic. And city. Warinchamrab a river separated them. The freight water stop. The old commercial area, reducing the role of trade since then. And neighborhood residents, mostly ethnic Chinese in Thailand. It is a culture that is quite clear. And a distinct identity as a tourist attraction to new experiences. Although agencies, both public and private, has been promoting a new tourism experience. Through tourism "Trail Tales Old Town Ubon Ratchathani " Old Town, including the creation of a "UBON STREET ART a new tourist attraction. Old Town "Besides," Ubon Street Art "is one of the activities in Ubon Only established to encourage take identity. Identities of hte In terms of art, culture, traditions, beliefs, intellectual property manmade. Or where it occurs naturally. Known for memorable and valuable (searched from the site. <https://www.guideubon.com/2.0/go2ubon/ubon-street-art/>, on June 12, 2561), however, the promotion of tourism experience that is still not known more widely.

From the data above, Researchers are interested to study the development strategy of tourism marketing experience. A case study of the old town Ubon Ratchathani The objective is to learn about experience in tourism marketing mix and tourist's behavioral intention, compare the different factors of the experience in tourism marketing mix and tourist's behavioral intention and the relationship of the marketing mix of travel experiences with behavioral intentions of tourists to the Old Town. Province of attraction Old Town. Ubon Ratchathani The results of the research. Agencies involved in tourism promotion. The operator stores Can be applied to the development and capacity building to tourism development of tourism marketing strategy to get the achievement.

Methodology

The research is a quantitative research, a survey (Survey research) and how to navigate through the questionnaire to study the development of targeted marketing strategies tourism experience. A case study of the old town Ubon Ratchathani

Population and sample

For a given population studied data collected from the population. Is a group of tourists who travel to Thailand in Ubon Ratchathani. Statistics show tour of Province during the 2557 - 2559 a total of 1,444,694 tourists person (Statistical Office of Ubon Ratchathani, search the site. <http://ubon.nso.go.th>, on September 12, 2561).

The samples were tourists to Thailand to visit the old town. Ubon Ratchathani A total of 400 samples were determined using a formula to determine the size of the sample Yamane, 1973 [11] a confidence level of 95%, and how to choose a coincidence.

Research tools

The instruments used to collect data for this study include questionnaires were prepared consists of 4 parts.

Part 1 personal information including gender, age, marital status, education level, occupation, monthly income. And all manner of tourists The question looks a questionnaire with the answers to the closed (Closed - End) is a query to answer a single model number 7

Part 2 Information about the behavior of visitors to the tourism experience. Old Town Ubon Ratchathani The question looks a questionnaire with the answers to the closed (Closed - End) is a query to answer a single model. And can choose more than one answer 11 questions.

Part 3 reviews the marketing mix, tour the Old City. Ubon Ratchathani BY 5Ps tourism marketing mix, including the products and services of the city. The price of goods and tourism services. The Channel / Distribution / Location attraction. The promotional tour The presentation tour The question is characteristic valuation (Rating Scale) 5 to 23 above.

Part 4 comments on the achievement of marketing tourism experience. Old Town Ubon Ratchathani BY composition, its value, satisfaction, come back repeatedly told to look on a valuation (Rating Scale) 5 Number 4

Research tools Qualitative

There are tools to ensure the quality of research by analyzing the reliability of the questionnaire by means of an alpha coefficient. (Alpha-Coefficient) by Cronbach [11] the questionnaire included a series of 30 questions, 23 questions. The equivalent of 0.948 indicates that the questionnaire with the confidence high.

Data collection

1. Study and collect information about the tourism experience. Travel industry marketing research papers from textbooks. Reports Technical Articles

2 electronic systems. The data were collected by questionnaires, who led the study, a questionnaire was created to collect data from the study and an assistant. The data were provided by describing the purpose and method of the survey clearly.

3. The answer to the integrity of the data collection questionnaire to analyze the reliability of the questionnaire, including the series of 30 questions, 23 questions, using the alpha coefficient. (Alpha-Coefficient) by Cronbach.

Data analysis

Processing the information obtained from the questionnaire. By bringing such information to ensure the integrity converting data into code variables and processed by computer. Using statistical package for social sciences.

1.Data analysis, descriptive describes the general information of the sample described and presented in tables Frequency (Frequency), percentage (Percentage) Average (Mean), standard deviation (S.D.)

2. Data analysis, inferential is the result of the sample was analyzed statistically to be used in reference to the behavior of people using tools to measure, test the hypothesis (Hypothesis testing) to confirm. what assumptions are correct or not, up to which the tool is used, including the use of statistical analysis, ANOVA t-test (ANOVA) for. Test the difference between the average of the samples containing more than 2 groups using one-way analysis of variance. The significant difference statistically significant. To detect differences in pairs. The significant level of 0.05 or 95% confidence level using a formula based on Scheffe method to compare the average population [11] and Statistics and Pearson correlation.

Results

1. Demographic characteristics of tourists

The sample consisted of 400 samples were found. Tourists who visit the old town. Ubon Ratchathani Most were female (by 55.8 %), single (58.0 %) aged between 20-30 years (percentage 43.2%) with a bachelor's degree (54.2 %), mainly as a student / students (37.2%) with an average income of less than 5,000 baht per month (25.5%) and most tourists are interested. Eager to learn another culture. Tourist attractions like the exotic (34.8%)

2. The behavior of tourist

The results showed that most tourists visit the Old Town. First-visit (64.2%), nature trips mostly overnight. (Morning - evening) (40.5 %), the cost of traveling to less than 2,000 baht (53.0 %), reasons for traveling as tourist attractions. Originally focused on the experience of the old town (many local shops, traditional markets. The architecture of the ancient houses, etc.) (65.5%), the purpose of traveling to watch the way the people. and architecture Old Town Ubon Ra Thani (54.2%) who were involved in the decision to travel to a few thousand friends (28.0 %) tourists prefer to travel with a group of friends, most (34.5%) most tourists are getting unstable (34.0%) and popular tour during the months from July to October (47%).

3. Opinion about the tourism experience marketing mix

The results showed that the review on the Marketing Mix tour Old Town (5Ps) Ubon Ratchathani. The overall level the joint opinion in all aspects. Considering the average order from most to least. Visitors to the factors of tourism products and services as possible. Lower prices of goods and services of the city. Promotion Marketing the Channel / Distribution / location and the presentation tour, respectively revenue side are detailed below.

(1) The products and services of the city. Issues that are on average the most was the interest of the tourism experience. Through tourism "Story Tales Old Town Ubon "issues with the lowest average is the quality of goods and services, food and beverages

(2) The price of goods, services and tourism. The issue has an average price of most goods and travel services are appropriate and cost effective. The issue has the lowest average is to have a clear label rates.

(3) The Channel / Distribution / Location attraction. Issues that are on average the most was the source of travel information readily Old Town. The issue has the lowest average is to have a transport system to reach an appropriate accommodation

(4) The promotion of the tourism market. Issues that are on average most of the promotional activities. Discounted tour packages and travel and tour companies. The shops in the old town. And issues that have an average minimum publicity in the media such as television, newspapers and websites.

(5) The Presentation of service in tourism issues that are on average the most atmospheric old town tour presentation provides a unique cultural identities (people, local food markets, traditional shops. The architecture of the ancient houses, etc.) of Ubon Ratchathani. The issue has the lowest average is to visit the tourist facility has nine signposted trails clearly shown in Table 1

Table 1 Shows the mean and standard deviation of review available to the marketing mix of travel experiences Old Town. Ubon Ratchathani The overall and in each aspect.

The marketing tourism experience (5Ps)	Opinion		
	X	S.D.	Translate
1. The products and services of the city	3.88	0.49	Much
2. The price of goods and services of the city	3.84	0.65	Much
3. Channel / Distribution / Location. landmark	3.81	0.54	Much
4. The promotion in tourism	3.82	0.54	Much
5. Presentation of service in tourism.	3.77	0.56	Much
Total	3.82	0.55	Much

4. The Opinion on the behavioral intentions of tourists

The results showed that the review of behavioral intentions of tourists. Old Town Ubon Ratchathani The overall level the joint opinion in all aspects. Considering the average order from most to least. Achievement of tourists to the tourism experience of the old town. There is satisfaction with the visit to the old town, the most minor of advice and told to come back and repeat. Of its value Visitors to the less important factors for success on the other side of Table 2

Table 2 Shows the mean and standard deviation review on the effectiveness of marketing tourism experience. Old Town Ubon Ratchathani The overall and in each aspect

The behavioral intentions of tourists	Opinion		
	X	S.D.	Translate
1.value	3.62	0.87	Much
2.Satisfaction	4.11	0.75	Much
3.Re-Visit	3.68	0.68	Much
4.Recommend and word of mouth	3.74	0.59	Much
Total	3.78	0.53	Much

5. The comparison of the different elements of marketing mix and the behavioral intentions of tourists

5.1 Comparison of different demographic of tourists. This includes sex, marital status, age, education, occupation, income and the interest of the visitors to comment on the tourist market mix (5Ps) found that age and income. Affect the review of the marketing mix of travel experiences. Old Town Ubon Ratchathani, said most tourists are aged and have different opinions on different tourism marketing mix factors. Followed by professional status and sex, respectively, education and the attention is no different to comments regarding the marketing mix tourism tourist experience is a degree and nature of different interests. Opinion on the marketing mix of travel experiences. not different.

5.2 The demographic characteristics of tourists. This includes sex, marital status, age, education, occupation, income and the interest of tourists to the achievement of tourism marketing experience. (Value, Satisfaction, Re-Visit, Recommend and word of mouth) found that income affects review the effectiveness of tourism marketing experience. Old Town that is most tourists who have different opinions on the effectiveness of marketing tourism experience different every minor factor status, occupation, interests, appearance, gender, age and education level.

6. The relationship of tourism marketing experience with behavioral intentions of tourists.

The hypothesis testing has concluded that independent variables, some can be used to forecast Tourist's Behavioral Intention shown in Table 3

Table 3

ANOVA ^b						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.908	5	1.982	5.418	.000 ^a
	Residual	144.115	394	.366		
	Total	154.023	399			

The researcher must make assumptions to test whether a variable is right to be prophetic. And forecasting by using Liner Regression showed that the presentation of the travel service is independent variables and can be predictive behavioral intentions of tourists (Presentation of service in tourism (P=0.03)) were statistically significant at the 0.05 level.

Therefore, researchers have worked to determine the relationship between behavior and the willingness of tourists to the presentation of tourist services that are related in any direction and is associated much. By finding the correlation between the variables by Correlation. The results of the study of the relationship between behavior and the willingness of tourists to the presentation of tourist services is equal to -0.218 is negative and has a value close to 1. Be interpreted as Variable behavior of travelers intend to travel offerings factors. There is a very high affinity but the relationship is going in the opposite direction.

Discussion

The results of the data analysis and summary of the findings can be discussed on various issues of interest follows

1. The marketing mix of travel experiences

Based on the findings, most tourists have for opinion toward marketing mix of travel experiences. Old Town Ubon Ratchathani And the overall level more consistent with the research of Tichakorn

Jariyaporn [4] studied the market factors influencing the travel of tourists, Hua Hin Thailand. Found that the level of importance to the overall marketing mix factors associated with the decision to use the FN level. It is seen that the marketing mix is critical to the development of tourism attractions that are interesting and a great experience to tourists visiting the old city to remember. Tell trip over and back in the future. When considering each aspect of the marketing mix of travel experiences. Old Town Ubon Ratchathani Researchers found interesting issues discussed in the following results.

(1) The products and services of the tourism issues that are on average the most. The attractiveness of the tourism experience. Through tourism "Trail Tales Ubon Old Town "is consistent with the research of Thanit Butthipsakul [6] have studied the subject. The behavior of tourists traveling Buddhist temple in the province find the attractions that make the holiday in Nan's famous attractions such as the beautiful landscape. Attractions range And want to experience the local culture Because features Tourism product than other types, especially the focus on selling value and experience to tourists and cost-effectively.

(2) the price of goods, services and tourism. Issues that are on average the most. Price and tourist services are appropriate and cost effective. Consistent with the research of the human spirit and immaculate Thanya Promburom and Narumon Kimpakorn [5] has studied the subject. Factors affecting the experience of eco-tourists, culture and health in the northern provinces on one of Thailand: Chiang Mai, Lamphun, Lampang, Mae found that the factors that affect the experience of tourists in Thailand is its value. money It is also consistent with research published during the next sacrament fluorescence v [7] studied the subject. Development, management style, image, local foods to strengthen the loyalty of tourists in the province. Factors that influence to strengthen the loyalty of the tourists are convinced reasonable prices.Consistent with the idea for the tour of the Jirawat Anuwichanont [2] represents the sum of the value that customers using Exchange to acquire. The benefits of tourism and hospitality. The tour price includes the price of each product, so that is really positive for the sentimental value of your customers or visitors enough if a sense of worth, meaning or customer satisfaction and tourists tend to re-visit next time.

(3) Channel / Distribution / Location attraction point with the lowest average is to have a transport system to reach an appropriate accommodation. Consistent with the research of the human spirit and immaculate Thanya Promburom and Narumon Kimpakorn [5] has studied the subject. Factors affecting the experience of eco-tourists, culture and health in the northern provinces on one of Thailand: Chiang Mai, Lamphun, Lampang, Mae Hong Son is found both in Thailand and overseas to assess satisfaction with the field of travel and transportation services. In area The average satisfaction score far less compared to the other elements. The Provincial Minister Should accelerate development and improve the quality of services in order to raise the level of satisfaction to tourists. And create a better experience for the tourists.

4) Presentation of service in tourism issues that are on average the most atmospheric old town tour presentation provides a unique cultural identities (people, local food markets, traditional shops. The architecture of the ancient houses, etc.) of Ubon Ratchathani. Consistent with the research of the human spirit and immaculate Thanya Promburom and Narumon Kimpakorn [5] has studied the subject. Factors affecting the experience of eco-tourists, culture and health in the northern provinces on one of Thailand: Chiang Mai, Lamphun, Lampang, Mae found that the factors that influence the experience of foreign tourists by the major top 5. is the environment and the atmosphere of the location. So we need to focus on the physical environment. As well as to create an impression and experience to the tourists.

2. Tourist's Behavioral Intention

Based on the findings regarding the review of the behavior of tourists. Old Town Ubon Ratchathani And specifically by the high level (value satisfied the return trip and repeatedly told) is consistent with the research of Phattaraporn Timdang and Winai Panjajonsak.([9] studied the model of experiential marketing to foreign tourists. The model of achievement experienced traveler contain valuable recognition satisfaction the return trip repeatedly told by incentive travel had significant direct and indirect marketing experience of foreign tourists and achievement. experiential marketing of foreign tourists in a positive direction. And consistent with the research of Hung-Che Wu and Tao Li [15] studied the quality of the experience. Perceived value Image heritage Satisfaction from the experience and behavior of travelers intend cultural heritage, the quality of the experience. Perceived value Image heritage Satisfaction from And tourist activities intended to affect the perceived quality of experience the cultural heritage of the area.

3. Compare the different demographic of visitors to the marketing mix of travel experiences and behaviors intended destinations

The results compare the different demographic of visitors to the marketing mix tourism experience. Tourists age and income differences. Opinions on tourism marketing mix of different factors. And comparing the different behaviors of intended travelers found that travelers who are earning well. Opinions on tourism behavior intended to experience all the different factors and consistent with the research of Pennapa Pengprapai [8] studied the marketing mix factors that influence the demand of tourists in Thailand. And international activities in the tourism and culture of the island. Surat Thani Test results showed that the difference value of a personal nature, the age and income of the average monthly demand in tourism activity. Social and cultural differences of Koh Phangan is statistically significant. Shows that the demographic break by the income effect of repeated trips to tourists about the economy and the purchasing power of consumers.

4. The Relative of experience in tourism marketing and Tourist's Behavioral Intention

The results of the study of the relationship between behavior and the willingness of tourists to the presentation of tourist services is equal to -0.218 is negative and has a value close to 1. Be interpreted as Variable behavior of travelers intend to travel offerings factors. There is a very high affinity But the relationship is going in the opposite direction. To explain the marketing mix of travel experiences. The presentation tour The development of the tourism atmosphere in the Old Town were presented to the unique cultural identities (people, local food markets, traditional shops. The architecture of the ancient houses, etc.) may not be able to make visitors re-visit. This may be relevant in terms of revenues, affecting the return flight over the area, which is related to the economy and the purchasing power of consumers and in line with the concept of life cycle associated with psychographic attractions tourism (Plog. Stanley C.1991, cited in celebrating Chalongsrl Pimonsompong, 2550), the Old Town tourist attraction is considered to be a tourist in. introduction of the product life cycle tourist from the theories of Professor Plog (Plog. Stanley C.1991, cited in celebrating Chalongsrl Pimonsompong, 2550) suggests that new tourist attraction. To attract the attention of tourists who are interested in tourism has not developed as much as the first group. This is a group that may be more than a tourist attraction, like the pursuit "Allocentrics" which are outstanding and not crowded with tourists who tried something new, unknown and when they come here, they will not re-visit and to seek exotic travel further.

5. The results of this research to guide the development of tourism marketing experience

(1) strategic approach to target the travel habits of tourists to experience the Old City, to determine marketing strategies that are appropriate to the behavior and needs of tourists, such as the visit of tourists. traveling short or more a day - trip.

(2) the development of strategic marketing for 5Ps tourist attraction old town. Ubon Ratchathani, including:

- *products and services of the city. The focus on selling value and tourism experience to travelers worthwhile. Through tourism "Trail Tales Ubon old town "and should be developed in the field of food quality and service of food and beverages. Store in a hygienic standards. The safety of tourists in the world. To experience the unforgettable image and confidence to tourists.*

- *The price of goods and tourism services. Pricing to suit the activities and good value for tourists and should be labeled clearly showing rates of both food service and various excursions*

- *The Channel / Distribution / Location attraction. Should the development of The transport system has appropriate access to attractions such as the car navigation and route transit traffic. To travel to attractions such as Old Town.*

- *The promotion of tourism should focus on marketing, advertising and public relations continuously. Both the government and the Province. In particular, the use of viral tactics to friends, relatives, close friends as a medium of communication, tourism or visiting friends introduced me to a friend. Through online media or public relations May include activities such as special events, street performances, music, old town. To stimulate interest to tourists may be more in high season is during holidays / festivals such as Ubon Ratchathani Candle Festival and Low season.*

- *Presentation of service in tourism access to the Old Town tourist route signs should be clear and important need to focus on the physical environment. Old Town include a tour presentation provides a unique cultural identity (local people. traditional market stores the architecture of the ancient houses, etc.) as well as to create a better experience for tourists to make an impression and tourists re-visit.*



Figure 1 : Walk Trail Tales - Old Town, Province and Ubon Street Art

Conclusions

1. Recommendations from the study findings

Government agencies, private operators shops. Old Town The findings could lead to direct and targeted marketing activities in line with the target group of tourists in order to create awareness, recognition and understanding. Tourists have been known to experience Old Town Tourism Ubon Ratchathani deeply.

2. Suggestions for further research

(1) Should be studied in depth overview of the management of the tourist town. Ubon Ratchathani involving stakeholders such as tourism operators. Local communities, social, economic and environment analysis (SWOT Analysis) and the potential for the holistic development of each sector to be in the same direction and can make the old town is a tourist destination to experience creatively.

(2) Should be studied comparative research strategy, experiential marketing tour of the city's old town with the tourism experience in other sources. In order to know the difference and can be compared to determine marketing strategies and enhance the attraction.

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References

- [1] Ministry of Tourism and Service. (3 October 2017). National Tourism Development Plan 2nd (2016-2021). From website: http://mots.go.th/ewt_dl_link.php?nid=8370.
- [2] Jirawat Anuwichanont. (2011). Tourism marketing and Service. Suan Dusit Rajabhat University, Bangkok, Dharmasarn Company Limited.
- [3] Chalongsri Pimonsompong.(2011). Tourism Planning and Marketing Development. Bangkok :Kasetsart University Press.
- [4] Tichakorn Jariyaporn.(2018). Marketing factors influencing Thai tourist to travel Hua Hin night market. (Master's thesis) Program in Hospitality and Tourism Industry Management, Graduate School, Bangkok University.
- [5] Thanya Promburom and Narumon Kimpakorn.(2015). Factors Affecting Tourist experience of Eco, Culture, and Wellness Tourism in the Upper Northern Provincial Cluster 1 of Thailand: Chiang Mai, Lamphun, Lampang,Mae hong son. Journal of Thai Hospitality and Tourism, 10(1), 71-87.
- [6] Thanit Butthipsakul.(2015). Tourist's behaviors on religion tourism at Buddhist temples in Nan province. Academic Journal Institute of Physical Education, 9(1),63-76.

- [7] Pimrawee Rocharungsat.(2018). Developing Local Food Image Management Model to Increase Tourist Loyalty: Case study of Phetchaburi. *Journal of International and Thai Tourism*, 14(1), 1-16.
- [8] Pennapa Pengprapai (2016). The Influence of Marketing Mix on Thai and Foreign Tourists' Interest in Socio–Cultural Tourism at Koh Phangan, Surat Thani. (Independent Study Master degree) Program in Hospitality Industry and Tourism Management Bangkok University.
- [9] Phattaraporn Timdang and Winai Panjajajonsak.(2011).A Model of experiential Marketing for Foreign Tourist. *Journal of the Association of Researcher*, 16(3), 89-101.
- [10] Walaiporn Rewtrakunphaiboon.(2008). Future tourist's behavior trends. *International Thai Tourism Journal*,(1), 1-12
- [11] Thanin Silpcharu (2009). *Research and statistical analysis with SPSS*. Bangkok : Business and D.
- [12] Adul Jaturongkul & Dalaya Jaturongkul. (2007). *Consumer Behavior (2nd Edition)*. Bangkok : Thammasat Printing house.
- [13] Kotler & Amstrong (2012). *Principles of Marketing*.14th ed. New Jersey: Pearson Education.
- [14] Ali, F., Ryu, Ki., & Hussain,K. (2016). Influence of experience of experience on memories, satisfaction and behavioral intention : A study of creative tourism. *Journal of Travel & Tourism Marketing*, 33(1), 85-100.
- [15] Wu H-C. & Li T.(2014). A Study of Experiential Quality, Perceived Value, Heritage Image, Experiential Satisfaction, and Behavioral Intentions for Heritage. *Journal of Hospitality & Tourism Research* published (online).
- [16] Lovelock, Christopher & Wirtz ,Jocher. (2004). *Services Marketing : People, Technology, Strategy*. United States of America : Pearson Prentice Hall.

The study of marketing factors that affect the decision to buy environmental products of Generation Y Group In Ubon Ratchathani Province

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Abstract

The purpose of this research was to study personal factors affecting the decision to purchase the Generation Y environmental products. To study the behavior of the Generation Y environmental product group and to study the marketing factors that affect the decision to buy products for Generation Y

The sample group used in this research is 400 Generation Y people, using questionnaires as tools. Which the research found Most consumers are female. Be single Bachelor's degree A personal business career With monthly income of 10,001- 20,000 baht, the consumption behavior of products for the environment that affect the purchase decision is found to buy by themselves. The time to purchase products 2-5 years. Buy products with packaging can be reused. The main reason is to maintain and promote the environment better. Buy products in department stores By considering the properties of the product that meet the needs Family members participate in purchasing decisions. What is received is the cost savings from using the product. On average, the purchase of products is in the price range of 201-500 baht. Marketing factors in the corner of consumers towards environmental products find that the demand for environmental products must be able to conserve the environment. The cost of environmental products has a reasonable price for quality For convenience, products for the environment should be convenient to buy. And communication has public relations to raise awareness of environmental conservation The decision to buy environmental products found that reducing consumption Affecting the decision to buy products in terms of convenience from reducing the size of packaging, buying refill products, reuse, affecting the decision to buy products that are recyclable packaging clean The circulation is reworked. Affecting the decision to buy products that the packaging is made from recycled plastic as an alternative to help protect the environment Hypothesis Sex is associated with the estimated spending behavior per month in purchasing products for the environment with statistical significance at the level of 0.05. And the level of education that has different effects on the marketing mix in different consumer angles with statistical significance at the level of 0.05

Keywords: Marketing Factors, consumer behavior, buying decision, green products

Introduction

Nowadays, the human population is increasing. Resulting in increased economic activity as well Especially the expansion of the manufacturing sector to support the needs of the population. Both in the industry Transportation And agriculture Causing a lot of natural resources to be used The result is Degradation of natural resources and environmental problems Some resources, when used, can not be replaced in a short period of time, such as minerals, coal, oil, etc., as well as waste that is released in large quantities, causing severe environmental damage. Is a global problem Global warming is one of the problems that is currently becoming more severe. Which is caused by greenhouse gas emissions caused by human activities such as burning fuels from coal, oil and natural gas The deforestation Smoke from exhausts, cars, agriculture and various industries, etc., causing many countries around the world to turn their attention and find ways to reduce this greenhouse gas (Greenhouse Gas) in the atmosphere to increase. Which is a major cause of global warming problems Today's hustling life Causing almost all society people to overlook the dangers surrounding them,

giving priority to convenience, saving time and neglecting the danger of contamination Current global warming reduction campaign Hot nature and environmental conservation.

In the consumer sector, especially consumers who use Generation Y consumer products, aged between 25-33 years due to this population being the second largest population in Thailand. As well as being a group that is rooting the foundation for themselves and their families (The AGE research team, together with Chuo Senko, 2005) has knowledge and understanding of the market for the environment and is ready to change to new things that are beneficial to society. Can save the environment for future generations Such consumer groups can contribute to reducing greenhouse gas emissions by choosing to use products and services that have low emissions of greenhouse gases. At present, the industrial sector as a manufacturer, as well as the service sector Recognizing the importance and being responsible for the environment by producing products with low greenhouse gas emissions, allowing consumers to know that such products have a small impact on the environment. Which is an alternative way to show responsibility to the environment and society As well as encouraging manufacturers to improve the production process by improving production efficiency Reducing the use of fossil energy, which releases a lot of air pollution And increase the use of renewable energy The benefits of carbon reduction label products are as follows: 1) Benefits to consumers First Is a new way to buy products and services Which helps stimulate manufacturers to improve production processes Acquisition of raw materials And produce products that emit small amounts of greenhouse gases. Secondly, participate in helping to reduce global warming from consumption of products and services that emit small amounts of greenhouse gases. 2) Benefits to manufacturers First Reduce production costs from the development of production processes to improve efficiency. Reduce the use of fossil energy and increase the use of renewable energy to be useful for product manufacturers to be able to find information from research to develop and improve products to meet the needs of consumers. To be able to publicize for campaigning and motivating the awareness of environmental conservation

The causes of these phenomena are caused by the increasing use of human natural resources and using without limits. Therefore has a direct impact on the environment and global changes (Polonsky, 1994). These problems arise. Therefore is the source of the importance of maintaining the environment Whether from the public sector, the public sector and the private sector, with many evidence that People all over the world pay attention and be responsible for the environment. Where people tend to change certain behaviors to support conservation concepts And prevent environmental destruction (Chen, 2008; Ottman, 1998; Vandermerweand and Oliff, 1990)

From the above information Make the researcher to study The study of marketing factors that affect the decision to buy environmental products of Generation Y Group Ubon Ratchathani In order to know which market factors affect the decision to buy environmentally friendly products Which will be beneficial to both the government sector and related agencies in organizing campaign activities in a manner that is consistent with the problems that occur and is effective Marketers and advertisers who will understand this group more Manufacturers and entrepreneurs can also be used as information to improve and develop production processes and products or services to be consistent with consumer behavior.

Methodology

Population boundary

The population is 1,836,523 people in Ubon Ratchathani province.

Sample scope

Sample groups include Accidental sampling method of people in Ubon Ratchathani Province Which can determine the sample size by using the formula to determine the sample size of Yamane, 1973 at the 95% confidence level, the number of samples of 400 samples

Data analysis methods

Statistics using data analysis using the program The statistics used are frequency, percentage, arithmetic mean Standard deviation, Pearson Chi-Square, t-test and F-test with statistical significance level of 0.05

Results

Part 1 Summary of personal factors affecting the decision to buy products for the environment of the group Generation Y

Found that most questionnaires were female. Be single Bachelor's degree A personal business career Have a monthly income of 10,001- 20,000 baht.

Section 2 summarizes the information of consumption behavior for Generation Y's environmental products.

Found that most buyers of environmental products purchased by themselves Time to purchase products 2-5 years. Buy products with environmental packaging. Products that can be recycled again. The main reason for buying environmental products is to buy and maintain the environment better. Most places to buy environmental products are purchased at department stores. The decision to buy environmental products mainly based on the properties of the product for the environment that meets the needs. Those who participate in the decision to buy products for the environment are mostly family members. Most of the things received from the purchase of products for the environment are cost savings from the use of products for the environment. Approximate cost per month for the purchase of products for the environment, mostly around 201-500 baht.

Part 3: Summary of market factors affecting the decision to buy products for the environment of the group Generation Y

1. The demand for environmental products found that The demand factor of the product that affects the decision to buy the product for the environment in the overall level is high.

Regarding the details, it was found that the demand factors of the products affecting the decision to buy products for the environment were in order of average purchasing decision from descending order environmental products must be able to conserve the environment Environmental products must be safe to use products and environmental products must have a variety of products to choose to buy (with an average of 4.26, 4.25 and 3.99) respectively. 2 . The cost of environmental products found that The cost factor of the product that affects the decision to buy products for the environment in the overall level is at a high level.

Regarding the items, it was found that the cost factors of the products affecting the decision to buy products for the environment were in order of average purchasing decision from descending Namely, environmental products that are suitable for quality and will pay more to buy products for the environment (with an average of 4.27 and 3.87) respectively

3. The convenience of products for the environment found that The convenience factor of products that affect the decision to buy products for the environment as a whole is at a high level.

Regarding the details, it was found that the convenience factor of the product affecting the decision to buy products for the environment was in order of average purchasing decision in descending order. environmental products should be easily purchased And have signs that show that the product is an environmental product (with an average of 4.14 and 4.11) respectively

4. Communication It was found that the communication factors of the products affecting the decision to purchase the products for the environment were at a high level.

Regarding the details, it was found that the communication factors of the products affecting the purchase of products for the environment were in order of average purchasing decision from descending order. In environmental products, public relations advertising to create awareness of environmental conservation Environmental products have salespeople who provide knowledge, benefits and how to use the product correctly. And environmental products have sales promotion (discount, giveaway, free) (average 4.23, 4.16 and 4.07) respectively.

Part 4: Summary of the decision to purchase the Generation Y environmental product

1 . Reducing consumption (Reduce) affecting the decision to buy products for the environment. The overall picture is at a high level.

On the side of the list, it was found that the reduction of consumption Affecting the decision to buy products for the environment Sorted in order of average purchasing decision from descending order Including convenience Comfort from reducing packaging size, buying refill products, reducing consumption and reducing packaging size to a smaller size (with an average of 4.15, 4.04 and 3.80), respectively.

2. Reuse (Reuse) affects the decision to buy products for the environment. The overall picture is at a high level.

On the side of the list, it was found that reuse Affecting the decision to buy products for the environment Sorted in order of average purchasing decision from descending order Ie, products that are recycled, clean and safe, products that are easily recycled Convenient and economical from the products that are used in the original packaging (with an average of 4.22, 4.20 and 4.19), respectively.

3. In terms of turnover, new products are produced. (Recycle) affects the decision to buy products for the environment. The overall picture is at a high level.

On the other side of the list, it was found that the circulation was reworked Affecting the decision to buy products for the environment Sorted in order of average purchasing decision from descending order Namely products that are made from recycled plastic as an alternative to help protect the environment. Products with recyclable packaging are clean, safe and the products that are recyclable packaging are cheap (with an average of 4.21, 4.18 and 4.02), respectively.

Table 2: Summary table of assumptions of personal factors correlated with buying behavior that is environmentally friendly

Personal factors are related to the behavior of buying products that are environmentally friendly.	Gend er	status	education level	education level	monthly income
1. People buy products for the environment	-	*	-	-	-
2. How long does it take to buy products for the environment?	-	*	-	-	-
3. Types of products containing packaging for the environment	-	-	-	*	*
4. The reason for buying products for the environment	-	*	*	*	-
5. Places to buy products for the environment	-	-	-	-	-
6. How to decide to buy products for the environment	-	*	-	-	-
7. People are involved in the decision to buy products for the environment	-	*	*	*	*
8. What you get from buying products for the environment	-	*	-	-	-
9. Estimated expenses per month for purchasing products for the environment	*	*	-	-	*

note

* There is a significant relationship at the level of 0.05

- No relationship

From Table 2, found that

Sex is associated with the estimated cost behavior per month in purchasing products for the environment.

Status is related to the behavior of buying products by themselves. Want to maintain and promote the environment better. The properties of the products for the environment that meet the requirements Family members are involved in making a purchase. Participation in treatment And promote the environment better And the cost of purchasing products per time is approximately 201 - 500 baht

Education level is related to behavior. And promote the environment better And family members are involved in making a purchase decision

The occupation is related to the behavior of buying products that the packaging can be reused. Want to maintain and promote the environment better and family members are involved in making a purchase decision.

Monthly income is related to the behavior of the product that can be used again. The family members are involved in making a purchase decision and the cost of purchasing products per time is approximately 201 - 500 baht.

Table 3: Summary table of personal factor assumptions affecting the marketing mix in the consumer corner and the environment

Marketing mix in the corner of consumers	Gender	status	education level	education level	monthly income
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The demand for products for the environment

.1Environmental products must be able to conserve the environment.	-	.	-	-	-
.2Environmental products must have the same quality as Or better than the same product	-	.	-	-	-
3. Environment products must be safe to use products.	-	-	-	-	-
4. Environmental products must have a variety of products to choose to buy.	-	-	-	-	-

The cost of products for the environment

1. Environmental products with a reasonable price for quality	-	-	*	-	-
2. You pay more to buy products for the environment.	-	*	*	-	

With the convenience of products for the environment

.1Environmentally friendly products should be purchased easily.	-	.	*	-	
.2There is a sign that shows that the product is an environmental product.	-	.	-	-	*

Communication

Marketing mix in the corner of consumers	Gender	status	education level	education level	monthly income
.1Environmental products are advertised to create awareness of environmental conservation.	-	.	*	-	*
.2Environmental products have advertising to motivate them to buy more products.	-	.	-	-	-
.3Environmental products have sales promotion (reduce, redeem, giveaway)	-	.	-	-	-
.4Environmental products have salespeople who provide knowledge, benefits and how to use the product correctly.	*	.	-	-	-
.5Environmental products have sales channels via the internet.	-	.	*	-	-

note

* Different with statistical significance at level 0.05
 - not different

From Table 3, found that

Sex affects the marketing mix in terms of communication about products for the environment. There are salespeople that provide knowledge, benefits and how to use the product correctly.

Status has an impact on the marketing mix in terms of cost of products for the environment, about paying more to buy products for the environment and communication about environmental products. There are sales channels via the internet.

Education level Affecting the marketing mix in terms of cost of environmental products, environmental products with reasonable prices, quality and more payment to buy products for the environment

The convenience of environmental products, environmental products, advertising and communication, environmental products, advertising and public relations for environmental conservation and environmental products, sales channels via the Internet

Occupation does not affect the marketing mix in the consumer corner and the environment.

The income level affects the marketing mix in terms of the convenience of environmental products. There are signs that show that the product is an environmental product. And communication about products for the environment, with public relations advertisements to raise awareness of environmental conservation

Discussion

Part 1 Personal factors that affect the decision to buy products for Generation Y's environment

Found that most questionnaires were female. Single status, Bachelor's degree A personal business career With a monthly income of 10,001 - 20,000 baht, consistent with Michel Laroche's research, Jasmin Bergeron and Guido Barbaro-Forleo (2001) The target consumers to pay more to buy environmentally friendly products found that women are more concerned about the environment than men. In accordance with the research of Laddawan Kittinon (2003), research on consumer attitudes toward environmental packaging in Bangkok General information of respondents of the attitude measurement found that most female consumers Monthly income received 10,001-20,000 baht, which is consistent with the research of Somrathat Burirat (2009), studying the attitudes of young consumers towards environmental products in Bangkok The study indicated that Most respondents were female, aged 19-20 years, with a bachelor's degree education.

Section 2 summarizes the information of consumption behavior for Generation Y's environmental products.

Found that most buyers of environmental products purchased by themselves Time to purchase products 5-2years. Buy products with environmental packaging. Products that can be recycled again. The main reason for buying environmental products is to buy and maintain the environment better. Most places to buy environmental products are purchased at department stores. The decision to buy

environmental products mainly based on the properties of the product for the environment that meets the needs. In accordance with the research of Nongnuch Impitak ((1997, the study of acceptance of environmental products of nursing college students under the Ministry of Public Health Found that the main reason for the sample group to use products for the environment Is a feature of a product that can meet their needs In accordance with the research of Siriwan Serirat (.(1995 Marketing for the environment In the view of students who have Master of Business Administration Program In higher education institutions under the jurisdiction of Bangkok Metropolitan and Vicinity, it is found that the most important motivation for purchasing environmental conservation products is Product features that can meet the needs of consumers

Part 3: Summary of market factors affecting the decision to purchase products for Generation Y's environment

1. Demand for environmental products

Factors that affect the decision to buy products for environmental needs in general At a high level Environmental products must have a variety of products to choose from at a high level. In accordance with the research of Thaweesak Dinprapha (2006), the study of factors influencing the decision to buy green products of working people in Pathumwan District, Bangkok found that personal factors were related to marketing factors. Quality, size, shape and variety of green products are important.

2. The cost of products for the environment

The factors that affect the decision to buy products for the environment are environmental products with the most suitable price for quality. In accordance with the research of Thaweesak Dinprapha (2006), the study of factors influencing the decision to buy green products of working people in Pathumwan District, Bangkok found that the price factor There is a high level of importance and is associated with personal internal factors. Price that is suitable for quality and not higher than general products Going of green products is important.

Part 4 Information on Decision Making for Generation Y Environmental Products

1 . Reducing consumption (Reduce) affecting the decision to buy products for the environment. The overall picture is at a high level. Because consumers viewed that there was a convenience from reducing the size of packaging, buying refill products which was consistent with the research of Laddawan Kittinon (2003), which studied the subject Consumers' attitudes towards packaging for the environment in Bangkok found that consumers have an attitude towards packaging for the environment in reducing packaging due to reduced packaging size, resulting in convenience from product use.

2. Reuse has an effect on the decision to buy products for the overall environment at a high level. Namely, products that are recycled, clean and safe Which is consistent with the research of Laddawan Kittinon. It is found that consumers have a good attitude towards reusing packaging to reduce pollution and solid waste problems that are a problem near consumers.

Conclusions

Personal factors affecting the decision to buy environmental products of the group Generation Y

Found that females are single Bachelor's degree A personal business career With monthly income of 10,001- 20,000 baht, Generation Y's environmental product consumption behavior found that most environmental product buyers buy on their own. Time to purchase products 2-5 years. Buy products with environmental packaging. Products that can be recycled again. The main reason for buying environmental products is to buy and maintain the environment better. Most places to buy environmental products are purchased at department stores. The decision to buy environmental products mainly based on the properties of the product for the environment that meets the needs. Those who participate in the decision to buy products for the environment are mostly family members. Most of the things received from the purchase of products for the environment are cost savings from the use of products for the environment. Estimated cost per month for the purchase of

environmental products, mostly around 201-500 baht. Marketing factors that affect the decision to buy products for the Generation Y environment, found that the demand for environmental products will Must be able to conserve the environment The cost of environmental products has a reasonable price for quality For convenience, products for the environment should be convenient to buy. And communication has public relations to raise awareness of environmental conservation The decision to buy environmental products found that reducing consumption Affecting the decision to buy products in terms of convenience from reducing the size of packaging, buying refill products, reuse, affecting the decision to buy products that are recyclable packaging clean The circulation is reworked. Affecting the decision to buy products that the packaging is made from recycled plastic as an alternative to help protect the environment.

Acknowledgements

- .1Public figures such as actors and actresses should be part of the introduction. Because such a person is an example that most people pay attention to And easily recognizable
- .2Products with recyclable packaging should be recommended to be clean and safe by labeling or through sales representatives.
- .3Creating products for the environment The manufacturer must be truly sincere in the production process and can communicate to the public to know and be confident in the quality.
- .4Agencies or organizations should be aware of the environment so that people can follow.

References

- Department of the Interior. (2013). **Ministry of Interior. Population information in Thailand.** (Online information).
- Thaweesak Dinprapha (2006). **Factors influencing the decision to buy green products of working people in Pathumwan District, Bangkok.** Bangkok: Office of Graduate Studies Development National Institute of Development Administration National Institute of Development Administration.
- Nongnuch Impitak. (1997). **Acceptance of environmental products of nursing college students Under the Ministry of Public Health: Case Study of Nursing Colleges in Central and Eastern Region, Bangkok:** Mahidol University.
- Laddawan Kittinon. (2003). **Consumer attitudes that affect packaging for the environment in Bangkok.** Master's thesis. Management College Srinakharinwirot University.
- Somtharat Burirat. (2009). **Study of the attitudes of young consumers towards environmental products in Bangkok. Objective: To study the attitudes of teen consumers towards environmental products in Bangkok.**
- Siriwan Serirat and Prinlaksitonon (1995) **Marketing Strategy Marketing management and case studies. Type 1. Bangkok:** Development of education.
- Kotler, Philip. (2003). **Marketing Management.** 10th ed. New Jersey: Prentice - Hall, Inc.
- Michel Laroche, John, Jasmin and Guido. 2001. Targeting consumers who are willing to pay more for environmentally friendly products. **Journal of Consumer Marketing**, VOL. 18 NO. 6: 503-520.

Farmers' Adoption of Tobacco Production Technology in Khounkham District, Khammouane Province, Lao People's Democratic Republic.

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Abstract

Adoption of technology is an imperative factor for the economic development. Successful introduction of technology for the developing countries require thorough understanding of the priorities and concerns from the smallholder of farmers at the grassroots. Thus, the objectives of the study were to study: the basic personal and socio-economic characteristics; farmers' adoption of tobacco production technology; factors affecting to farmers adoption of tobacco production technology; and problems and suggestions about tobacco production. Two stage random sampling technique was used to determine the sample size and the questionnaire was created to collect data from a sample of 182 farmers. Statistical techniques were used descriptive statistics and multiple regression.

The result of the research revealed that the majority of farmers (65%) were male with an average age of 52 years, married, and finished primary education. The farmers had an average 6 of family members, 4 household workforces, and 0.40 hectare of tobacco production area, agricultural income earned 6,714,000 kip. The amount of household debts was 3,376,520 kip. The perceived information of farming was 7 times, contracted with agricultural staff with an average of 2 times. Participated in agricultural tradition activities and engaged in-service trainings/education trips on average of 3 times per year. The farmers have 18 years of experienced on tobacco production and most of them are members of agricultural organization. However, the farmer's adoptions on tobacco production technology were all in the average high level ($\bar{x} = 3.62$). The factors effecting to farmer's adoption are three factors such as; participation in the agricultural trainings, educational attainment and the number of labors in the households. The problems of the tobacco production found were; 1) Soil erosion due to slope areas 2) The costs and inputs for productions were high, particularly labor, fertilizers and pesticides costs. 3) Tobacco yield was affected by natural disasters for example drought and flooding, and 4). The price of tobacco is quite low. Therefore, the farmers suggested to the concerned agencies to promote and develop tobacco production by the following recommendations; 1) Farmers are encouraged to prioritize education to equip them with necessary knowledge and skills. 2) Farmers should focus more on increasing labor-days for optimal to ensure close supervision of tobacco at all stages to minimize on-field losses. And; 3) Stakeholders should organize more useful seminars and intensive trainings programs on tobacco farming in order to provide farmers with skills and innovative knowledge to improve the traditional on-field tobacco management practices since most of the agriculturist depends on tobacco production.

Keywords: technological adoption; tobacco production; tobacco farmer.

Introduction

Agriculture is an important sector in the Lao People's Democratic Republic (Lao PDR). Income from agricultural sector accounted 23.70 percent of gross domestic product (GDP), and it also creates a career of Lao people in the agricultural sector up to 80%. While the industry accounted

for 29.10% and services 47.20% (Ministry of Planning and Investment, 2016: 5). The country's major cash crops include rice, sugarcane, vegetables and tobacco. It can be seen that tobacco is one of the important cash crops for the farmers, which the most popular tobacco species is Burley, Turkish or Oriental and Virginia (Savith, 1977). The main area where tobacco is grown in the central and southern regions, especially in central provinces such as Khammouane, Borikhamxay and Savannakhet provinces. Because there are tobacco companies that have made contracts with many farmers in these areas to allow farmers to produce tobacco as raw materials for cigarette production. In addition, Tobacco was the third largest agricultural product that earn USD 50 million a year and a substitute for rice in Laos. Farmers grow tobacco as a family business with contract farming. Tobacco farmers sell their products to cigarette manufacturing companies but keep a small amount of tobacco for household consumption. The characteristic of tobacco cultivation, mostly grown as a family that has a contracted with the company and some families have grown tobacco replacing of other crops, especially rice. The characteristics of almost all tobacco factories in Lao PDR are state owned enterprises, which doubled cigarette production, up from 41 million tons in 2010 to 82 million tons in 2015. Tobacco production increased from 0.77 tons per hectare in 2005 to 3.6 tons per hectare in 2010. The production increased to more than 5 tons per hectare in 2012 and slightly increased between 2013 and 2014. However, there was a slight decrease in 2015 due to flooding in many areas of the country, which caused damage of many agricultural products such as rice, sugar cane, soybeans and tobacco (Baothammavong, 2007).

The tobacco produced is not only sold to the tobacco factory, but also make tobacco for household consumption (Khamphouth, 2016). Besides, tobacco is also an export product to generate income for the country as well. Since tobacco production is one of the important agricultural activities in Lao PDR, it also generates income for the Laotian farmers and creates jobs for the farmers as well. Each year, Lao PRD produces 28,000 tons of tobacco and 361 million cigarettes (Saysamone and Team, 2018:10).

Tobacco production increases each year because the relevant authorities have encouraged farmers to use modern technology to get more benefits from tobacco production, started from the preparation of planting areas to harvesting and selling products to obtain quality tobacco that meets the needs of the factory and allow tobacco production to progress to the industrial sector continuously. But there are still farmers that do not accept the modern technology used in production, because they thought that there is no need of using modern technology to increase the production cost. Thus, this research aimed to study the adoption of tobacco production technology of the farmers and to know the factors affecting the adoption of technology for farmers and to know why some farmers do not adopt modern technology for production. The results obtained from this research is essential information in the planning of tobacco production extension policies and planning for the transfer of tobacco production technology to farmers in target area and other areas throughout the country.

Review of Literatures

Recently, the Lao PDR conducted a major agricultural census which provided an excellent overview of the basic nature of Laos' agricultural system. The results of this survey indicated that 65.2% of the total population was engaged in farming (Ministry of Planning and Investment. 2016). The average land holding was 1.62 hectares with 27% of households having 2 hectares or more and 36% having less than 1 hectare. An impressive 97% of farmers own their own land. About 93% of the area devoted to rice production was for the production of sticky rice, a subsistence crop used primarily for home consumption (Vang Chu. et al., 2008).

Tobacco farming is a very important source of income for the Lao people. It created a lot of jobs for poor people in the rural area. Furthermore, tobacco production contributed about USD2 million to government revenue. Tobacco farming was the second major agricultural production of

Laos over the period of the study, accounting for around 2.18% - 3.11% of GDP in the agricultural sector. The results from the survey in the 3 regions illustrated that farmers grew both tobacco and other crops within the same area. However, the benefits they gained from farming and non-farming activities varied. The average profit derived from tobacco leaves was very different from that of rice. Tobacco production in 2010–2011 was 81,175 tons, and in 2014–2015 it will be 64,600 tons; this represents 71 percent of the Five-Year Plan target (90,000 tons). Tobacco is planted in Champasak, Savannakhet, Khammouane, Bolikhamxay, Luangprabang and Vientiane provinces for supplying to the factories in Vientiane and Savannakhet and for export. The profits earned from tobacco leaves production was USD450.40 per farming household per year which accounted for 25% of the total cost per household while rice generated a profit of USD39.38 per farming household per year, or 8% of total cost (Saysamone et al., 2008)

Waman et. al., (1998) found that the level of education, size of family, interest in modern farming and sources of information were the main factors, which significantly influenced behavior of the small farmers regarding new farm technology.

Truong (2008) suggests that some machines are too heavy, which creates mobility problems as it is difficult for farmers to transfer the machines from field to field. While traditional farmers are enjoying minimum costs with respect to conducting their farming routines, things are different for the technology adopters.

Abdullah and Samah (2013) elucidate that technology usage among farmers, and the benefits that can be gained from this technology and also explains the factors affecting technology usage. Finally they concluded that farmers' perceptions and levels of education, as well as extension-workers' knowledge, the management of the extension program, and the physical conditions of the area, are all factors that affect technology adoption among farmers.

Although previous studies of tobacco provided some significant information and results on tobacco policy use in Lao PDR, but no study has yet been conducted on farmers' adoption of tobacco production technology. Therefore, this study hoped to fill the gap by investigating the issues of technology and expenditure of the farmers. This study used different methods and samples from previous studies and aimed to provide significant conclusions. From the results of the study it is hoped that workable and practical policy recommendations to government of Lao PDR can be proposed. The details of study and analysis are explained in the next sections.

Methodology

This study is quantitative research, to study farmer's adoption of Tobacco Production Technology of Farmers in Khounkham District, Khammouane Province, Lao People's Democratic Republic, the research process as the following:

Population and Sample Size

This study was carried out in Khounkham district, Khammouane province where tobacco production is third largest proportion in the country. Two stage random sampling technique was used to determine the sample size (Prachum Suwatthi, 1998: 115): 1) randomize the village sampling from 5 villages namely: Kang, Namnone, Phakhorm, Nakham; and Namngarm villages with total 333 of tobacco producers. Then calculated sample size by Taro Yamane formulation (1973:727) at the 95% of confidence level and 0.05 of error level, got total sample 182. 2) Randomly calculated the household sampling number in each village by using proportional size method and randomized the

household from number of households and one respondent in each household chosen as representative for conducting the interview.

Data Collection

Data collection was carried out through interview survey which based on a semi-structured discussion. A first draft of the interview was designed according to the research objectives. Interview schedule was carried out in the manner of pre-tested during pilot observation organized in the study area. The interview schedule was up-dated based on pilot survey and later on, used for primary data collection from the farmers who are the producers of tobacco.

Data analysis

Various descriptive and inferential statistical techniques i.e. percentage, mean, standard deviation, regression analysis etc. were applied for getting meaningful results by using Statistical Packages for the Social Sciences (SPSS).

Adoption quotient for an individual farmer was calculated based on the adoption scores gained by the farmer for the adoption of tobacco production technology. A total of 4 requirements were used for calculation of the adoption quotient. On the basis of the adoption quotient, farmers were classified into five categories as follows.

Average	Adoption level
1.00 – 1.80	Lowest
1.81 – 2.60	Low
2.61 – 3.40	Moderate
3.41 – 4.20	High
4.21 – 5.00	Highest

Result and Discussion

Farmers' personal backgrounds and social-economic characteristics

The study results showed that the majority of farmers, 65 percent, were male with average age of 52 years, married, and finished primary education. The farmers had an average 6 of family members, 4 household workforces, and 0.40 hectare of tobacco production area, agricultural income earned 6,714,000 kip, the amount of household debts was 3,376,520 kip. Farmers perceived information of farming of 7 times, contracted with agricultural staff of an average of 2 times. Participated in agricultural tradition activities and participate in training/education trips on average of 3 times per year. The farmer has experienced on tobacco production for 18 years on average and most members are of agricultural organization in the community.

Famers' adoption of tobacco production technology in Khounkham district, Khammouane province, Lao PDR.

The farmers' adoption though tobacco production technology, all the average on a high level (3.62). Moreover, the accumulate average of adoption among 4 requirements were trended from low to highest levels, while highest level had only one requirement that is preparation of planting area (4.47); follow by high and low levels such as harvesting and processing (3.93); production's care (3.70); and marketing and selling (2.40) respectively (Table 1).

Table 1. Farmer's Adoption Level of Tobacco Production Technologies
(n=182)

Adoption of Tobacco Production Technologies	\bar{x}	SD.	Adoption Level
Preparation of Production Area	4.47	.305	Highest
Production's Care	3.70	.285	High
Harvesting	3.93	.394	High
Marketing and Selling	2.40	.312	Low
Total	3.62	.159	High

Remark: Highest = 4.21- 5.00; High =3.41- 4.20; Moderate = 2.61-3.40; Low =1.81-2.60; Lowest =1.00 -1.80

Factors affecting to farmer's adoption of tobacco production technologies

The determination of factors affecting to farmer adoption of tobacco production technology was the third objective of the study. Multiple regression analysis was applied to determine the specific contribution of each independent variable and the total variance explained by all variables on factors influencing the adoption of tobacco production technologies. There were fifteen independent variables entered in the model, out of which only three variables had significant influence at the 5% level on farmers of tobacco production technologies.

As shown in Table 2, the result revealed that the adjusted R^2 had a value of 0.226 indicating that 22.6% of variation in adoption of technologies was explained by the characteristics. Participate of Agricultural training/educational trip was found to have a positive influence on respondents' adoption of the selected of tobacco production technology. The education level and number of labor in the household has negative influence on the adoption on tobacco production technology.

Moreover, the result from regression pointed out that participation in agricultural trainings and educational trips were significant at 0.05 probability level. It was widely accepted that participated in trainings will help a farmer to acquire knowledge relating to tobacco production. Accordingly, farmers participated in trainings or educational trips were likely to adopt of tobacco production technology. This result was similar to those from the study of Singh et. al. (2015) that farmers' participation in organic farming related to training as the main determinants of adoption of organic farming among farmers which is similar to the research result of Kaya and Atsan (2013) that farmers participating in the trainings are more likely to engage in organic farming. This result confirmed the statement of Jierwiriapant et. al. (2012) that farmers who switch to organic farming to join organic agricultural networks will receive the trainings for organic rice farming

The regression coefficient of education level of the farmer had a negative value of -0.076 and statistically significant at $p < 0.05$ with the p-value of 0.009. The role of education in the development of agriculture hardly needs any emphasis. The role of education is immense in bringing about socio-economic transformation, which in turn affects the way in which a person utilizes his skills on agricultural land. Education is also able to erase the information gaps. Information gaps are the main communication barriers/hindrances which checks the flow of development. Education is thought to create a favorable mental attitude for the acceptance of new practices, especially information-intensive and management-intensive practices. This contradicts findings was established by Ruggimbana (2008) who found that coefficient of the level of education for the famer had a positive sign and significant at $p < 0.05$ and attributed the same to the fact that educated farmers are more likely to understand and follow the advice and directive from the extension agents on the importance of using improved technologies and the use of inputs on recommended rates. It can be deduced from the result that education is independent of the other factors included in the

regression model and order to increase tobacco production by one unit, education level should be decreased by -0.076.

The regression coefficient of labor for production in the household of the farmer had a negative value of -0.041 and statistically significant at $p < 0.05$ with the p-value of 0.003. Farming practices are typically very labor intensive and the majority of the labor is provided by household members. Agricultural household labor is therefore a key household asset and its accurate measurement is important. The estimation of labor inputs on smallholder farms is complex and vulnerable to misreporting. Availability and amount of family labor plays a vital role in determining adoption and intensity of use of agricultural technologies. The existence of active work force in rural households usually encourages them to show interest in trying some agricultural technologies. Off course, the influence of labor availability on adoption depends on the characteristics of the technology to be adopted. When the new technologies in relative to the older ones are more attractive and labor intensive, farmers with more labor would tend to adopt those technologies. Some new technologies are relatively labor saving and others are labor using. For example, when a technology is laborsaving like tractors, harvesters, pesticides and the like, its impact will be negative. For those labor-using technologies, like improved varieties of seeds and fertilizer labor availability plays significant role in adoption. Plenty of adoption studies found out a positive impact of family labor on technology adoption such as Solomon et al (2012). The reviewer argues that higher family labors increase the probability to adopt agricultural new technologies. Most of Ethiopian farmers have not used labor saving technologies like tractors, harvesters in their production system. They depend on labor-using technologies and this agricultural new technology require human resource from sowing to the final harvesting of the crop; and this result contradicts Davies M. (2017), who found the coefficient of labor used per hectare had a positive sign and significant at $p < 0.05$. This implies that in order to increase tobacco production by one unit, labor man-days should be decreased by -0.041.

Table 2. An Analysis of Factors Affecting Adoption of Tobacco Production Technology of Farmers in Khounkham District Kammouane Province, Lao People's Democratic Republic.

Independent variables	Dependent variables		
	Adoption of tobacco production technology		
	B	t	Sig.
1. Sex	-.021	-.807	.421
2. Age	-.002	-1.252	.212
3. Education attainment	-.076	-2.653	.009**
4. Status	.006	.232	.817
5. Number of Member in the household	.014	1.549	.123
6. Number of Labor in the household	-.041	-3.017	.003**
7. Tobacco Production Area	.009	.510	.611
8. Total Household's Income	1.721E-006	1.252	.212
9. Amount of Household's Debt	-1.274E-006	-1.735	.085

10. Agricultural Information perceived	-.002	-.351	.726
11. Contacted with agricultural extension staff	-.019	-1.249	.213
12. Participation in Agricultural activities	.014	.923	.358
13. Participate of Agricultural training/educational trip	.040	4.417	.000**
14. Tobacco production experience	-.002	-.887	.377
15. Membership of Agricultural Organization	.025	.683	.496
Constant	3.836	31.327	.000**
$R^2 = 0.226 (22.6\%)$ $F = 3.231$ $P_Value = 0.000^{**}$			

Remarks *statistically significant level at 0.05

** statistically significant level at 0.01

Problems and suggestions about tobacco production of the farmers in Khounkham district, Khammouane province, Lao PDR.

The problems of the tobacco production found in this research 1) soil erosion due to area slope, 2) The costs and inputs for production were high, particularly labors, fertilizers and pesticides. 3) Tobacco yield was affected by natural disasters such as drought and flooded which direct and indirect caused to tobacco yield and affected the quality 4). Produces breakout of diseases and insects 5) Price of tobacco is still quite low.

Therefore, the farmers suggested to all concerned agencies and benefactors in order to promote and develop tobacco production by 1) Farmers should be encouraged to prioritize education to equip them with necessary knowledge and skills since educational background positively influence tobacco production. 2) Farmers should focus more on increasing labor-days to optimal to ensure close supervision of tobacco at all stages to minimize on-field losses. 3) Stakeholders should organize trainings and seminars on tobacco farming more often to equip farmers with skills to improve on-field tobacco management practices. 4) Provide knowledge on tobacco production cost and marketing analysis and modern methods to prevent diseases and insect pests properly; and 5) States and national governments to help in provisions of market and subsidized fertilizers to tobacco farmers

Conclusion

The analysis developed in this research proves useful and providing evidence on an important issue concerning the adoption of technology in tobacco production. Results obtained from the estimated model shows robust support to most hypothesized effects and in agreement with previous empirical results in the literature or in accordance with the adopted theory. The significant factors that increased the adoption of tobacco production technology includes; participation on agricultural training/educational trips; education attainment; and number of labors in the household.

Based on the results some fundamental policy implications can be drawn from this study. The role of institutional factors is critical in facilitating the adoption of practices that are risk reducing. Therefore, policymakers should promote research on the adoption of tobacco production technology for more production in the country. The government of Laos should take a proactive role to launch advance agricultural extension education program so that to guide the tobacco farmers in a better way. In conclusion, institutional services should be strengthened to provide managerial and technical skills on tobacco technology adoption, and on time provision of financial services to enhance tobacco farmers' productivity.

It is also recommended that training sessions should be offered to farmers, and builds their entrepreneurial skills, it is by so doing they will begin to consider their farming as business and adopt technologies that would increase productivity. New technologies should be directed to the large scale of farmers since they are more likely to adopt than aged farmers and small-scale farmers.

Recommendation

Based on the results, the following recommendations are proposed:

- a) Farmers should have more opportunities to gain higher level of education. They should learn new processes and agricultural technology methods;
- b) The Ministry of Agriculture and Forestry should provide some support, especially training and marketing, to farmers. The farmers should have more knowledge on how to grow other agricultural products and to replace tobacco products. Some main agricultural products (ie. rice, cassava, and soybean) should be subsidized in order to keep the prices higher than the cost of production. This could motivate farmers to produce other agricultural produce instead of tobacco.
- c) Although tobacco farming is an important source of income for farmers, nonetheless, tobacco can also cause many diseases to the smoker such as cancer, heart disease, and stroke. Therefore, tobacco farming should be reduced in terms of the scale of production and the land area under cultivation.

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References

- Abdullah, F. A. and Samah, B. A. (2013). Factors Impinging Farmers' Use of Agriculture Technology. **Asian Social Science**. 9 (3).
- Arif Ullah, Dilawar Khan, Shaofeng Zheng and Uzair Ali. 2018. **Factors influencing the adoption of improved cultivars: a case of peach farmers in Pakistan.**
- Baothammavong Fongvanh. 2017. **Interview by Saysamone Phoydouangsy**, 20 July 2017, Tax Department, Ministry of Finance, Vientiane Capital. 188 p.
- Davies Machel Muchuma. 2017. **Factors Influencing Tobacco Production Among Contracted Farmers in Kenya: A Case of Bungoma Country.**
- Food and Agriculture Organization of the United Nations, 2003. **Issues in the global tobacco economy: Selected case studies.**
- Jaliwa Ntibiyoboka. 2014. **Economics of Smallholder Tobacco Production and Marketing. Mpanda district.**
- Jierwiriapant, P., Liangphansakul, O.A., Chulaphun, W. and Pichaya-satrapongs T. (2012). Factors Affecting Organic Rice Production Adoption of Farmers in Northern Thailand. **CMU.J.Nat.Sci.Special Issue on Agricultural & Natural Resources**. 11(1), 327 – 333.
- Kaya, T.E. and Atsan, T. (2013). Factors Affecting Rural Women's Adoption of Organic Agriculture (TAR1 of Sample). **Food and Agriculture Organization of the United Nations.**
- Kriangkai Sanponhan and Panuphan Prapatigul. 2018. **Factors affecting adoption of using organic fertilizers of growers' mango Namdokmai Sithong export in Phrao district, Chiang Mai province.** *Khon Kaen Agriculture Journal*. 46 (SUPPL. 1), 887-893.

- Ministry of Planning and Investment. 2016. **8th Five - Year National Socio - Economic Development Plan (2016-2020)**. Vientiane: Department of planning.
- Patthraporn Kessung. 2016. **Action Research**. Bangkok: Chulalongkorn University Press. 301 p.
- Prachum Suwatthi. 1998. **Principles of Statistics**. NIDA Development Journal. 38(3), 103-130.
- Preedaporn Kanjanasamranwong. 2017. **Principles of Statistics**. Nonthaburi: IDC Premier. 568 p.
- Rugimbana, F. 2008. **Assesment of the impact of contract farming on farm productivity and returns: a case study of tobacco in Uyui district**. Sokoine university of agriculture. Morogoro, Tanzania.
- Saysamone Phoydouangsy, Piya Wongpit and Xaignasack Lassachac, 2018. **Livelihood in Tobacco Farming and Cigarette Consumption in Lao PDR**. Vientiane Capital.
- Seyyed Milad Samizadeh and Saeed Firouzi. 2016. **The Driving and Inhibiting Factors of Mechanized Tobacco Production in Iran Using the Delphi Technique**.
- Singh, M., Maharjan, K.L. and Maskey, B. (2015). Factor Impacting Adoption of Organic Farming in Chiwan Distric of Nepal. **Asian Journal of Agriculture and Rural Development**. 5(1), 1 – 12.
- Solomon Asfaw, Bekele Shiferaw, Franklin Simtowe and Leslie Lipper. Impact of modern agricultural technologies on smallholder welfare: Evidence from Tanzania and Ethiopia. **Food Policy**. 37:3, 283-295 p.
- Suchart Prasit-rathasint. 2002. **Applications of statistical methods in research**. Bangkok: Fueang Fa Printing House. 352 p.
- Thomas Bilaliib Udimal, Zhuang Jincai1, Owusu Samuel Mensah, Ayamba Emmanuel Caesar. 2017. Factors Influencing the Agricultural Technology Adoption: The Case of Improved Rice Varieties (Nerica) in the Northern Region, Ghana. **Journal of Economics and Sustainable Development**. ISSN 2222-1700 (Paper) ISSN 2222-2855 (Online) Vol.8, No.8, 2017.
- Truong, T. N. C. (2008). **Factors Affecting Technology Adoption among Rice Farmers in the Mekong Delta through the Lens of the Local Authorial Managers: An Analysis of Qualitative Data**. Omonrice.16.
- Varaporn Punyawadee. 2008. **Driven to the way of safe food from toxins: the case of growing vegetables**. Thammasat Economic Journal. 26(1), 107-127
- Vietnam Steering Committee on Smoking and Health and Southeast Asia Tobacco Control Alliance. 2012. **The ASEAN Tobacco Control Report**.
- Waman, G. K., Patil, P. S. and Patil, P. G. 1998. Adoption of Onion Production Technology and its Correlates. Journal of Maharashtra Agricultural University. 23 p.
- Wanida Sujaritturakarn and Jitpaka Tanapanyaratchawong. 2010. **Factors Influencing the Adoption of Production Techniques and Applications of Organic Fertilizer for Farmers in Hatyai District, Songkhla Province**. Suranaree Journal of Social Science. 4 (1), 29-44.
- Wararat Sudcha and Prapatsorn Kiatsuranont. 2019. **Adoption of *Trichoderma* sp. Application on Seasonal Rice Production of Farmers in Kalasin Province**. Khon Kaen Agriculture Journal. 47 (1). Available https://ag2.kku.ac.th/kaj/PDF.cfm?filename=47-1_13_120_611.
- Waro Phengsawat. 2010. **Applied Statistics for Social Science Research**. Suveeriyasarn: Bangkok. 428 p.
- World Health Organization. 2015. **Lao Health Survey**. Vientiane: WHO Vientiane Office.
- Yamane Taro. 1973. **Statistics: an introductory analysis**. Harper International. 886 p.

Strategy for adapting to the opening up of free trade within the ASEAN Economic Community of the enterprises within the City of Phomvihane and Outhomphone in Savannakhet province.

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Abstract

The analysis of adaptive trade liberalization strategies in the ASEAN Economic Community of Entrepreneurs had conducted by using a quantitative study with the interviews of 180 research groups. The entrepreneurs commented that free trade facilitates increased efficiency and competitiveness, reducing competition opportunities. Comparing the opinions of entrepreneurs by type of enterprise, it was found that: The form, model, mechanism, and scope of different enterprises did not have the level of behavior on business incentives in terms of customer recruitment and market share expansion at a statistical level of 0.05. The results of the test of the relationship between the five stresses of competition found that: The pressure on competition with existing competitors, potential competitors, buyers of goods / services, goods / services, substitutes and sellers, each factor has a Sig value greater than 0.05.

Keywords: Adaptation Strategies, ASEAN Economic Community, Motivates, Five forces competitive pressures.

Introduction

FTA (Free Trade Area or FTA) are as countries which negotiate market or reduce barriers on trade and investment in tax and non-tax together with the duty to country members. FTA is aimed to stimulate the growth of trade and investment such as the FTA of North America (NAFTA), trade group Free Europe (The European Free Trade Association, or EFTA) Free Trade Area of the Americas (Free Trade Area of America or FTAA). For example, the FTA with ASEAN (ASEAN Free Trade Area or AFTA) free trade negotiations are controversial among many scholars as to the pros and cons of the Free Trade Area (Krai Rerk Pinkaew: 2007: 26-29). Businesses may choose a strategy adapted to international conditions pressures Cost to respond to a major that may have 4 strategies such as (1) international strategy which is suitable companies face to pressure costs and pressure to meet the low Strategies, (2) International (Multidomestic strategy) which is suitable companies face low pressure costs that is to meet high demand, (3) strategic world (Global strategy) suitable companies face pressures of high cost, but this pressure is to meet the needs of low and strategy multinational (Transnational Strategy) and (4) suitable companies face pressure costs and pressure to meet high demand (Natthaphan Khechonnann 2009: 340). The five pressures of business development competition as a tool to clearly analyse the competitive situation in the industry. The standard force of & states includes: (1) The intensity rivalry among competing firms, (2) the threat of new entrants to the market, (3) the bargaining power of the firm is supplier, (4) the threat of substitute products, and (5) the threats from interchangeable products) (Krai Rerk Pinkaew: 2007).

The province of Savannakhet investment industry is a key channel to generate income and create jobs for people, and causing the growing economy due to industrial production, trade and

service businesses in the manufacturing and foreign investment. Private domestic and foreign FY 2013-2018 as investment enterprises in the country in 2013 amounted to 260 units which includes the total capital test all registered 35,874,045 dollars, in 2014 with 255 units worth including the experiment registered 28,239,800 dollars, in 2015 amounted to 224 units including total capital test all registered \$ 22,083,800, in 2016 there were 202 units with a total registered capital of 221,044,630 dollars, in 2017 there were 230 units with a total registered capital of 520,599,874 dollars, in 2018 there were 235 units with a total registered capital of 77813 dollars. Investment of enterprises abroad in 2013 amounted to 76 units worth including the experiment all registered 472,004,467 dollars, in 2014 with 88 units worth the experiment all registered 634,120,086 dollars, in 2015 with 95 units worth the experiment all registered 745,521,311 dollars, in 2016 amounted to 103 units Total capital test all registered 835,779,108 dollars, and in 2017 with 111 units worth the experiment all registered 891,924,396 dollars, 2018 amounted to 115 The unit has a total registered capital of \$ 966,732,234 (Chitpasong Broliboun 2019).

Purpose of research

- 1) To study the opinions of entrepreneurs on the opening of free trade in the ASEAN Economic Community.
- 2) To Compare the opinions of entrepreneurs by enterprise type on the motivations of doing business in order to adapt to the opening of free trade in the ASEAN Economic Community.
- 3) To Analyze the relationship between the five pressures of competition and the adjustment strategy to support the opening up of free trade in the ASEAN Economic Community of Entrepreneurs.

Methodology

This research is to be used a mixed method such as: a quantitative and qualitative research model with the following principles:

Sample selection

The sample used in this research was a business operator of 180 units because they know the exact population, so they used the calculation of the sample using the formula of Taro Yamane (Taro Yamane. 1970) to determine the confidence level of 95%, the predictability of the sample is 5%.

Data collection

Using a questionnaire to collect information on the views of entrepreneurs on the opening of free trade, the nature of the enterprise and the five pressures from a sample of 180 units.

Data analysis

Quantitative data analysis, and research processing are using descriptive statistics to explain such as Frequency, Percentage, Mean, S.D. of Entrepreneurial Opinion on FTA.

One-way Analysis of Variance, F-test was used to analyze the difference between the mean values of more than two groups at a statistical significance level of 0.05 and to test the correlation coefficients of the Persan (1998) Correlation Test. Where the union coefficient is between $-1 < r < 1$

Results and findings discussion

The results of the analysis of the opinion level on the opening of free trade of entrepreneurs

Results showed that: opening trade causing efficient and able to compete increase, reduce restrictions and phone into the market monopoly quota related to trade / services, population increase, causing demand rose, comfortable and ready to conduct business due to the support of the government, merger or hands in the Alliance Business Industrial same cause stability in business by the average was 3.79, 3.53, 3.56, 3.56, with an average equal to 3.66 respectively (Table 1).

Table 01 Results of Opinion Level Analysis on the Free Trade of Entrepreneurs

Opinion Level Analysis on the Free Trade of Entrepreneurs	Level of opinion		
	\bar{X}	S.D	explanation
Opening up free trade leads to greater efficiency and competitiveness	3.79	0.77	Very good
Reduce barriers and barriers to market access, such as trade/service related quota monopolies	3.53	0.95	Very good
The increase in population has led to increased demand for goods, convenience and readiness to do business due to the expansion of the government	3.56	0.92	Very good
Convenience and readiness to do business due to public sector switching	3.56	0.93	Very good
Mergers or acquisitions in the form of business alliances in the same industry create a stable business environment	3.66	0.90	Very good
Communication and telecommunication developments such as satellite communication systems have a clear accuracy	3.58	0.88	Very good
Development of transportation such as roads, fast-moving aircraft	3.46	0.85	Very good
With the development of marketing, such as increased public relations, the demand increased	3.41	0.91	Very good
Promoting international trade and investment cooperation facilitated	3.33	0.93	Moderate
Total	3.54	0.89	Very good

Source: From interviews with business units in Kaysone and Outhomphone districts on 18/01/2018

The results of the analysis of the level of opinion on the incentives for international business of entrepreneurs.

Customer recruitment and market segmentation of the business.

The results of the analysis of data on international business incentives were generally moderate, with an average value of 3.29. When analyzed, it was found that: Creating a competitive advantage from doing business internationally and protecting oneself from the domestic market, business growth increased by an average gain of 3.58, and 3.48.respectively.

Table 02: Results of customer acquisition research and market share expansion

Customer recruitment and market segmentation of the business	opinion level		
	\bar{X}	S.D	Explanation
The increase in sales was driven by increased demand and purchasing power of the ASEAN market. 3.21 0.87	3.21	0.87	Moderate
Overseas customer base to prevent sales and profits from fluctuating	3.10	0.81	Moderate
Development of goods / services to international standards with internationally equivalent standards	3.07	0.80	Moderate
Minimizing risks such as creating a competitive advantage from doing business internationally and protecting oneself from the domestic market	3.58	0.88	Very good
Business growth resulted in a strong increase in demand	3.48	0.94	Very good
Total	3.29	0.86	Moderate

Source: From interviews with business units in Kaysone and Outhomphone districts on 18/01/2018

The pursuit of resources and the creation of business assets.

The results of the analysis of data on the stimulus for doing business in international business as a whole have a very high level of opinion, with an average value of 3.48. When analyzed in many ways, it is found that finding sources of capital, information technology from modern countries, reducing the risk of shortage of production factors, increasing business opportunities by expanding investment , production and trade, which average 3.68, 3.44 and 3.52 respectively, see Table 3).

Table 03: The searchfor resource and the creation of business assets

Resource findings and the creation of business assets	Level of Opinion		
	\bar{X}	S.D	Interpretation
Finding quality and cheap raw materials from outside the country	3.40	0.89	Moderate
Recruitment of Skilled, Skilled and Cheap Foreign Workers	3.37	0.97	Moderate
Finding sources of funding, information technology from countries that are very modern	3.68	0.79	Very good
Reduce the risk of inputs	3.44	0.95	Very good
Increase business opportunities by expanding manufacturing and trade investment	3.52	0.92	Very good
Total	3.48	0.91	Very good

Source: From interviews with business units in Kaysone and Outhomphone districts on 18/01/2018

The results of comparing the opinions of entrepreneurs by enterprise type on business incentives to adapt to the opening up of free trade in the ASEAN Economic Community

Entrepreneurs pattern, sector and size of business, different opinions on what motivated in seeking customers and grow market share and seek resources and build assets of the business to improve support for open trade in the economy and not have opinions different had the Sig as 0,532, 0,782, 0,840, 0,279, 0,651, 0,108, respectively, with the confidence Statistical 0.05.

Table 04: Comparison of Business Characteristics with Adaptation Incentives for Free Trade in the ASEAN Economic Community.

Comparing Enterprise Characteristics to Business	Incentives Source	SS	df	MS	F	P-value
Business model for customer motivation and market expansion	between groups	0.204	2	0.102	0.634	0.532
	Within the group	28.449	177	0.161		
Entrepreneurship model to the stimulus for resource exploration and asset creation	between groups	0.093	2	0.047	0.246	0.782
	Within the group	33.503	177	0.189		
Enterprise dynamics on customer motivation and market share expansion	between groups	0.056	2	0.028	0.174	0.840
	Within the group	28.597	177	0.162		
Enterprise dynamics on resource motivation and asset creation	between groups	0.481	2	0.24	1.285	0.279
	Within the group	33.116	177	0.187		
The role of the enterprise in motivating customers and expanding market share	between groups	0.265	3	0.088	0.547	0.651
	Within the group	28.388	176	0.161		
The role of the enterprise in motivating the pursuit of resources and creation of assets	between groups	1.137	3	0.379	2.054	0.108
	Within the group	32.460	176	0.184		

Confidence Statistical 0.05

Test of the five competitive prssures on strategies to support free trade in the ASEAN Economic Community

From Table 05, the results of the analysis of the relationship between competition with existing competitors in the business, competitors in business, buyers/services in the business and sellers in the production factors to the strategy to support free trade in the ASEAN Economic Community.

Personal pressure on the production of goods/services against the competition of existing competitors, against buyer of goods/services, and against vendors, respectively.

The pressure to meet the business needs of customers with the competition of existing competitors, with buyers of goods/services, and with vendors such as the following ($r=0.103$, $\text{sig}=0.171$, ($r=0.008$, $\text{sig}=0.912$), ($r=0.004$, $\text{sig}=0.957$), ($r=0.094$, $\text{sig}=0.210$) and ($r=0.037$, $\text{sig}=0.620$), respectively and these values have the relationship at low level.

Table 05 Demonstrated that the Analysis of 5 Competitive Influences on the Strategies is to support Free Trade in the ASEAN Economic Community

5 Competitive Influences on the Strategies is to support Free Trade in the ASEAN Economic Community	Competing with existing competitors in the business			New competitors in the business			Vendors of goods/services in business			Goods/Replacement service in business			Vendor side , factor of production		
	Pearson Correlation	Sig	Level of significal	<i>Pears on Correlati on</i>	Sig	Level of significal	Pearson Correla tion	Sig	Level of significal	Pearson Correlat ion	Sig	Level of significal	Pearso n Correla tion	Sig	Level of significal
Self inflicted pressure on the production of goods/services	0.084	0.264	Low level	-0.042	0.573	Low level	0.029	0.699	Low level	0.069	0.360	Low level	0.046	0.543	Low level
Stress in response to business customer needs	0.103	0.171	Low level	0.008	0.912	Low level	-0.004	0.957	Low level	0.094	0.210	Low level	0.037	0.620	Low level

Confidence Statistical 0.05

Discussion

The research on the adaptation strategy for free trade in the ASEAN Economic Community (AEC) of entrepreneurs in Kaysone Phomvihane and Outhomphone districts in Savannakhet province, the research team highlighted the key issues as follows:

- 1) towards open trade entrepreneur found that entrepreneurs in the city far from Phomvihanh and city Uthumphon comments to open trade at more or agreed in opening trade causing efficient and able to compete increase, reduce restrictions and phone into the market monopoly quota related to trade / services, population increase, causing demand rose, comfortable and ready to conduct business due to the support of the government, merger or hands in the Alliance Business Industrial same cause of stability in the business, developing communication and telephone communication systems like communication satellite with a clear quick development of telecommunications, transport, roads, planes Rapid advances and marketing developments such as increased public relations have led to increased demand.
- 2) Entrepreneurs with different forms, strengths and weaknesses in doing business with an opinion on the motivation to seek customers and expand market share and seek resources and build business assets to adapt to the opening of free trade in the ASEAN Economic Community.
- 3) Cost pressures on the production of goods / services against the competition of existing competitors, against existing competitors, against buyers of goods / services and against sellers of inputs, which have a low correlation.
- 4) The pressure to meet the business needs of the business customers with the competition of the existing competitors, with the new competitors, with the buyers of goods / services and with the sellers of inputs, which have a low correlation.

References

- Somsak Padidbongkot (2012). Adaptive Strategies for Free Trade in the ASEAN Economic Community of Outbound Tourism Entrepreneurs in the Greater Bangkok Area. Bachelor's Degree (Management). Bangkok: Graduate School, Srinakharinwirot University
- Anon. (2014). The direction of the socio-economic development plan of Savannakhet province.
- Chealanai Phatthalakhom (2009) A Study of the Adjustment of Business Entrepreneurs in Amphoe, Chiang Mai Province
- Somkid JDivong (2006) A Study of the Characteristics of Small and Medium Business Entrepreneurs in Phetsaboun Province.
- May the tip of the John Rhode (2000) to study the marketing strategies of companies, entrepreneurs, business guides in Bangkok city
- Chirasak (1985) studied "Private Foreign Investment and The Economy" on the factors that determine the direct foreign investment.
- The International Economic Center (1997) reports on the results of a study on the liberalization of trade in services and the impact on the Thai tourism industry (case study on ASEAN and APEC obligations).
- Nalaphiphong Thammasak (2005) study of the past activities of the APEC Economic Cooperation Group, especially the economic role of Thailand.
- Wuttitthep Inthapanya and Atikun Model (2012) Study on the Economic Impact of the Tourism Industry in Thailand

- Latsaphong Mulalin (2003) conducts a comparative study of the tourism industry in Thailand and an analysis of factors influencing the determination of tourism objectives of foreign tourists visiting Thailand.
- Suerero (1986). Study Factors Determining Direct (Foreign) Investment in Thailand
- Champasakorn (2002) A Study of Comparison of Background and Entrepreneurship Characteristics between High and Low Successful Entrepreneurs in Small and Medium Enterprises, Chiang Mai Province.
- Xavier Temayakun (1994) Study of knowledge and skills in the profession of freelancer in the field of industrial mechanics.
- Somkeo Hungheung, Kiangkai and others (2007) Study the characteristics of successful entrepreneurs in the southern part of the Kingdom of Thailand.
- Conclusion Trade Department of Industry and Commerce Savannakhet year 2012-2015
- Kalpande, S. D., Gupta, R. C., & Dandekar, M. D. (2010). A SWOT analysis of small and medium scale enterprises implementing total quality management. *International Journal of Business, Management and Social Sciences*, 1(1), 59-64.

EDUCATING THE GLOBAL CITIZEN

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Internationalization in Higher Education: Lao-German tandems – challenges, contexts, perspectives

Prof. Dr. Martin, Isabel

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Abstract

The Lao *Voluntary National Review of the 2030 Agenda for Sustainable Development* (2018) identifies “life-long learning” and “teacher education” as necessary factors for “Quality Education” (SDG 4).

The enormous demand for English teachers globally has led to increased mobility and the internationalization of education. Students’ and teachers’ intercultural experience and pedagogical expertise are heightened by stays abroad. However, as the foundations of “Teaching English to Speakers of Other Languages” (*TESOL*) are governed by Western (sometimes neocolonial) assumptions, a culture-sensitive and customized teaching approach is called for which considers socio-linguistic features of the learners’ backgrounds, local conditions, and values and goals in education, by following a “postmethod pedagogy” of particularity, practicality, and possibility (Kuramavedivelu 2003, Alvarado & Lozada 2016).

The “Bi-directional learning and teaching” project between the University of Education Karlsruhe (KUE) and Lao partner schools started in 2015 with English and quickly expanded to include other school subjects and then also institutions of Higher Education (HEI). Savannakhet University (SKU) started cooperation with UEK in 2018, which resulted in an English Language Teaching (ELT) volunteer programme and two 3-year Erasmus+ Mobility programmes (2018-2023).

Our Lao-German “Professional Learning Community” (PLC) builds on bi-directional tandem-work and intensive mentoring. A multiplier project structure develops and disseminates the participants’ new linguistic and methodological skills, while their intercultural learning moves through the five stages of Global Citizenship Education for the “decolonizing of minds”, which leads to the decolonizing of teaching and HEIs.

Lao participants may thus facilitate their students’ contributions to a sustainable integration of Laos into the ASEAN, while German participants learn to foster their multi-cultural students’ contributions to the safeguarding of peace and democracy in Europe. This PLC ultimately serves the Agenda 2030. It showcases how transboundary tandem-work can contribute to “Quality Education”, which is key to tackling the global problems of the 21st century.

Project blog: www.thelaosexperience.com

Keywords: Internationalization, SDG #4, Tandem-work, PLC, Decolonization

Introduction

“Internationalization is changing the world of higher education, and globalization is changing the world of internationalization” (Knight 2008, 1).

The Anthropocene is the current geological era in which *homo sapiens* has become the determining factor for the ecological future of “our” planet and the survival of the remaining

species. The consequences of man-made climate change, pollution, mass migration, and pandemics have solidified into existential challenges which must be met in all political fields, also in science policy studies. The goal of “21st century skills” in the education of the next two generations must therefore be pursued by educational institutions at all levels and then implemented in National Curricula worldwide. National measures are futile because climate change, pollution, mass migration, and pandemics cross borders. In Germany, the think tank of the “German International Exchange Service” (“Deutscher Akademischer Austauschdienst”, DAAD) aims at transnational solutions for the “Sustainable Development Goals” by strengthening international cooperations, digitalization, and focussing on the African continent, and by financing university cooperation projects about climate change, health, Sustainable Development, and conflict management. (<http://www.daad.de>)

The University of Education Karlsruhe (KUE, <https://www.ph-karlsruhe.de/>) declares internalization to be one of its major development goals in its “Structure and Development Plan 2016” and identified three “strategic partnerships” amongst their international partner universities. Also, new degrees are now only approved if they have an international component. However, this does not make KUE an International University, because its structural organizational foundation is German, and because the intercultural dimension of teaching at a HEI may be implemented structurally in the Humanities, but not necessarily in other Faculties. (This is not only a feature of KUE, but of German universities in general.)

Limiting factors at KUE to becoming an International University are low awareness regarding the relevance of Global Citizenship Education; insufficient English language skills or lack of courage amongst older staff to lecture in English; shortage of housing in Karlsruhe; and understaffing of the International Office.

Internationalization at KUE is propelled by the International Office, the President, an (increasingly digital) Language Learning Center (LLC), and individual professors who run projects, publish, attract Master and doctoral students, and heighten KUE visibility by giving papers at international conferences (as in our PLC www.thelaosexperience.com/research).

Still, KUE aims to become more competitive and future-oriented to as to attract more (international) students, for example by offering many opportunities to incoming and outgoing lecturers and students for transiting across boundaries so they can develop their international and intercultural competencies and global skills. KUE has more than 50 international cooperation partners by now; many of our students spend one term abroad at least once during their studies, and we host 25-30 international students from all over the world in our Master or doctoral programmes every semester.

The majority of students at KUE are enrolled in the teaching degrees for primary and lower secondary school, so they are the key generation of teacher-multipliers who will help the next generation to develop the essential “21st century (global survival) skills”. For this they need to professionalize themselves first: with opportunities, guidance, and supervision provided by their educators, who, in turn, need to create transboundary cooperation projects by acquiring funds for such professionalization opportunities in the first place.

A Case Study: “Bi-directional learning and teaching” between German and Lao partners 2015 – 2020

“Paths are made by walking them.” (Franz Kafka)

Working with a Lao partner is new territory for any Western university. Lao P.D.R. needed two decades to combat “poverty, [...] analphabetism, high mortality rates for vulnerable groups of people, low life expectancy, food insecurity, and almost non-existent public utility” (Khemmarath, “Background to the Symposium” [Program], 2) in the aftermath of Indochina’s devastating 30-year battle, which only ended in 1975. The accelerated reconstruction since the 1990s opened new doors first to the other South-East Asian countries, and, eventually, also to the Western world. With no precedents to go by, we chanced a PLC blind-folded, in a high-risk project.

Project 1: “Teaching English in Laos” (AfC, BHS, KUE & three Lao schools)²

The “Teaching English in Laos”-project funded by the Angels-for-Children Foundation (AfC, <http://engel-fuer-kinder.de/en/>) and built by KUE began in October 2015 at a Lao primary school in Ban Sikeud and a secondary school in Ban Phang Heng, with five German graduates (Team 1). It ran for five years and involved 10 teams, i.e. 77 German volunteers. The project leaders mentored all teams in a number of preparatory meetings and additional workshops (“Learning Through The Arts”, LTTA), and visited them regularly during their internships to conduct interviews, meetings, and generally collect data in a multi-method approach, for self-assessment and -correction. This was followed by a more formal evaluation in the intensive post-phase.

Already in 2016, promising learning outcomes were clearly manifest on both sides, so another primary school supported by AfC in Ban Phang Heng was included in the project in the spring of 2016. Only half a year later the Lao-German Technical College (LGTC) joined the project, which was funded by BHS Corrugated (BHS), the family business behind AfC.

While this first AfC-BHS-KUE project (2015-2020, Teams 1 to 10) was already structured in a bi-directional way with cascading levels of teaching and clear tasks and goals in the pre-, while-, and post-phases, the main emphasis was on the support of Lao school teachers of English by German graduates with excellent English and advanced teaching skills, and latterly also by volunteers teaching physics, chemistry, and maths.

Project 2: “Bi-directional learning and teaching” (KUE with Lao HEIs)

In the spring of 2017, the educator went on a “Fact-Finding Mission” funded by the DAAD to explore institutions of education in central and southern Laos. This led to first contact and mutual interest between KUE and SKU, and the visit was returned six months later. In 2018, a Memorandum of Understanding (MoU) sealed the new cooperation, and in October 2019, on the auspicious occasion of the 10th anniversary of SKU, we held our first “International Symposium” at SKU to disseminate our research results to a wider audience.

In the autumn of 2017, the educator developed a new seminar, “Global English(es), Global TEFL [Teaching English as a Foreign Language] & Global Citizenship Education”, to facilitate deeper understanding of global issues, internationalization, and the ever-growing responsibility of English teachers at KUE, and also to open up research opportunities for student-volunteers

² For detailed background information on the project refer to the bibliography, “Blog articles”. Every new step and outcome mentioned in this chapter was chronicled in a blog post. Alternatively, type a key work into the search window of the blog www.thelaosexperience.com to find articles, or click on one of the “tags” or “categories” to get a broader overview.

in the project. This triggered Bachelor and Master theses researching critical issues in the advancement of the SDGs, resulting in first papers at international conferences by the young scholars, and first international publications. At the close of 2018, the project-leader started a new series on the project blog to allow more course participants (not only the volunteers going to Laos) to publish their first academic contributions to the field of “Language Education and Global Citizenship” (enter “Language Education and Global Citizenship” in the blog search window to view these articles).

By 2019, the original project had grown into a multi-module-project involving seven Lao partners at college-, university-, and ministry/party-level as well as research partners in Melbourne (Australia) and Hong Kong. The new cooperations with the Vocational Education Development Institute (VEDI) and SKU as well as the (renewed) one with the Lao-German Technical College are funded by the DAAD, Erasmus+, and the partner institutions respectively.

Four prospective new partners, the National University of Laos (NUOL) and the Sunshine School in Vientiane and the Xaisombath Technical College and Teaching Training College (TTC) in Savannakhet are also preparing to join this Lao-German PLC project.

A secure financial basis was established for the cooperation between KUE and SKU with two successful applications for consecutive Erasmus+ Mobility projects: “Bi-directional learning and teaching” (2018-2021) and “Sustainable Development & Global Citizenship Education” (2020-2023). By early 2020, other Faculties and subjects were added to the English teaching and research portfolio, namely biology, food science, Information Technology, physics, technics, and economics. The Covid-19 lockdown arrested our endeavours for the rest of the year, but with a vaccine on the horizon, we shall hopefully resume our exchanges of staff and students in 2021.

Methodology ³

concepts, and meanings underpinning human behaviour are examined, to be able to understand, predict, and then reduce miscommunication between partners.

The “grounded theory” approach may help a researcher embarking in field research who has no previous knowledge of the new “field”, to formulate hypotheses and investigate them in the new terrain. Aiming at being able to make generalizations from a case study and to understand one’s subject more fully, a multi-method or “triangulation” approach could include direct observation, notes and journal entries, participation in the community, in-depth interviews or discussions with experts and participants of the project (formal or informal), conferences with participant groups, stakeholders, and policy-makers, analyses of the documentation produced and the results of the activities conducted by the group in the field, self-examination, and reviews of the literature (if there is any). In this participatory and reflexive process, the gathering of quantitative data may be added to help verify or falsify the propositions, i.e. for analysis, interpretation, and the reaching of conclusions or more general recommendations, to substantiate the evidence collected qualitatively.

³ The following explanation was partly used in a modified form in a prior publication by the author, referenced in the Acknowledgements (Mentz & Papaja 2020, 213-214), similarly some points listed under the “Action Research Cycles” and “Results”.

“Spiral action research” builds on the circle of the “plan-do-review” approach: Planning, actions, and fact-gathering with interpretations of the results. This investigation of one’s own practices and results does not only aim to solve a problem, but also seeks to catalyze personal motivation of partners, volunteers (and oneself), and, ultimately, to snowball and cascade, disseminate, and lead to the next research questions and project goals. If the results are satisfactory, it might even model for other PLCs elsewhere in the world. Possibly a scientific generalization can be made in the end, which can then be adapted to other localities and particularities. The German Minister of Economic Cooperation and Development, Dr. Gerd Mueller, saw the potential in our project for such modelling already in 2016 and therefore encouraged an application for a “best-practice” project to his Ministry, but due to the subsequent floods of refugees to Germany had to concentrate the work of his Ministry on the African continent.

Table 1: Cycles in Action Research

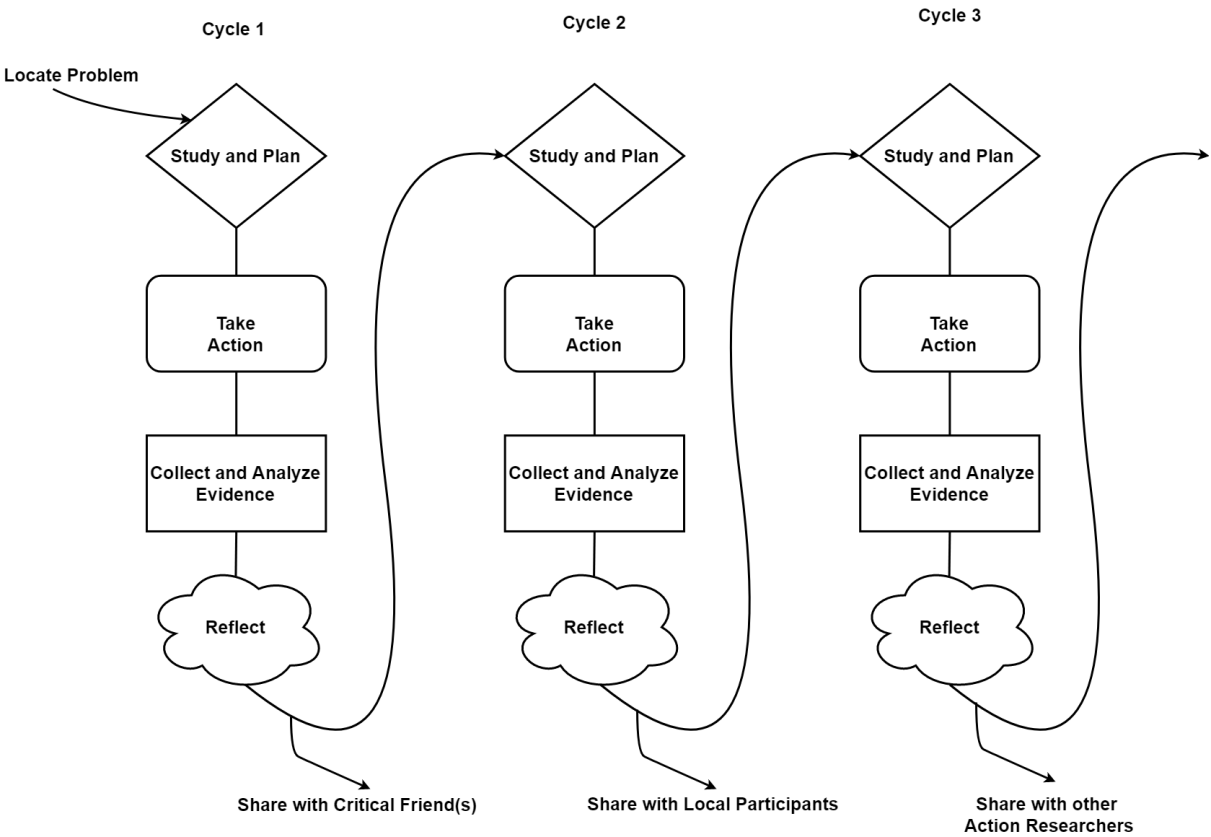


Illustration: “Model of Action Research” (Wikimedia Commons, Center for Collaborative Action Research illustration for action research 2018.
https://en.wikimedia.org/wiki/File:Model_of_Action_Research.webp)

Four-tier cascading structure of the project

In the project so far, 77 volunteers were paired up with one or two Lao partners from seven Lao institutions to form one or two tandems after an intensive preparation phase in Germany.

Each volunteer has five tasks:

- 20 hours of tandem-work and teaching (ideally 4 blocks of 5 hours: 5 hours of teaching English to tandem-partners or other groups of teachers, one or two 5-hour blocks of hospitation, joint lesson preparation and tandem-teaching with one or two tandem-partners, and 5 hours of model-teaching “English Activity Time” for pupil or student groups),
- one “Special Task” within the team (Blog Master, Media Master, Lending Library/Didactics Room Master, etc.),
- “Weekly Reports”,
- one workshop for partner institution on teaching methodology (often co-led),
- one blog publication per month (often co-authored).

Depending on the partner institution and current (unplannable) conditions there, especially the first task can vary and is discussed with the course leader until a timetable is fixed (or “fixed”) for this particular institution.

Table 2: Volunteers’ tasks

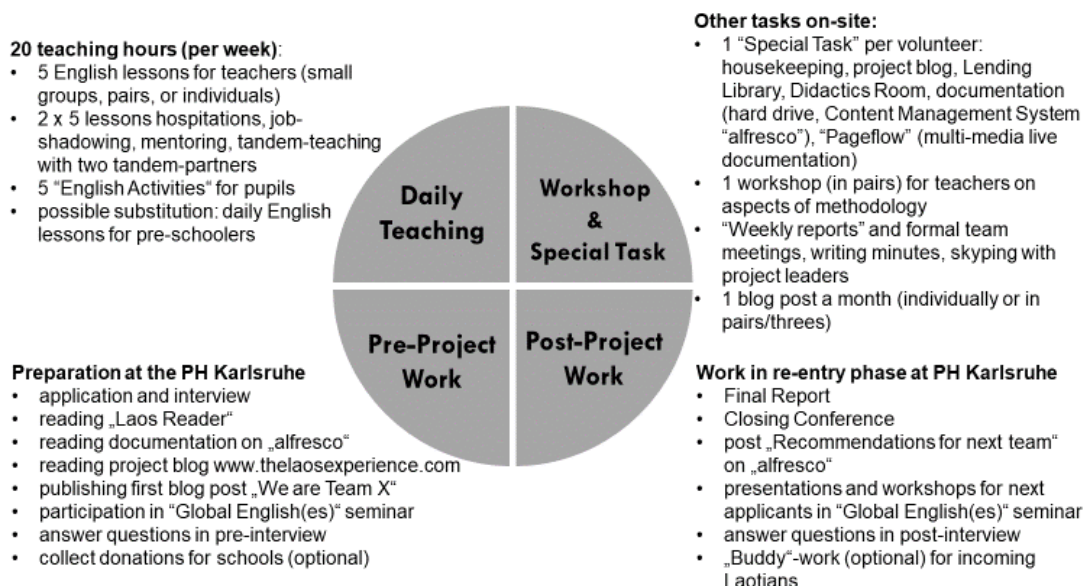


Illustration by V. Golla & I. Martin (2018)

The tandems build their working-relationship through four tiers with different and fluid roles: Observation, input & modelling, practice & tandem-work, and consolidation. In the initial observation lessons, the German partner observes how Lao partners teach and fill in an “Observation Sheet”, which is then discussed. One item is isolated for focus in the next lesson. This is balanced by “model-teaching” in the afternoon, where the German partner offers a voluntary class (“English Club”) to students or pupils, which fosters oral English communication by playful or artistic teaching techniques, while the Laos partners observe and then share *their* feedback.

Second, the Lao partner develops their language skills and the German partner learns to teach interculturally through the regular five English language lessons.

Third, in their tandem-hours, they jointly negotiate and develop their *joint* English lessons for a Lao class, thus developing their teaching skills.

Fourth, in planning a workshop on one particular topic pertaining to Applied Linguistics, the Lao partner learns to identify and formulate *desiderata* and wishes, which the German partner then tries to fulfil by customizing their teaching style, methodology, and material. Modern teaching equipment and digital media receive special attention here, and some special rooms are created in the process, e.g. a Lending Library, Didactics Room, or science laboratory. A blog post is written about this workshop later.

In these four areas, the German partner accompanies and guides their Lao tandem-teacher(s) through different phases of learning (<http://www.thelaosexperience.com/teacher-tandems/>).

This, however, is only possible because at the same time the Lao teacher guides *their* German tandem-partner through similar learning stages regarding their own confrontation with an overwhelmingly foreign setting and culture as well as their own Eurocentric blind spots. They, too, can now expand their language and teaching skills as well as deepen and widen their global understanding and perspective.

After a great deal of initial nervousness on both sides, the working relationship relaxes, deepens, and, with help from the mentor, starts professionalizing by becoming more consciously bi-directional in that both partners understand and fulfil their responsibilities to one another. This “zip”-like learning process creates a safe learning environment, in which mutual trust and then also ideas, initiatives, and new challenges grow. This initiation phase takes about a month, after which the teams can start devising *customized* content and methodology for their classes.

The smallest working unit – the heart of the project – is therefore the tandem-partnership between one or two Lao teacher(s) and one German volunteer. On the higher operational level, there are teams at each school, college, or university, which may range from four to ca. eighty active participants. The project leaders mentor all institutions and participants. For team cohesion it is essential that tasks are equally divided and responsibilities shared. This is monitored and adjusted in bi-weekly and, later, monthly team meetings, in which current tasks and new challenges are discussed with the project leaders (Skype, Whatsapp, Email). Any irritations caused by individuals are to be resolved confidentially, provided one of the project leaders is informed by either the team or the partners about a persistent offence. It is probably no coincidence that conflicts only ever erupted when such information was not passed on in due time. When it was, appropriate measures were taken and further irritation could be averted. (Both on the Lao and German side, “offences” are never meant to be offensive, but are not recognized to *be* just *that* in this very different other culture.)

Workshop topics were offered in the following order, which pinpoints the thematic and methodological development and progress within the project. Some workshops were conducted by different teams at different institutions (e.g. “Pronunciation” or “Creating Material”):

“Singlish”: English Action Songs for Children

Integrated language learning with Square Dance

Activities in School: Songs and rhymes for English lessons

Games for the classroom; Methods for the classroom

Opening the new Didactics room; teaching material (secondary school)

Pronunciation I & II

Teaching Models for the English Classroom

Teaching vocabulary

How to use picture books in the classroom

Storytelling: Pre-,while, post-phase

How to prepare material for science lessons

Opening the new Didactics room: creating material (LGTC)

Creating teaching material

How to work with the course book *Tech Talk* (LGTC)

Storytelling for young learners

Picture books in the classroom: creating material

Pronunciation: L1 (“language one”) interference in L2 or L3

How to embed experiments into science lessons

How to work with the course book *Technical English*

How to use compass, triangle and ruler

Techniques of teaching and learning

Classroom English

Lesson planning, games and material for mathematics

How to create a course plan for *Technical English* (LGTC)

Split lessons for science experiments with a big class

Communication in the classroom: How to make pupils talk

Body language: presenting yourself

How to use Excel, E-mail and PDF

How to create and structure worksheets; Chemistry lab

Discussion

Cycle 1 Study and plan, take action, collect and analyze evidence, reflect, share with critical friends

The **pre-phase** covers four fields of preparation in three mandatory 4-hour workshops (plus recommended participation in 14 sessions of the “Global English(es)” class), which are spread out over 6 weeks. For mental and organizational preparation, the project leader begins by guided reflections about expectations, risks (fears), chances, and challenges (“World Café” method).

Second, the organizational agenda - visa, flights, finances, vaccinations, timeline - is introduced and dates are agreed.

Third, the comprehensive project documentation tool “Alfresco” (Content Management System [CMS]) and the project publication platform Wordpress (backend of the blog www.thelaosexperience.com) are explained – often by returnee students - and participants are walked through the “how to” documents about important aspects of smooth project work (e.g. “How to name files”, “How to write a blog post”); then they are given their first task of uploading new material in the right place in the right manner. Fourth, reading material (apart from the blog) before departure is provided: Secondary literature on culture and linguistics (in the “Global English(es)” class), key reference works on teaching methodology, travel and culture guides, and, lastly, a selection of Western “International” English course books and some Lao ones, which are studied and compared together in group work.

In the end, ideas for raising donations are shared and, in the end, useful gifts for the partner-schools are collected.

When the new team leaves, they are also given a digital and hard copy of the “‘The Laos Experience’ Reader” (editions vary between 80 and 140 pp.), compiled by the project leaders and a number of returnees.

In the **while-phase**, volunteers come to terms with the new cultural environment, with self-organization, a considerable workload, and an unpredictable week of teaching and surprises. On Fridays, they summarize their work and impressions in a Weekly Report form (bullet-points). After a while they discover that the form can be also used for planning the week ahead, which later saves time in writing the report. The mentor replies to those reports over the weekend if necessary and continues to revise the Research Action Plan according to the progress or problems on-site.

Keeping close contact with the team, the educator also visits in person once or twice for observation, interviews, hospitations, consultations, meetings, and active participation in the field, while the Lao project partners pave the way for the German leaders to Lao local and national authorities as well as the German Embassy and the “MoES” (Ministry of Education and Sports). Visibility and transparency encourage trust.

In the **post-phase**, after eliciting, collecting, and analyzing the (overwhelmingly positive) evidence and responses from the German and Lao participants about their experiences and learning outcomes in the weekly reports, meetings, interviews, questionnaires, final reports, and a Closing Summit, the perpetuation of the pilot programme was agreed early in February 2016. The next team of volunteers (Team II) was quickly prepared and sent over for another 7 weeks before the final exam phase and the rainy season started in May. This set the project rhythm for the following four years across 10 teams in total.

Also, through the analysis of teaching records, hospitation notes, tandem-experiences reported in the Weekly Reports, personal exchanges with our Lao partners, Final Reports, and informal and formal meetings with Lao Government officials, the following perception of the Lao school system (seen through a German lens) was obtained: A lack of teachers, teaching materials, methodological training, and digital media; low salaries; absence of planning; and next to no information available regarding the *teaching goals* pertaining to the subject of English because the National Curriculum had not yet been revised.

The academic literature confirms that the education system of Laos is underfunded, conditions in most schools are poor, especially in the mountainous or rural areas of the country. There is a

lack of expertise in setting up and developing a modern education system basically from the ground up, a shortage of teachers, and ineffective training in tertiary and continuing education. An estimated 30% of teachers in Laos do not even have the qualification to teach in a Lao school (UNESCO-IBE 2010, 12).

The *Voluntary National Review of the Agenda 2030* also mentions these obstacles and stresses the role of education for reducing poverty, yet the government spends little on schools and teachers. Lao teachers often have second and third jobs for subsistence, also because salaries (ca. 120 €) may not be paid regularly, sometimes not at all. This will interfere with regular presence at school, e.g. during the rice harvesting season. With 83 percent of its low education budget spent on teacher salaries, one can begin to imagine how little money the Lao government spends on education in total (Cooper 2014, 50-51).

Cycle 2 Study and plan, take action, collect and analyze evidence, reflect, share with local participants

As the factors hindering quality education were identified in Cycle 1, Cycle 2 investigated how and in which areas the German teams might be able to support their partners in effecting better quality in teaching and learning. By now, it was also evident that the didactic-methodological *desiderata* in the *English* classroom were issues equally prevalent in other subjects.

Two other factors intensified the work in the second project year: The “snowball-effect” of professional inspiration and personal motivation amongst the Lao partners on the one hand, and the bi-directionality of the learning experience amongst their German peers on the other hand.

The Lao side

There is no written data or proof of the snowball-effect, as Lao culture is oral. Important information is communicated by word of mouth (lately WhatsApp), also official information. Circulars by emails at school level are uncommon, and Lao teachers are often called away from work for meetings. We therefore assume that the rising demand for tandem-partners voiced by the school administrations in Cycle 2 resulted from word of mouth and reports by tandem-teachers in meetings. The school administration also made sure to always confer with local Government officials and the Party, to get official backing.

As a result, biology, physics/chemistry, and math were added to the programme, and more volunteers (up to ten in some teams) were sent over to work with partners in those subjects; also the LGTC asked to be included. The necessity to teach English became even greater then because most natural science teachers had never had any English lessons before.

The Cycle 2 task “share with local partners” in Laos is more easily said than done. The attempt to obtain feedback and recommendations directly from Lao partners in meetings or by way of questionnaires failed. It is not the Lao custom to answer directly or speak openly. Feedback is positive, criticism taboo. Dissent can occasionally be expressed by evasive behaviour. Consent expresses itself in copious hospitality and kindness. This means research results about the *Lao* perspective is to be gathered mainly by observation, evidence, and informal conversation, and it therefore cannot be assumed that our inferences are always correct.

However, this became easier as trust and mutual interest within the tandem peer groups grew and when participants lost some of their shyness towards the educator. After 5 years, in February 2020, 15 LGTC project participants were ready to answer questions in an anonymous questionnaire, which was to decide the question whether the programme should continue even after AfC/BHS withdrew from the project. The results were very positive, but single points of criticism were also listed, which helped to draft a new framework for the future cooperation with this institution.

The German side

The German group, on the other hand, were working against a completely different cultural foil in a maximally different setting on an unusually demanding teaching task. Some of the teams first shared their experiences in multi-medial ways via their “Team Videos” (<http://www.thelaosexperience.com/videos/>) or individual video contributions on different aspects of their experience on the “Live documentation” page of the project blog (<http://www.thelaosexperience.com/pageflow/>).

Before too long, the teams regularly questioned their own Western learning as well as their underlying Western morals and assumptions about teaching, priorities, virtues, and values. The mentor then scaffolded a discourse about the “decolonization of minds, of language, and of teaching”: This dimension was added to the “Global English(es)” class to create research opportunities at home; the university library was stocked with publications in this field; global partners were sought out during a sabbatical for Cycle 3.

This is how the volunteers started researching aspects of decolonization in academic papers after re-entry, and some of them developed this 2-3 years later into full Master theses within the larger SDG context (www.thelaosexperience.com/research). From this sprang first conference papers and publications, and the first doctoral theses appeared on the horizon.

Cycle 3 Study and plan, take action, collect and analyse evidence, reflect, share with other Action Researchers

The project design with its four-tiered cascading system ensures that project participants cooperate on as many layers of the education process and as many levels of the education apparatus at the same time, creating synergies for the other partners. (They are unaware of the significance or extent of their contributions until they start reading the project blog on a regular basis or engage in post-phase activities or the preparation of new teams.) This synergy creates *momentum* amongst the participants, which is continuously fueled by the mentor, causing more demand. The result is an active PLC of ca. 100 participants who intermittently get back to the project or assist each other with literature or teaching tips or as “critical friends” in other contexts, even years after their team phases. An estimated 400 Lao teachers and lecturers in seven different institutions joined the project in one or several of its modules by 2020, and the ongoing interested resulted in Bachelor, Master, and doctoral theses on the German side as from 2018, after Cycle 3.

This is also due to the professionalization of the pre- and post-project work in this cycle. A “Closing Conference”, the writing of a “Final Report”, and guided reflection by the mentor help returnees to realize and verbalize “what it meant” and “what they learnt” and sometimes also helps to overcome “re-entry shock”, which may afflict returnees under certain conditions. One of the coping strategies is a 90-minute “post”-interview with the educator, which follows up on the “pre”-interview before departure. Some volunteers do not choose to take part in this, but may engage in delayed post-reflection with the educator long after their stay. Others join the annual German-Lao Friendship Feast to keep themselves informed about the progress of the project.

The continuous mentoring by the educator in the pre-, while- and post-phase of the project is considered important by the volunteers for feeling “safe” while they embark on a high-risk

enterprise, an unusual professional challenge, and a considerable amount of work with unexpected frustrations, and as comparative studies have shown, it is also one of the distinctive features of this project.

KUE and SKU started two cooperative project modules in 2018: 1-2 German volunteers are invited to teach at SKU for the duration of one academic year, and two Erasmus+ Mobility programmes across faculties allow joint research and teaching and training exchanges of staff in “Bi-directional learning and teaching” (2018-2021) and “Education for Sustainable Development and Global Citizenship” (2020-2023). So far, four Lao Master students spent an entire semester at KUE and one German doctoral student at SKU. The first exchanges between staff in the English and biology departments were conducted in October 2018, when the second Cycle 1-3 began, and colleagues from the IT department joined the project in March 2020. The technics and economy departments were subsequently delayed by the onset of the pandemic.

The temporal gaps between the two annual weeks or months of contact - in internships or training/teaching mobilities - allow both sides to consolidate and elaborate on the new input, do research, or catch up on other tasks. It now remains to be seen how much of this impetus remains after the gap caused by the travel restrictions due to Covid-19. Digital Meetings Rooms and several online teaching tools were installed at KUE by mid-April, but the technical and financial restraints on the Lao side prevented this from becoming a new project routine in 2020.

From the start, “teaching” in this project has never meant following one (Western) “method” or course book or technique or style in the manner of “one size fits all”. Different methods, techniques, and styles were tried and tested, which meant *identifying and then providing the conditions in which a certain group of learners can learn, be they Lao or German participants*. After Cycle 3, when the more thorough research started, we discovered the theoretical model which reflects our own findings, experiences, and observations: the “postmethod pedagogy” of decolonization, which respects “particularity, practicality, and possibility” (Kumaravedivelu 2003). This “macrostrategic” framework helps teachers to develop a systematic and personal theory of practice and will provide the theoretical basis for project work in the next three Cycles in the context of “Global Citizenship Education”.

Results

Challenges for the tandems

After illuminating the contexts and perspectives of tandem work, the challenges and benefits need identifying. German-Lao tandems share no common linguistic or cultural ground. Transboundary understanding and respect with the aim of making personal and professional progress in a tandem makes a double-demand on the participants, which is perceived as a great source of delight, pride, or even revelation, but also experienced culture-shock and strain.

Coping strategies of the German or Lao teams (students or staff) on-site are evening discussions with their “critical friends” in the team, but also pleasurable activities like cooking, exercise, outings, and shared weekend trips. Cross-cultural clashes in the tandems’ expectations and experiences occur daily throughout the first month and then subside, making way for a new routine characterized by more familiarity and mutual tolerance.

There is almost no area of life which does not cause bewilderment (data collected from 2015 to 2019):

- general knowledge and education (liberal Western vs. communist Lao)
- travel experience (abundant vs. none)
- general knowledge of each other's country (none)
- knowledge of each other's language (none)
- religion (non-existent or rarely practised vs. ubiquitous Buddhism, animism)
- age (average early- to mid-twenties, *match*)
- knowledge of English (B2/C1-level vs. non-existent or A1/A2, sometimes B1)
- understanding of each other's spoken English (too fast vs. L1-interference)
- communication in project work (written vs. oral)
- didactics and methodology of teaching English (activating vs. rote learning)
- lessons (student-centered, prepared vs. teacher-centered, unprepared)
- assessment (individual vs. communal, e.g. "monthly test")
- school management, timetables, uniforms, festivals and holidays
- quality and diversity of teaching materials and school equipment
- size of classes (40-60 pupils in one class)
- judgement of behaviour or occurrences (open vs. not communicated)
- organization of teams and schools (own decisions vs. centrally directed)
- hierarchies (negligible vs. Ministry, Head of School, Party, village elders)
- work ethic and discipline (strong feature vs. oblique)
- work routines (self-determined, work at home vs. no work outside the office or classroom)
- meetings (agenda points, minutes vs. open, no minutes)
- career advancement options (merit vs. other)
- economic standing (stable, funded, affluent vs. unstable, poor, evening jobs)
- housing (bed, table, shelves, stove, shower, flushing toilet vs. Lao-style accommodation)
- food (Western stomachs and vegetarianism vs. unknown Lao food)
- appearance (hair, nails, tattoos, clothing, (in)formal propriety)
- hygiene in kitchens, bathrooms, shops, on markets (Western vs. Lao)
- encounters (open, individual, *curious* vs. reticent, communal, *curious*)
- criticism and complaints (open vs. channeled through hierarchies)
- temperament (outgoing vs. shy, quiet)
- values upheld in project (*friendship*, reliability, efficiency, punctuality vs. family, community, *hospitality*)

The initial research hypothesis was that successful tandem-work could be catalyzed by a very small number of overlaps or shared common features provided they were personal enough and influenced attitudes in a positive way and showed that this "mattered" – regardless of the staggering number of differences. The three that were found are italicized in the list: roughly same age, strong peer-curiosity, and German advances towards friendship effortlessly met by abundant Lao hospitality.

The following gains listed by two participants of the first Erasmus+ Mobility project are representative of several dozen more as given in post-phase interviews and Final Reports.

The Lao perspective:

⁴After I finished my study at KUE this semester I can say I improved myself:

I am more confident and convinced of my abilities,

I know better my strengths and weaknesses,

I am more able to adapt to and act in new situations,

I am more able to think and analyze information critically,

I am more tolerant towards other persons' values and behaviour,

I am more open-minded and curious about new challenges,

I intend to participate more actively in the social and political life of my community,

I am more interested in knowing what happens in the world daily,

I am more able to reach decisions,

I am more able to cooperate with people from other backgrounds and cultures,

I am more aware of social and political and global issues.

I could say that the exchange student mobility provide[d] me a lot of things including educational and international knowledge, personal growth, and good experiences.

It also provide [me with] the good opportunity to [get to] know so many new friends, and some of them [were] very friendly and very kind to me.

The German perspective (additions in italics):⁵

I am more confident and convinced of my abilities (*even in new situations*),

I know better my strengths and weaknesses,

I am more able to adapt to and act in new situations,

I am more able to adjust my behaviour according to the local customs and culture,

I am more tolerant towards other persons' values and behaviour,

I am more aware of cultural differences (between Laos and Germany),

I developed a deeper understanding of the local culture,

I am more open-minded and curious about new challenges,

I am more able to cooperate with people from other backgrounds and cultures,

I am less hesitant to ask people for help.

Challenges for the educator

The educator mentors participants in all phases through the above-mentioned disparities, which requires constant availability and a considerable amount of time. Additionally, participants need to understand the project structure and "rules" and their new roles as representatives of their university and country in a very different kind of state, which also demands time. Hitches occur regularly nonetheless, because

⁴ <http://www.thelaosexperience.com/2020/10/18/friendship-without-boundaries-by-mr-phongsavang-xaikhongkham/> (18.10.2020)

⁵ Mail to author (30.11.2020)

information sometimes is not understood or forgotten, which necessitates more communication. Participants need further mentoring for their organization of documentation, formal meetings, minutes, as well as academic writing for the project blog.

Providing model-teaching, workshops, a class on “Global English(es)” and working towards visibility within the internationalization strategy of the university and the international academic community, and to generally role-model for volunteers, is the more regular part of the educator’s duties.

Balancing these claims against the time needed for liaising with the project partners on the Lao side and for research and grant applications on the one hand and the demands of one’s regular job on the other hand has continued to claim the project leader’s evenings, weekends, and vacations. After 3 successful Cycles (years), the decision whether to reduce the scope of the project again or install support for the educator for another 3 Cycles resolved itself by securing two Erasmus+ grants for the main cooperation between KUE and SKU, by the retreat of AfC/BHS, and by the forced Covid-19 “break” in 2020.

Outlook

The 62-year old diplomatic Lao-German relations have been cultivated on a political and personal level by the first generation of Lao-German partners and friends since the 1970s. Many of them occupy influential positions in the Government, in business, or in education, and are nearing retirement age. They are organized in the tandem organizations “Lao-German Friendship Association” (LGFA) and “German Lao Friendship Society” (GLFS).

As the German Federal Minister of Economic Cooperation and Development removed Lao P.D.R. from the list of direct cooperation partners earlier this year, it would be advisable for current project partners to join the Lao Society or German Association as the next generation, to keep cooperation between Laos and Germany alive at the educational level beyond the current Erasmus projects. (Individual Lao-German cooperation applications may still be funded by the German Government if processed through official institutions or NGOs.)

On this larger scale, it is hoped that the MoES will hold on to its plans to include our model project in its next 5-year plan so that international funds may also become accessible.

On a smaller scale, KUE will need to make this model PLC more visible both in Germany and internationally, and SKU will need to disseminate the outcomes of the project locally and also develop their staff’s academic English competencies to generate higher numbers of successful applications for study grants abroad. Digital teaching, learning, and publishing could become powerful tools to help reach these aims.

Thereby we would hope support the Laotian education system to improve the quality of teaching, which would help to enable the next generations to achieve a sustainable integration of Laos into the Asian Economic Community. With this transboundary and decolonized (and decolonizing) project we would also hope to continue providing a non-Western and globally challenging learning environment for German pre-service teachers and graduates, in which they can become aware of the global dimension and responsibilities of their profession as English teachers and also make progress in the development of their own Global Citizenship. Education is known to be a potent instrument for combating poverty and achieving more Global Justice, and English language education is a necessary condition in the globalized 21st century for any educational goal, for better or worse.

By anchoring these two main project goals in the wider context of the Agenda 2030 and the SDGs, we will perhaps make a small contribution to a sustainable future. As multipliers in education, our small contributions may well model for and catalyze other small contributions, amounting to locally palpable impacts, *as one good thing leads to another*.

Acknowledgements

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References

Project blog (co-)publications by the author (selected bibliography 2015-2020)

Martin, I., Zeck, J. (eds.) (2015 ff). *The Laos Experience: Bi-directional learning and teaching*. Project blog. Pädagogische Hochschule Karlsruhe & Engel für Kinder Stiftung (Angels for Children). Wordpress: www.thelaosexperience.com

Project blog: 336 articles, 63 pages, 1,750,525 hits by 317,370 users from over 200 countries (4.12.2020)

Martin, I., Mayer, T. (14 February 2016). "Closing summit and information session on "Teaching English in Laos" at the University of Education Karlsruhe". *The Laos Experience, Teaching English in Laos blog*: <http://www.thelaosexperience.com/2016/02/14/closing-summit-and-information-session-on-the-project/>

Martin, I., Zeck, J. (5 April 2016). "6 May 2016: Start of a new project phase". *The Laos Experience, Teaching English in Laos blog*: <http://www.thelaosexperience.com/2016/04/05/6-may-2016-start-of-new-project-phase/>

Martin, I., Müller, H. (1 July 2016). "Teaching material assessment and guest lecture on 'Language education in global contexts'". *The Laos Experience, Teaching English in Laos blog*: <http://www.thelaosexperience.com/2016/07/01/team-iii/>

Martin, I., Wink, L. (22 August 2016). "Preparing the teaching of Technical English at the LGTC. *The Laos Experience, Teaching English in Laos blog*: <http://www.thelaosexperience.com/2016/08/22/technical-english-lao-german-technical-college/>

Martin, I., Zeck, J. (30 October 2016). "Honoured and proud: German Federal Minister for Economic Development and Cooperation visits BHS/AfC in Weiherhammer". *The Laos Experience, Teaching English in Laos blog*: <http://www.thelaosexperience.com/2016/10/30/dr-gerhard-mueller-visits-angels-for-children/>

Martin, I., Broghammer, A., Schrep, D. (23 February 2017). „Our cooperation with the Research Institute of Educational Sciences (RIES)". *The Laos Experience, Teaching English in Laos blog*: <http://www.thelaosexperience.com/2017/02/23/research-institute-of-educational-sciences-teaching-material/>

Martin, I., Zeck, J. (14 March 2017). "Minister for Education and Sports H.E. Mrs Sengdeuane Lachanthaboune visits Angels for Children". *The Laos Experience, Teaching English in Laos blog*: <http://www.thelaosexperience.com/2017/03/14/mrs-sengdeuane-lachanthaboun-visits-project/>

Martin, I., Dengler, R. (23 September 2017). "Global English: Teaching English in Asia". *The Laos Experience, Teaching English in Laos blog*: <http://www.thelaosexperience.com/2017/09/23/global-english-teaching-english-asia-different-approaches-difficult-subject/>

- Martin, I., Adelberg, J. (21 December 2017). “Workshop on 16 November 2017: How should we teach Technical English at Lao Vocational Colleges”. *The Laos Experience, Teaching English in Laos blog*: <http://www.thelaosexperience.com/2017/12/21/tech-talk-workshop-adelberg/>
- Martin, I., Glass, H., Malchow, L. (22 January 2018). “Workshop on 20 November 2017 – Creating and using teaching material”. *The Laos Experience, Teaching English in Laos blog*: <http://www.thelaosexperience.com/2018/01/22/workshop-20-november-2017-creating-using-material/>
- Martin, I., Herrmann, L. (8 February 2018). “Workshop on 11 December 2017 – “Micro-teaching with a picture book in the classroom – what, why, when, and how”. *The Laos Experience, Teaching English in Laos blog*: <http://www.thelaosexperience.com/2018/02/08/picture-book-workshop-farmer-duck/>
- Martin, I., Kirsten, M. (6 March 2018). “Workshop on 18 December 2017 – “Practising Pronunciation” and Lao-English interference”. *The Laos Experience, Teaching English in Laos blog*: <http://www.thelaosexperience.com/2018/03/06/workshop-practising-pronunciation-lao-english-interference/>
- Martin, I., Uhlig, S., Kummetz, As. (7 March 2018). “Workshop on 25 December 2017 – The new “Didactics Room” at the LGTC”. *The Laos Experience, Teaching English in Laos blog*: <http://www.thelaosexperience.com/2018/03/07/we-open-the-new-didactics-room-workshop-on-25-december-2017/>
- Martin, I., Ud-Din, S., Kämmer, I. (29 March 2018). “Techniques of Teaching and Learning”. *The Laos Experience, Teaching English in Laos blog*: <http://www.thelaosexperience.com/2018/03/29/teaching-techniques/>
- Martin, I., Stober, F. (3 April 2018). “Mathematics – the latest addition to the project”. *The Laos Experience, Teaching English in Laos blog*: <http://www.thelaosexperience.com/2018/04/03/mathematics-the-latest-addition-to-the-project/>
- Martin, I., Kämmer, I., Ud-Din, S. (8 April 2018). “Trio” (Lao) Export Co., Ltd Garment Manufacturers Industry – from fabrics to education in Ban Sikeud”. <http://www.thelaosexperience.com/2018/04/08/an-excursion-to-trio-lao-export-co-ltd/>
- Martin, I., Walschburger, S., Grüttner, J. (20 June 2018). “Workshop on 22 March 2018 – “Classroom English””. *The Laos Experience, Teaching English in Laos blog*: <http://www.thelaosexperience.com/2018/06/20/workshop-on-22-march-2018-classroom-english/>
- Martin, I., Zeck, J. (1 September 2018). “Reflection and evaluation of the second project year 2016-2017 – looking back to Team III and IV”. *The Laos Experience, Teaching English in Laos blog*: <http://www.thelaosexperience.com/2018/09/01/reflection-and-evaluation-team-iii-and-iv/>
- Martin, I., Khemmarath, S. (16 November 2018). “Lao university delegation visits University of Education Karlsruhe – the Lao perspective”. *The Laos Experience, Teaching English in Laos blog*: <http://www.thelaosexperience.com/2018/11/16/lao-university-delegation-visits-university-of-education-karlsruhe-the-lao-perspective/>
- Martin, I., Erdogan, D. (9.12.2018). “Eat, dance, laugh (and be sick) - our first weeks in Laos”. *The Laos Experience, Teaching English in Laos blog*: <http://www.thelaosexperience.com/2018/12/09/eat-dance-laugh-and-be-sick-our-first-weeks-in-laos/>
- Martin, I. (30.12.2018). “New series: “Language education and global citizenship” (edited by I. Martin)” *The Laos Experience, Teaching English in Laos blog*: <http://www.thelaosexperience.com/2018/12/30/language-education-and-global-citizenship/>
- Martin, I. (2019 – 2020) (ed.). [9 new articles in the “Language education and global citizenship” series. *The Laos Experience, Teaching English in Laos*: [blog:http://www.thelaosexperience.com/?s=Language+Education+and+global+citizenship](http://www.thelaosexperience.com/?s=Language+Education+and+global+citizenship)

Martin, I., Wickmann, N., Linder, M. (13.2.2019). „Workshop on 22 November 2018 – ‘Split lessons for science experiments with a big class’”. *The Laos Experience, Teaching English in Laos blog*: <http://www.thelaosexperience.com/2019/02/13/science-experiments-w>

Martin, Isabel (11.2.2019). “Looking back – our first contact with institutions of education in Laos (2015) & visiting the VEDI”. *The Laos Experience, Teaching English in Laos blog*: <http://www.thelaosexperience.com/2019/11/02/first-contact-with-institutions-of-education-in-laos-2015-visiting-the-vedi/>

Martin, I. (20.3.2019). “A new partnership: Lao university delegation visits University of Education Laos – the German perspective”. *The Laos Experience, Teaching English in Laos blog*: <http://www.thelaosexperience.com/2019/03/20/lao-university-delegation-visits-university-of-education-karlsruhe-a-new-cooperation/>

Martin, I., Proels, C., Dimtsiou, M., Heinz, E. (7.4.2019). “Workshop on 21 March 2019 – How to use Excel, E-Mail and PDF”. *The Laos Experience, Teaching English in Laos blog*: <http://www.thelaosexperience.com/2019/07/04/workshop-on-21-march-2019-how-to-use-excel-e-mail-and-pdf/>

Martin, I., Vogt, R., Wecker, R. (7.6.2019). “Workshop in 28 March 2019 - How to create and structure worksheets”. *The Laos Experience, Teaching English in Laos blog*: <http://www.thelaosexperience.com/2019/07/06/workshop-on-28-march-2019-how-to-create-and-structure-worksheets/>

Martin, I., Wiesa, N. (20.6.2019). “Workshop on 16 November 2018 – How to create a course plan for ‘Technical English’”. *The Laos Experience, Teaching English in Laos blog*: <http://www.thelaosexperience.com/2019/06/20/workshop-on-16-november-2018-how-to-create-a-course-plan-for-technical-english/>

Martin, I. (9.11.2019). “Erasmus+ research week English Departments PH KA and SKU (March 2019)”. *The Laos Experience, Teaching English in Laos blog*: <http://www.thelaosexperience.com/2019/09/11/erasmus-research-week-english-departments-ph-ka-and-sku-march-2019/>

Martin, I., Zeck, J. (31.12.2019). “Final reports by volunteers”. *The Laos Experience, Teaching English in Laos blog*: <http://www.thelaosexperience.com/2019/12/31/final-reports-of-volunteers-new-page/>

Martin, I. (24.2.2020). “There is a crack in everything”. *The Laos Experience, Teaching English in Laos blog*: <http://www.thelaosexperience.com/2020/03/24/there-is-a-crack-in-everything/>

Martin, I. (12.10.2020). “Our new-old cooperation partner: the Sunshine School in Vientiane, Lao P.D.R.” *The Laos Experience, Teaching English in Laos blog*: <http://www.thelaosexperience.com/2020/10/12/the-sunshine-school-in-vientiane-lao-p-d-r/>

Project blog Pages by the author:

Martin, I. “Teacher tandems”. *The Laos Experience, Teaching English in Laos blog*: <http://www.thelaosexperience.com/teacher-tandems/>

Martin, I. (2015-2018 ff.). “Research”. *The Laos Experience, Teaching English in Laos blog*: <http://www.thelaosexperience.com/research/>

Martin, I. (forthcoming 2021). “Research results of the “Bi-directional teaching and learning” project. *Full-text Bachelor and Master theses (16 so far) written under author’s supervision.*

Other relevant blog posts:

Xaikhongkham, P. (18.12.2020). "Friendship without boundaries". *The Laos Experience, Teaching English in Laos blog*:

<http://www.thelaosexperience.com/2020/10/18/friendship-without-boundaries-by-mr-phongsavang-xaikhongkham/> (18.10.2020)

Zeck, J. (2016). Education in Laos (Part I) The Beginning of a formalized School System". *The Laos Experience, Teaching English in Laos blog*:

<http://www.thelaosexperience.com/2016/06/11/education-in-laos-part-i-the-beginning-of-a-formalized-school-system/>

Zeck, J. (2017). Education in Laos (Part II) Parallel School Systems during the Lao Civil war 1954 – 1975". *The Laos Experience, Teaching English in Laos blog*:

<http://www.thelaosexperience.com/2017/09/17/education-in-laos-part-ii/>

Print publications by the author:

Martin, I. (2020). "Teaching English in Laos: TESOL education and global justice". In: Mentz, O., Papaja, K. (eds.). *Focus on Language. Challenging Language Learning and Language Teaching in Peace and Global Education: From Principles to Practices*. Wien, Zürich: Lit Verlag. 205-237.

Weinmann, M., Neilsen, R., Martin, I. (2020). "Juggling Selves: A comparison of Global Mobility programs for pre-service teachers in two contexts". In: Nickl, Benjamin, Popenici, Stefan, Blackler, Deane & Skinner, Isabella (eds.). *Transnational German Education and Comparative Education Systems: Research and Practice*. Springer Series Global Germany in Transnational Dialogues. Springer Nature Switzerland AG. 133-154.

eBook: <https://link.springer.com/book/10.1007%2F978-3-030-36252-2>

Abstract of chapter: https://link.springer.com/chapter/10.1007/978-3-030-36252-2_8

Secondary literature (quoted sources):

Alvarado, A. Lozada, G. (2016). "Decolonizing Language Teachers' Teaching Practices through a Postmethod Pedagogy". *Enletawa Journal* (9.1, January-June), 69-85.

Cooper, R. (2008). *The Lao, Laos... and you*. Vientiane: Lao-Insight Books.

Cooper, R. (2014). *Laos – Work in Progress*. Vientiane: Lao-Insight Books

Internationale DAAD Akademie (ed). Otten, M., Scheitza, A. (2015). *Hochschullehre im multikulturellen Lernraum. Studie zur Bestandsaufnahme und Empfehlungen zur Planung hochschuldidaktischer Interventionen*. Bonn: DAAD Akademie.

Khemmarath, S. (2019). "Background to the Symposium". *The International symposium on Sustainable Development and Internationalisation of Higher Education*. Program and Abstract. [Unpublished], 2.

Knight, J. (2008). *Higher Education in Turmoil. The Changing World of Internationalization*. Rotterdam: Sense Publishers.

Kuramavedivelu, B. (2003). "A postmethod perspective on English language teaching". *Forum Critical Language Pedagogy. World Englishes* (22/4), 539-550. <https://doi.org/10.1111/j.1467-971X.2003.00317.x>

Lütge, C. (ed.) (2015). *Global Education: Perspectives on English Language Teaching*. Münster: LIT Verlag.

Lao People's Democratic Republic (2018). *Voluntary National Review on the Implementation of the 2030 Agenda for Sustainable Development*.

<https://www.la.undp.org/content/laopdr/en/home/library/sustainable-development-goals/laos-democratic-republic-voluntary-national-review-on-t.html> (last accessed 29 November 2020)

Online sources (quoted):

<https://www.ph-karlsruhe.de/>
<https://www.daad.de>
www.thelaosexperience.com
<http://engel-fuer-kinder.de/en/>

Other (used, but not quoted):

Chiang, L.-C. (2014). *Trading on the West's strength: The dilemmas of transnational higher education in East Asia*. In K. H. Mak & K. M. Yu (Eds.), *Internationalization of Higher Education in East Asia*. New York: Routledge, pp.208-226.

Gaudelli, W. (2016). *Global Citizenship Education: Everyday Transcendence*. London & New York: Routledge.

Hammer, J. (2012). *Globalisierung als Bildungsziel*. Heidelberg: Universitätsverlag Winter.
McLeod, J. (ed.) (2007). *The Routledge Companion to Postcolonial Studies*. Milton Park & New York: Routledge.

Jackson, J. (2016). "Encountering unfamiliar educational practices abroad".
In: D. Velliaris & D. Coleman-George (Eds.), *Handbook of research on study abroad programs and outbound mobility* (pp. 137-162). Hershey PA: Information Science Reference.

Khaykhamphithoune, Kikeo et.al. (2015). *Lao PDR. 40 Years 1975-2015*. Vientiane: Pasaxon Printing House.

Kirkpatrick, A. (2010). *English as a Lingua Franca in ASEAN: A Multilingual Model*. Hong Kong: University Press.

Kirkpatrick, A., Sussex, R. (2012). *English as an International Language in Asia: Implications for Language Education*. New York: Springer.

Kirkpatrick, A. (2016). The Future of English in Asia. In: O'Sullivan, M., Huddart, D., Lee, C. (eds.). *The Future of English in Asia: Perspectives on language and literature*. Routledge Studies in World Englishes. Abingdon, Oxon, New York, NY: Routledge, Taylor and Francis Group.

Macedo D. (ed.) (2019). *Decolonizing Foreign Language Education*. N.Y.: Routledge.
Milligan, L., Tikly, L. (eds.) (2019). *English as a Medium of Instruction in Postcolonial Contexts*. N.Y.: Routledge.

Schultze, M. (2013). *KulturSchock Laos*. Bielefeld: Reise Know-How Verlag Peter Rump GmbH.

Souriyavongsa, T., Rany, S., Abidin, M. J. Z., Mei, L.L. (2013). *Factors Causes Students Low English Language Learning: A Case Study in the National University of Laos*. International Journal of English Language Education (1/1), pp. 179-92.
<http://www.macrothink.org/journal/index.php/ije/article/download/3100/2631>.

Stuart-Fox, M. (2008). *Historical Dictionary of Laos*. Lanham, Maryland: The Scarecrow Press, Inc.

UNESCO International Bureau of Education (2010). *Lao People's Democratic Republic: World Data on education*. http://www.ibe.unesco.org/sites/default/files/Lao_PDR.pdf

Vorapheth, Kham (2015). *Contemporary Laos. Development Path and Outlook of a Nation*. Bangkok: White Lotus Press.

Woodin, Jane (2018). *Interculturality, Interaction and Language Learning. Insights from Tandem Partnerships*. Milton Park & New York: Routledge.

Teaching English to Lao Adult Beginners: Intercultural barriers to language learning

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Abstract

Teaching and learning English as a foreign language can never be separated from the context it is taught in. It is influenced by the learners' culture, the local context, the proficiency level of the teachers and pre-knowledge of the learners, but it also depends on other variables like the course book that is used.

In many English course books produced for the "international" market, British and American cultural content still dominates, and native-speaker norms are still assumed as the underlying goal. Since it seemed to offer slow progression and "simple" content for beginners, and for sheer want of alternatives, the General English course book *Straightforward Beginner* was used to teach English to teachers in Laos in the project "Teaching English in Laos", which the "Angels for Children" Foundation and the University of Education Karlsruhe began in 2015.

Lao learners are not familiar with most Western concepts, however. Therefore, the cultural content in the course book often hindered the language-learning process instead of helping it. Many intercultural barriers became obvious through questions like "what is Mozart?"

Not only the casual mentioning of Western celebrities, but also illustrations, topics, icons, symbols, and less obvious Western concepts such as English names (female or male?), posed barriers to the Lao adults' language-learning.

This article will give an overview of the difficulties encountered and give recommendations for a more suitable approach: The local culture and circumstances must be considered. The course books and materials have to be customized to fit the specific context.

Keywords: Teaching English in Southeast Asia, TEFL, intercultural issues, course book development

Introduction

As part of the project "Teaching English in Laos", German volunteers teach English to Lao adults in Laos. Teaching and learning a foreign language can never be separated from the context it is taught in. This teaching in Laos is a very specific intercultural situation which is influenced by the teacher's culture, the learners' culture, and the local context. These variables are not the only ones influencing the teaching and learning situation, there are even more. One important variable is the course book that is used for teaching English to the Lao adult

beginners. Since the context and culture in Laos differ greatly from Western cultures and contexts, intercultural barriers came up during the teaching process.

When English lessons for beginners (Science teachers and other non-English teachers) were introduced at Ban Phang Heng Secondary School in Laos, the book *Straightforward Beginner* (Clandfield, 2013) was chosen to work with. It offers very good grammatical explanations and a slow progression, which should make it suitable for beginners, but very often it has been found inadequate for the use in Laos.

The book *Straightforward Beginner* was produced for the “international” market, but it contains mostly British and American cultural content and it is quite European-centered. The cultural content and the topics are supposed to help the learners to understand and study the foreign language. The course book is set in a Western context and relies on the learner's’ knowledge of Western concepts and culture. The Lao learners are not familiar with most Western concepts and therefore, instead of supporting the learning process, the cultural content in the course book more often hindered it. They do not only have to learn the new language content but also get to know and understand a very unfamiliar cultural context without explicit explanations. The course book assumes that the learners who use it are familiar with Western concepts and therefore does not explain Western cultural content.

Examples of intercultural barriers that came up while teaching with a Western General English course book in Laos are described in this article as well as considerations for teaching English in Laos and adapting course books for the ASEAN context.

Methodology

Theoretical background - Reasons for adapting course books for the Lao context

In course books, often British and American cultural content dominates and, most of all, native-speaker norms are presented to be the goal. Tomlinson (2006) points out that the global market does not provide many global course books and that publishing a course book with a more global view of English is financially risky.

Representing local and international context

Nevertheless, it is important the multilingual model of English language teaching finds its way into course books so that the native-speaker and predominantly British and American culture centred view is no longer the only view represented in course books. Either the changed view should be considered when a new course book for ASEAN countries like Laos is designed or it should guide the adaptations which have to be made to use Western General English course books in Southeast Asian settings.

Many course books focus on presenting the target cultures and when they include other cultures the focus is mainly on European, also Western, cultures (Böcua & Razi, 2016). Like Alptekin (2002) argues, material should reflect the learner’s local context as well as the international context and prepare the learners to be local but also global speakers of English. Text should not exclusively present discourse between native speakers but also between native speakers and non-native speakers, and between purely non-native speakers. Often the course book is the only opportunity the students have to access a specific culture.

Why is this change of view away from target cultures to source and international cultures and the following adaptation of course books important for the Lao learners?

Souriyavongsa et al. see one of the reasons for poor performance of Lao learners in English language learning as the mismatch of the students' learning styles and the teachers' teaching. Poor performance can arise if the "English course does not relate to the students' needs and interests" (Souriyavongsa et al., 2013, 183).

The teaching of foreign English teachers often does not consider and match the student's needs and interests and it often does not fit the context. However, with teaching comes English course books. The course book used during the teaching periods in Laos were Western English course books for adult learners. One of the books for the beginners was Straightforward Beginner. This book is not especially developed for the Asian context nor for the environment of Laos.

There are many course books for teaching English to adult beginners but many of these course books are Western based and England- or America-centered. Straightforward Beginner focusses on England and seems to be Europe-centered. There is a shortage of textbooks developed for southeast Asian countries and there is no English course book especially adapted for Laos and its cultural and social context. There are books used for English education developed by Lao institutions but they have huge weaknesses in content and design of the course and the teaching.

Taking the students' needs and interests into account

Souriyavongsa et al. (2013) postulate that the curriculum should take the students' needs and interests into account when it is being designed. The language teaching should encourage the students to study English and to develop their language skills.

To fit the particular needs of the students, a course book and its contents must be adapted. McGrath (2002) sums up four reasons why course book adaptations should be considered. The first is to localize the learning content by substituting Western concepts and settings with regional ones. This helps to keep the focus on the language and does not use up the efforts of the students to understand the cultural setting. The language objectives have first priority. In a later step, also new cultural information can be presented when it has been made sure that the language objectives have been achieved. This helps to not overwhelm the students with new language and new cultural content at the same time.

A second reason to adapt course books is to personalise them so that the activities and the content directly relate to the student's interests. Chea, Klein and Middlecamp (2012) bring in the example to first let the students come up with an English menu containing local dishes before they study a Western menu with Western food.

Another reason why course books sometimes need to be adapted is when its content is outdated. In this case, the outdated content needs to be substituted by more up-to-date content. When topics like technology or media are included this must happen very often because technology and media are changing and developing constantly and rapidly.

The last and fourth reason McGrath (2002) points out is adaptation to simplify the learning content. A teacher is supposed to know her or his students and their knowledge and learning level. According to this knowledge, the teacher decides whether exercises are too difficult, too easy, or not adequate for the students and, on this basis, adapts the exercises.

Reducing the cognitive load

A course book is supposed to support the students who study with it as well as possible with its content, structure, and visualisations by taking their needs and interests into account. In his book, Cognitive Load Theory, Sweller (1994) points out the importance of reducing the

cognitive load for the learner's working memory by structuring the learning content, illustrating it, and presenting it clearly and comprehensively.

The working memory has a limited capacity and the more demanding the task or the learning content is and the less help received to solve the task or to learn a specific item, the more mental resources are demanded. According to this theory, unfavourably designed learning material increases the cognitive load and hinders the learning process by putting additional stress on the working memory. Such an additional load can be unstructured content, unclear explanations, inadequate images and visualisations, or badly written text books. Instead, if the learners' individual preknowledge is activated, it reduces the cognitive load, helps the learners to process the information and learning content, and to store it in their working memory where the information is processed into the long-term memory (Gold, 2015).

This theory suggests that the teacher, the textbook, and the selection of material has a great influence on the student's ability to learn and the learning value of the language lessons. The right material and exercises support the learners and their learning process. Therefore, it is important to select material and a course book that promotes the individual learning process of the students and does not burden them with an additional cognitive load, in addition to that it should fit the context the students live in and their needs.

One aspect of additional cognitive load can be intercultural barriers. Intercultural barriers stand in between the learner and the learning content. These barriers have to be broken through before the learner can understand the learning content and process it. During the teaching of Lao adult beginners with the course book *Straightforward Beginner*, many intercultural barriers were encountered that complicated the learning process, increased the cognitive load during the learning process and often drew the focus away from the language input onto cultural aspects. Before examples of intercultural barriers are given, the project within which the teaching took place is examined.

Project description

In 2003, the foundation "Angels for Children", in German "Engel für Kinder", was established by Ingrid Engel in Laos. She wanted to support children and their education in Laos, which is one of the poorest countries in the world. The aim was to provide the children with the best education possible in the Lao context by providing them with adequate equipment, health care, an inviting school building, and an education based on the local needs.

At the moment, the Angels for Children foundation supports three government schools in the villages Sikeud and Ban Phang Heng, two primary schools and one lower secondary school. The villages are located around 15 kilometres north of Laos' capital city Vientiane. Besides renovating and maintaining the school buildings and providing a beneficial surrounding for learning, the foundation supports the schools financially and medically and works on improving the teaching quality at the schools in cooperation with the University of Education of Karlsruhe, Germany.

Every year volunteers, who are students at the University of Education in Karlsruhe and study to become teachers, go to the schools in Laos and work together with the Lao teachers to improve their English, their teaching skills and the quality of their lessons. In the beginning volunteers, mostly people who just finished high school in Germany, taught the Lao teachers. However, they mostly stayed just for a short period of time and the next volunteer almost had to start from the beginning again. To make the project more effective and lasting and to have

pedagogically trained volunteers, the cooperation with the University of Karlsruhe was established.

The first team of volunteers of the University of Education went to Laos in autumn 2015 under the direction of Isabel Martin. Since then four more teams have been teaching the teachers at the three schools in Laos and a sixth team taught in February and March this year. The volunteers give English lessons especially for the English teachers at the school but to other teachers and the directors as well to improve their English skills. Moreover, the volunteers will sit in on lessons held by the Lao teachers and, after the lesson, they analyse them together. The volunteers provide the Lao teachers with advice and methods of how to improve their lessons, how to make the lessons more varying, and how to improve the learning outcomes of the lessons. Even though the Lao teachers were trained at the teacher's college, they did not learn anything about didactics or methodology (Angels for Children – Engel für Kinder, 2017).

One goal is the improvement of English lessons at the schools. This includes increasing the level of English of the teachers and thereby the level of English of the students. Another aspect is the development of science lessons. In 2016, an equipped science laboratory where teachers can work with their students was donated and established at Ban Phang Heng Lower Secondary School. The aim is to enable and encourage the science teachers to use the laboratory with their students and to improve the science lessons. An important goal is to establish the regular integration of experiments demonstrated by the teacher and experiments the students can do on their own. The students are given the chance not only to study scientific phenomena theoretically out of the textbook but to experience them practically and thereby develop a deeper understanding.

The focus of the project lays on the teachers. Improving their English knowledge and teaching quality will soon have positive impacts on the students, their learning and their knowledge. However, the goal is to improve education as a whole in Laos by improving the education of the teachers at the university and college level. In order to do this, contacts were made with the National University of Laos, the Teacher Training College Dongkhamxan, the Research Institute for Educational Sciences, and the Ministry of Education and Sports in Laos. In cooperation with the Ministry of Education and the vice-president of Education of Laos, the project was developed to be a national education project and the three schools serve as model schools for further development of education and schools in Laos (Angels for Children - Engel für Kinder 2017; Angels for Children & University of Education Karlsruhe 2016).

During the time I spent teaching in Laos with other volunteers of Team IV, I worked together with the science teachers at Ban Phang Heng Lower Secondary School.

On the one hand, it was my task to sit in on two Lao teachers' science lesson and give them feedback about their lesson and their teaching. Since the teaching was in the Lao language, it was difficult to find out what the lessons were about. By using the Lao textbook and the images in it, it was mostly possible to find out the lesson's topic. However, the most important aspect was not to check the teachers' subject-specific accuracy but to help them to include material and other methods in their lesson. The 100-minute lessons most often consisted of ten- to twenty-minutes of teacher's lecture and the remaining time the students had to copy the text and images from the textbook into their exercise book. I encouraged the teachers to implement simple experiments into their lessons and practiced them with the teachers beforehand. Together, we went to the science lab with the classes and conducted some lessons there where the students could do experiments on their own. Moreover, I showed the teachers how to create additional material to supplement the black and white textbook and I accompanied the teachers

to the lessons where they tried to use the created material and experiments. For many, this would seem to be only a small step and achievement but for the Lao teachers, who have never done experiments with their students before or printed and laminated additional illustrations, it was a huge step. One could already see a great difference regarding the students' engagement and attention in the lessons.

On the other hand, I had a tandem English lesson with two Lao science teachers every day where I studied English with them using the book *Straightforward Beginner*. They could already express the most basic things in English because they were previously taught by another volunteer. Unlike the lessons for English teachers at the schools, the English lessons for the science teachers only started with the arrival of Team III. By learning English, the teachers could communicate with us volunteers. Moreover, in Lao, there are not many resources regarding teaching material and even the search results in google are very limited when you search in Lao. Therefore, English is helpful for the teachers to be able to improve their teaching.

Results and Discussion

While teaching Lao Adult Beginners with the course book *Straightforward Beginner*, many intercultural barriers were encountered because the course book is not adapted for the Lao or Southeast Asian cultures. Western cultural and conceptual knowledge is assumed, and this causes problems that hinder the learning process of the Lao learners. Not only obvious cultural content presents intercultural barriers but also illustrations, names, underlying concepts, and certain topics.

“Douangdeuane, Houava, Khamphong, Souvankham, Sevinay, Xok, Sih, Thongloun”.

When one tries to read out these names, which are typical Lao names transcribed from Lao letters to English letters, one will not be sure from the written form alone how to pronounce these names.

In the first unit of *Straightforward Beginner*, the Lao learners of English are confronted with various English or Western names. The book does not limit the names to a few recurring ones but a vast number are mentioned on the first pages. The learners are confronted with names like Jack, Orion, Emily, Willy, Ben, Emma, Thomas, or Jessica. At first, from the written form alone, the Lao teachers find it difficult to read out the names and pronounce them correctly, similar to the way Western people, who do not speak Lao and are not familiar with Lao names, find it hard to pronounce Lao names. One should always keep in mind that an additional obstacle for Lao people can be the Latin alphabet.

The Lao names are not only hard to pronounce for Western people but it is also almost impossible to tell if the name is a name for a woman or a man. How can one tell whether “Houava” is a female or male name? Or if the name is even bound to a certain gender? For the Lao learners it is the other way around. In the Lao language, there is no distinction between the pronouns “she” and “he”. Therefore, exercises where the Lao learners should replace nouns with the personal pronouns “she” or “he” can be a challenge. However, once the concept is explained, it is not very hard to understand. In the teaching, it was experienced that the students could explain when to use “she” and when to use “he” but the students still had trouble using the right forms. It took a while until it was clear that the distinction between “she” and “he” was not the problem but instead, differentiating the male and female names caused the problem.

The English names in the book were not the only difficulties. Questions like “What is Mozart?” came up. In total, a huge overrepresentation of European or Western people and also cities and countries was noticed. Often the learners didn't know where the country or the city lays. The

intention of the course book writers was most likely to include well known cities, like Rome, Frankfurt, or New York, but, for the Lao teachers, most of these cities were unknown. There were only a few Asian cities mentioned. Therefore, activities like matching cities and countries, could only be done by guessing or with a lot of help and input from the teacher.

Sometimes underlying concepts even formed intercultural barriers. Often the units base on the concept of being a tourist. The Lao teachers that have been taught by German teachers have never been to an English-speaking country before. Most of them have never been outside Laos, and the ones that have, have visited Thailand, which is just a few kilometres away. They have never stayed at a hotel nor gotten to know what Westerners link with travelling. So, this concept, that should have supported the learning process, imposed additional topics to learn for the Lao learners.

The cultural differences became especially clear when a student tried to figure out signs in the book. With the sign which is supposed to represent a beach, the student had the most trouble. The sign shows a pile with a shovel and a bucket. The student was asked what he thought the sign should stand for, and he answered that it must stand for work or a construction area. Laos is a landlocked country and the Laotians who have never been outside Laos have never been at the sea. They have never seen a beach at the coast, only on pictures or in videos. For the student, a shovel and a bucket only stand for work or construction, whereas Western people also know that children play at the beach with shovels and buckets to build sandcastles.

Two last examples of the many intercultural differences and barriers experienced, occurred with the topic of food. The course book introduces breakfast vocabulary such as orange and apple juice, a coffee, a tea, a mineral water, a croissant, an omelette, a cheese sandwich. These are food and drink items that many Western people have for breakfast. However, the typical Lao breakfast consists of noodle soup, fish, rice, or other salty dishes. All this vocabulary will not be used by the Lao adults when they talk about their eating habits, but it might help them to understand what people from Western countries eat.

Another striking experience regarding food and breakfast was made when teaching a chapter in which two menus are presented: a breakfast menu and a lunch menu. The aim is for the students to use the structure “What would you like for lunch/breakfast?” and answer with the structure “I’d like...”. While doing the exercise, one student asked the other one “What would you like for breakfast?” and the other student picked dishes from the lunch menu. First, I thought that the exercise or the terms breakfast and lunch had not been understood but then it became clear that the dishes listed on the breakfast menu mostly are things Lao people don’t eat for breakfast. On the breakfast menu, there are eggs, toast, fruit, or croissants. They rather have dishes listed on the lunch menu for breakfast, like soup or fish. This explained why the students picked items from the lunch menu even though they were asked about breakfast.

Conclusions

Taking the local context into account to overcome intercultural barriers is one of the first steps. With language teaching in Laos also comes culture teaching because language and culture are closely interwoven (Hsin, 2008). However, many researchers argue that the traditional teaching of target culture from the Inner Circle countries does not fit the English language teaching and the culture teaching in Laos. Kirkpatrick (2011) as well as Chang (2011) say that the view and the goals of English language teaching in Southeast Asia must change. Chang claims that one must consider bi-directionality when teaching, that is: not only teaching the target culture but also teaching the language from the point of view of the learner’s culture. Kirkpatrick suggests

a multilingual model of English language Teaching, which implies that the goal of teaching English in ASEAN nations is no longer to acquire native-speaker like proficiency but to become successful users of English as the ASEAN lingua franca. This entails that the linguistic goals and also the cultural content must be adapted in English language teaching. Kirkpatrick would rather see the Southeast Asian learners become familiar with local cultures than with cultures from the inner circle.

In accordance to the claim to take local culture into account in English language teaching, Byram and Feng (2004) point out the importance of context. The context shapes interactions and therefore it must be paid attention to with all its variables and dimensions. If the context is not taken into account, intercultural barriers can come up and hinder the language learning. The teacher and the learners should embrace a dialogic process where they share their cultural knowledge at eye level.

All these views on English language teaching and learning in Southeast Asia, and especially in Laos, imply that course books and teaching must be adapted for this context.

When teaching Lao adult beginners with the Western General English course book *Straightforward Beginner*, many intercultural barriers were encountered because the course book is not adapted or made for the Lao or Southeast Asian cultures. Western cultural knowledge is assumed and this causes problems that hinder the learning process of the Lao learners. Not only obvious cultural content presents intercultural barriers but also illustrations, names, underlying concepts, and certain topics. There are only a few exercises and chapters that include content from Southeast Asian nations.

To avoid intercultural barriers that hinder the learning process and put unnecessary cognitive load onto the learners, a course book should be adapted for the local context. This can be done by re-ordering and re-structuring the content depending on the learner's difficulties, by cutting out non-adequate exercises that are not necessary for the learner to achieve the language goals, by adding activities and content that include local and international culture, and by adding more practise where the learners need it.

As a conclusion of this article, a checklist has been put together. The checklist should help teachers and educators to know what to look for in a course book or to consider when adapting or writing a course book for the Lao context or the broader ASEAN context.

- Integrate the source/ local culture to enable the students to speak about their daily experiences in English in an intercultural exchange or localise the given content.
- Include information and learning content about other ASEAN nations into the course book so that the students get to know the countries and the cultures they are likely to meet people from or visit themselves.
- Integrate international cultural aspects with examples where English is used as a lingua franca (global language) in situations where non-native speakers of English communicate.
- Make sure to enable the students to get to communicate about their own cultural experiences and compare them to other cultures to increase their intercultural competence.
- The course book should provide them with a wide range of English vocabulary of local and global importance.
- Target culture may be included as well but the cultural content has to be explained explicitly.

- Choose topics that are relevant for learners in Laos. Specific pronunciation exercises and drills should be added as long as pronunciation is important for understanding. The goal is to communicate effectively and not to have a native-speaker-like pronunciation.
- Take out some grammar that is not relevant, especially in the beginning when English is used as an Asian lingua franca.
- Pick illustrations that do not expect the learners to have Western visual literacy skills.
- Consider language differences between the learner's first language and the English language, e.g., letter system, punctuation, etc.
- Include explanations and practises on punctuation and spacing between words.
- Since most Laotians have a high uncertainty avoidance, provide them with clear structure and tasks.
- Work closely together with local partners to make it more effective and relevant.

The most important aspect of making English language education successful in Laos is to work closely together with Lao partners. It is vital to get to know them and their needs and interests better and not to assume any cultural knowledge that Western people see as universal. Most English course books are produced by Western countries which have significantly different cultures than Laos and other ASEAN nations. The English language is becoming more and more important in Laos, but to make Lao people successful local and international speakers of English, the issues on the checklist should be regarded when teaching English in Laos. Intercultural barriers will still arise at some points in foreign language teaching, but taking the pointed-out aspects into consideration will help to reduce the intercultural barriers, to promote intercultural competence, and to train successful users of English as a lingua franca in Southeast Asia.

The intercultural barriers described in this article arose from teaching with the course book *Straightforward Beginner* because it was the course book that was available for teaching in the schools in Laos. There is no course book specifically adapted or designed for Lao adult beginners yet. However, with further research, other course books could be looked at as well and tested for their suitability to the Lao context. The checklist can be used to identify whether a course book might be more suitable for the Lao context than *Straightforward Beginner* is.

To confirm or disconfirm the intercultural barriers that were experienced during the teaching period in Laos, scientific studies should be conducted that focus on the intercultural barriers in the English language learning processes in Laos and the local interests and needs with regards to the English language. The aim is to reduce intercultural barriers, to adapt English language teaching for the Lao context, to help the Lao learners to develop intercultural communicative competence, and to help them to become successful users of English in local and intercultural situations.

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References

- Alptekin, C. (2002). Towards Intercultural Communicative Competence. *ELT Journal*, 56(1), 57-64.
- Angels for Children - Engel für Kinder (2017). Angels for Children - Engel für Kinder. Online: <http://engel-fuer-kinder.de/en/> (accessed June 1, 2017).
- Angels for Children & University of Education Karlsruhe (2016). The Laos Experience. Online: <http://www.thelaosexperience.com/> (accessed June 1, 2017).
- Böcua, A. B. & Razi, S. (2016). Evaluation of textbook series 'Life' in terms of cultural components. 'Life' ders kitapları serisinin kültürel bileşenleri açısından değerlendirilmesi, 12(2), 221-237.
- Byram, M. & Feng, A. (2004). Culture and language learning: Teaching, re-search and scholarship. *Language Teaching*, 37(3), 149-168. Online: <https://doi.org/10.1017/S0261444804002289>.
- Chang, B.-M. (2011). The Roles of English Language Education in Asian Con-text. *Journal of Pan-Pacific Association of Applied Linguistics*, 15(1), 191-206.
- Chea, K.; Klein, A. & Middlecamp, J. (2012). Adapting Textbooks to Reflect Student Needs in Cambodia and the ASEAN Region. *Language Education in Asia*, 3(2), 218-229. Online: https://doi.org/10.5746/LEiA/12/V3/I2/A10/Chea_Klein_Middlecamp.
- Clandfield, L. (2013). *Straightforward*. Oxford: Macmillan Education.
- Dengler, R. & Golla, V. (2018). Live Documentation: Teaching English in Laos. Online: <http://multimedia.hd-campus.tv/laos#3000> (accessed May 1, 2019).
- Gold, A. (2015). *Guter Unterricht: Was wir wirklich darüber wissen*. Göttingen, Bristol, CT, U.S.A.: Vandenhoeck & Ruprecht. Online: <http://dx.doi.org/10.13109/9783666701726>
- Hsin, C.-L. (2008). Language and Culture in Foreign Language Teaching. Paper presented at the British Educational Research Association New Researchers/Student Conference, Heriot-Watt University, Edinburgh.
- Kirkpatrick, A. (2011). English as an Asian Lingua Franca and the Multilingual Model of ELT. *Language Teaching*, 44(02), 212-224. Online: <https://doi.org/10.1017/S0261444810000145>
- Kounnavongsa, S. (2015). Chapter 1.8: An Overview of the State of Language Policy/ Practice in Lao PDR. In T. W. Bigalke & S. Sharbawi (Eds.). *English for ASEAN Integration: English for ASEAN Integration: Policies and Practices in the Region*. Brunei Darussalam: Universiti Brunei Darussalam, 65-66.
- McGrath, I. (2002). *Materials Evaluation and Design for Language Teaching*. Edinburgh University Press Series: Edinburgh University Press. Online: <https://books.google.de/books?id=PiqLQgAACAAJ>
- Souriyavongsa, T.; Rany, S.; Abidin, M. J. Z. & Mei, L. L. (2013). Factors Causes Students Low English Language Learning: A Case Study in the National University of Laos. *International Journal of English Language Education*, 1(1), 179-192. Online: <http://www.macrothink.org/journal/index.php/ije/article/download/3100/2631>

Sweller, J. (1994). Cognitive Load Theory, Learning Difficulty and Instructional Design. *Learning and Instruction*, 4, 295-312.

Tomlinson, B. (2006). A Multi-Dimensional Approach to Teaching English for the World. In R. Rubdy & M. Saraceni (Eds.). *English in the World: Global Rules, Global Roles*. London: Continuum, 130-150.

Podcast utilization for enhancing listening comprehension

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Abstract

Technology has a positive effect on learners' learning. It causes learners to be more engaged, motivated in learning. The objective of this study opinion on utilizing podcast for enhancing listening comprehension. The participants comprised 20 English students in Champasack University. The questionnaire consisted of 25 items. Each item was measured on a 5-point Likert- type scale .The participants were asked to respond to each item as: (1) strongly disagree, (2) disagree, (3) Neutral, (4) agree, and (5) strongly agree. The data were analyzed using Excel to get descriptive statistics and describe respectively. The findings revealed that podcasts were meaningful for enhancing listening skills through exposing real materials. They would experience with a range of oral language, conversation, lecturing, and reports. They were also accustomed to different English accents and learned new vocabulary. Listening from podcast could be occurred anywhere and anytime. Podcasts facilitated students to improve their listening comprehension and listening with podcast brought enjoyments and increased listening ability. Podcasts were effective tool able to improve listening.

Keywords: Listening comprehension, Podcast, Technology, Learning English.

Background

The English language is an integral part of people's lives, and they are encouraged to learn it for different reasons. English is considered to be the second language in many parts of the world. Advancements in almost every discipline necessitate learning English. Because most research is published in the language, it is regarded to be an important and universal language. In addition, many schools and higher education systems use it as the medium of instruction [26]. Technology is able to bring authenticity into the language classrooms with the assistance of Internet, computers, tablets, mobile devices, and many other technological advances [1, 7, 42]. Graddol (2012) stated that "technology lies at the heart of the globalization process, affecting work, education and culture". This is especially true in existing times due to the fact that technology is indeed reshaping the world through each and every facet of individuals' lives.

The significant role that information technology currently plays in English education cannot be overemphasized. An innovative approach to teaching listening skills has emerged due to the hi-tech developments. One of them is a so-called "podcasting" (a portmanteau of the words iPod and broadcasting), which has recently become very prevalent. The term "podcast" was first coined in 2004, and it means the publishing of audio materials via the Internet. Audio recordings are designed to be downloaded and listened to on a portable MP3 player of any type, or on a personal computer. Audio files available for downloading and other means of online listening have been around for some time. Podcasts offer a 'real-life listening' source that allows all second language listeners to take advantage from it. The importance of using podcasts in the second language class: Even at the beginning levels, learners can benefit from global listening even if they only listen from three to five minutes a day. Beginning students will be

exposed to the new language. . . The intermediate learner has a need for authentic texts and to be exposed to a variety of voices. By the time learners reach the advanced stage, they must be able to learn from listening [9]. McGarr (2009) noticed that podcasting alludes to the sharing sound or video records in computerized format. It can be downloaded physically from the web or naturally appropriated to endusers. These records are open straight from the desktop or transmittable to a media gadget.

In order to develop listening skills and listening competence, *podcast* may assume a critical part. Podcast is viewed as a —new innovation for building up students’ listening and talking abilities [34]. Significant practice along with authentic materials may cause learners to feel more comfortable with second language listening. Technology is one of the means of accessing those materials and practicing this vital skill. Listening comprehension is emphasized as a vital skill in language learning as it is difficult to learn a language without understanding the input provided [27]. Listening comprehension is one of the most problematic skills for language learners. However, when it is considered that many of the learners have technological devices such as MP3 players, computers, and tablets and mobile phones allowing them to listen to the audio files easily, the problem of listening seems more manageable. In order to overcome these problems caused by the complexity of listening process, learners need significant practice to improve. Many researchers agree on the positive role of authentic listening materials while practicing listening skills [11, 27, 41, 42]. Language instructors are able to help learners to practice a foreign language outside the classroom by encouraging them to use podcasts to improve their language skills [24].

According to Trinkle (2008), students develop listening skills before they acquire reading skills. Moreover, they are able to comprehend the complex structures of stories that are read to them before they can read on their own. In order to identify the meaning of messages received, the language instructors need to employ certain learning strategies and teaching materials to achieve the goal of learning languages [6, 14, 21, 27, 31, 39, 40]. Language instructors are required to help listeners to comprehend authentic texts; to do so, listening comprehension skill needs to be developed by exposing listeners to different discourses [2, 18, 30, 31, 39]. This study aimed at introducing podcast utilization to enhance listening comprehension in English Department, Champasak University. It will be a new alternative medium to practice listening skills because of inadequate listening materials and uninstalled technology sources in the classroom. As a result, Listening class is impossible to integrate with technology and unable to guarantee students completely practice their listening comprehension. The introduction podcasts to students will be able to extend and fulfill the gaps of insufficient technology to deliver listening class. In addition, it will open more opportunities to students to employ technology as podcast to respond the purposes of listening.

Research Questions

- 1) What is the opinion on utilizing podcast for enhancing listening comprehension among English students?

Methodology

Participation

The participants of this study were 20 English students in English Department, Champasack University. This number of students are the third year students, both male and female students were selected to be participants and their age ranged was from 20 to 23.

Instruments

Researcher created the podcast on Google Quiz to ease for listening and doing the test in the same platform. Students enable to print the files as PDF and download audio files.

There was no need to listen to the podcast files online but it could be listened asynchronously. The students in the target group had the opportunity to choose the time they wanted to listen. In the test, there were four tests and individual test comprised of eight questions are all multiple questions. Students listen a range of conversations in podcasts. These questions used to assess the level of listening comprehension. Researcher designed questionnaire on Google Quiz because of its fast result response. Students are able to receive the result of the test concurrently. In order to request students to state their opinion of utilizing podcast. Researcher built questionnaire in Google form, created links by scanning QR Code to access to questionnaire. The questionnaire consisted of 25 items. Each item was measured on a 5-point Likert- type scale .The participants were asked to respond to each item as: (1) strongly disagree, (2) disagree, (3) Neutral, (4) agree, and (5) strongly agree. The following showed screenshots of podcast features.

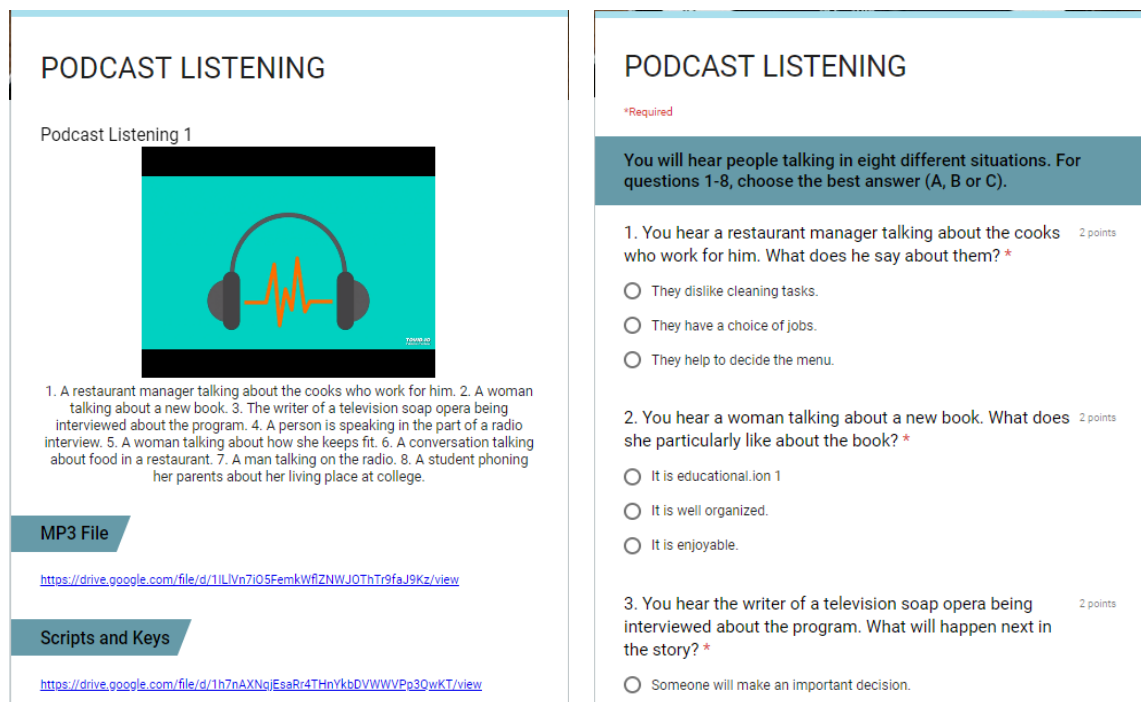


Figure 1: Screenshots of podcast platform and its test.



Figure 2: QR code scan to podcast platform.

Data Collection

The questionnaire created in Google form and used its link to create QR Code. Participants scanned the code to respond the questionnaire about utilizing podcast and their opinion about it.

Data analysis

When participants responded to all items, the data were analyzed using Excel to get descriptive statistics and describe respectively.

Result

Podcasts provide students with a more authentic and personal experience to develop various language skills. Podcasting become alternative method of learning which enables to assist to improve students' listening skills. The following table showed opinion on utilizing podcast to enhance listening comprehension. It included 25 items with level agreements that students stated their opinion about it.

No	Statements	Mean	S.D	Level
1	I enjoy listening to podcasts	4.80	.410	Strongly agree
2	It is easy to access the podcast audios files	4.45	.510	Agree
3	I found there are not problems in playing the podcasts.	4.15	.366	Agree
4	Podcast topics are unsuitable to my listening needs.	2.25	1.209	Disagree
5	I found the conversations in podcasts are interesting.	4.20	.410	Agree
6	Podcasts are useful for learning new vocabularies.	4.45	.510	Agree
7	I think it is a good experience to listen to podcasts.	4.20	.410	Agree
8	Transcripts make me better understanding audio files	4.85	.366	Strongly agree
9	The length of 8 to 10 minutes of podcast is suitable for listening	4.05	.224	Agree
10	Podcasts are useful for listening comprehension.	4.25	.444	Agree
11	Listening to podcasts is possible to anywhere and anytime	4.35	.489	Agree

12	Listening to English podcasts has made me more motivation to improve listening comprehension	4.40	.503	Agree
13	Podcasts engaged my intention to improve listening comprehension.	4.45	.510	Agree
14	I think podcasts are an effective tool to practice listening comprehension.	4.30	.470	Agree
15	I think podcasts help me to improve a lot in listening comprehension	4.15	.489	Agree
16	Listening to podcast is effective for enhancing my comprehension skills.	4.35	.489	Agree
17	After listening with podcasts, I am more open to learning through podcasts in the future.	4.40	.503	Agree
18	I will continue to listen to podcasts in the future.	4.15	.587	Agree
19	I would recommend that other students learning English listen to the podcasts.	4.05	.224	Agree
20	Podcasts are difficult	2.30	.571	Disagree
21	I don't know how to handle this technology	2.00	.973	Disagree
22	I think podcast bring me no fun at all.	2.30	.571	Disagree
23	Using podcasts is waste of time.	2.40	.503	Disagree
24	I will not listen to podcasts again after this research	4.45	.510	Agree
25	Practicing listening by utilizing podcasts was not a productive use of my time.	2.15	.745	Disagree
Total		3.83	0.51984	Agree

From table above, it showed that the average of $\bar{X} = 4.80$ and S.D = .41 of students responded that they enjoyed listening from podcast. Listening with it was not difficult to access and they enabled to choose a wide range of topics to listening. Moreover, podcasts audios files were available to download and stored in device. They could repeatedly listen files anytime, anywhere when they were off internet. Podcast facilitated for improve listening with the average of $\bar{X} = 4.45$ and S.D = .51. It was adjusted and customized to be compatible with devices. As a result of customization to incorporate with other devices, there were no problems in playing and gave clear decibel with $\bar{X} = 4.15$ and S.D = .36.

Podcast sources offered a wide range topics and genres for listeners. They could select listening level to suit with their listening ability and topics they preferred to improve. As a

result, they did not get distracted and failed to practice listening skill anymore with the average of $\bar{X} = 2.25$ and $S.D = 1.20$. Different speakers, accents, situations, word hearing in conversation also enhanced the speech familiarity. Much more listening would strengthen listening capacity when they were accustomed to pitch of speech. This could make conversation interested to listeners and further stimulated their listening skill with the average of $\bar{X} = 4.20$ and $S.D = .41$. Speakers in conversation used different words to describe their emotions, feelings and situations they were in. That would be advantage for listeners improved their vocabulary as well with the average of $\bar{X} = 4.45$ and $S.D = .51$. Additionally, it was good experience to listen to podcasts when they listened to native speakers pronounced words, sound stress and intonation in speech.

Most podcasts are recorded by native speakers for native speakers, and this means that they can sometimes talk very quickly and may not enunciate clearly. But many podcasts have transcripts available online, so listeners could read along while they listen if they are really struggling. However, it was not easy to all listeners to understand native speakers when they pronounced, linked sound together, or even mute sound. They might face frustrations with varied sound from them. Students in English Department in Champasack University had English background of non-native teachers with Lao English accent when they initiated to learning English. Therefore, it was impossible to understand to all words in conversation. The transcription offered to them would encourage their comprehension to native speakers with average of $\bar{X} = 4.85$ and $S.D = .36$. The selection to listening to suitable conversation, lecturing, reports and other speeches needed to consider. Listening might be in appropriate length between 8 – 10 minutes because long listening would be difficult to catch up main ideas or even overall conversation. And that, proper length of conversation were much more enhancement in listening comprehension with average of $\bar{X} = 4.25$ and $S.D = .44$.

The average of $\bar{X} = 4.35$ and $S.D = .48$ of questionnaire respondent said podcast empowered and aroused motivation to improve listening. They were able to pick up their device to listen anywhere and anytime. Listening podcast were mere unlimited to listening only in the classroom but they could listen wherever they wanted. There were many websites have implemented podcasts to their sites daily with current issues to talk. Listeners can keep to date new topics from various sources. They also expressed that podcast were an effective tool to enhance listening comprehension with the average of $\bar{X} = 4.30$ and $S.D = .47$. Therefore, the average of $\bar{X} = 4.40$ and $S.D = .50$ of them agreed to continue to employ podcast for enhancing listening comprehension and recommended other students to listen to podcast. The availability of podcasts allowed listeners to improve their listening comprehension but different background on computer skills brought the problems to access podcasts and waste of the time to search for them. They did not think podcasts were unimportant to improve listening with the average of $\bar{X} = 2.15$ and $S.D = .74$. They agreed that podcasts were used to improve their listening.

Discussion

The overall finding of students' questionnaire response provided agreements in utilizing podcast to enhance listening comprehension. They agreed that podcasts were effective tool able to improve listening if they pick the right podcasts that suits the level of their listening level. Additionally, the findings revealed that podcasts were useful for enhancing listening skills through exposing them to authentic materials. They would benefit from the varieties of oral language, conversation, lecturing, and reports. They were also accustomed to different English accents and practiced new vocabulary in conversations. The accessibility and availability of podcasts facilitated to download for listening when internet was off. The podcast utilization was productive time of practice. Podcasts facilitated for students to improve their listening comprehension and listening with podcast brought enjoyments and increased listening ability.

Conclusion

Podcasts facilitated for students to improve their listening comprehension and listening with podcast brought enjoyments and increased listening ability. They listened to new vocabulary, phrases, and pronunciation that attributed to bettering speaking skill. Audio script accompanied with podcast raised more understanding to speakers. Much more listen to podcasts with a wide range of topics, genres and situations that were describe in the conversation impacted on listening improvement.

References

- [1] Adair-Hauck, B., Willingham-McLain, L., & Youngs, B. (1999). Evaluating the integration of technology and second language learning. *CALICO Journal*, 17(2), 269–306.
- [2] Anderson, A., & Lynch, T. (1988). *Listening*. New York, NY: Oxford University Press.
- [3] Artyushina et al., (2011). How to Improve Listening Skills for Technical Students: DOI: 10.1109/ICL.2011.6059543
- [5] Brown, H. D. (2001). *Teaching by principles: An interactive approach to language pedagogy*. White Plains, N.Y: Longman.
- [6] Butler-Pascoe, M. E., & Wiburg, K. M. (2003). *Technology and teaching English language learners*. Allyn and Bacon.
- [7] Cartr, R., & Nunan, D. (2001). *Teaching English to Speakers of Other Languages*. Cambridge: Cambridge University Press. <http://dx.doi.org/10.1017/CBO9780511667206>
- [8] Chan et al, (2011). Students' perceptions of and attitudes towards podcast-based learning – A comparison of two language podcast projects. *Electronic Journal of Foreign Language Teaching*, 8, 312–335.
- [9] Constantine, P. (2007). Podcasts: another source for listening input. *The Internet TESL Journal*. 13 (1). Retrieved 29th January 2007 from <http://iteslj.org/Techniques/Constantine-PodcastListening.html>.
- [10] Cross, J. (2013). Promoting autonomous listening to podcasts: A case study. *Language Teaching Research*, 18(1), 8–32.
- [11] Field, J. (1998). Skills and strategies: Towards a new methodology for listening. *ELT Journal*, 52(2), 110–118.
- [12] Flowerdew, J., & Miller, L. (2005). *Second language listening: Theory and practice*. Cambridge: Cambridge University Press.
- [13] Graddol, D. (2012). *The impact of macro socioeconomic trends on the future of the English language*. Doctoral Thesis at Stockholm University, Sweden.
- [14] Hadley, A. O. (2001). *Teaching language in context*. Boston, MA: Heinle & Heinle.
- [15] Heilesen, S. B. (2010). What is the academic efficacy of podcasting? *Computers & Education*, 55, 1063–1068.
- [16] Hyslop, N. B., & Tone, B. (1988). Listening: Are We Teaching It, and If So, How? ERIC Digest ED295132. Retrieved November 11, 2006, from <http://www.ericdigests.org/pre-928/listening.htm>.
- [17] Kavaliauskienė & Anusienė, (2009). English for Specific Purposes: Podcasts for Listening Skills: DOI: 10.3846/1822-430X.2009.17.2.28-37

- [18] Kennedy, S., & Trofimovich, P. (2008). Intelligibility, comprehensibility, and accentedness of L2 speech: The role of listener experience and semantic context. *La Revue Canadienne des Langues Vivantes [The Canadian Modern Language Review]*, 64(3), 459, 489.
- [19] Kidd, T.T., & Chen, I.L. (Eds.) (2009). *Wired for learning: An educator's guide to web 2.0*. Charlotte, NC: Information Age Publishing.
- [20] Lee, L. (2009). Promoting intercultural exchanges with blogs and podcasting: A study of Spanish-American telecollaboration. *Computer Assisted Language Learning*, 22(5), 425-443. Doi:10.1080/09588220903345184.
- [21] Lin, L. (2002). *The effects of feature films upon learners' motivation, listening, & speaking skills: The learner-centered approach*. Retrieved from ERIC database. (ED 470811)
- [22] McGarr, O. (2009). A Review of podcasting in higher education: It's Influence on the traditional lecture. *Australasian Journal of Educational Technology*, 25(3), 309-321.
- [24] McMinn, S. W. J. (2008). *Podcasting possibilities: Increasing time and motivation in the language learning classroom*. Retrieved from <http://www.eife-l.org/publications/proceedings/ilf08/contributions/improving-quality-of-learning-with-technologies/McMinn.pdf>
- [25] Mendelsohn, D. J. (1994). *Learning to listen: A strategy-based approach for the second language learner*. San Diego: Dominie Press.
- [26] Morris & Maxey.,(2014). The Importance of English Language Competency in the Academic Success of International Accounting Students: *Journal of Education for Business*, v89 n4 p178-185 2014
- [27] Osada, N. (2004). Listening comprehension research: A brief review of the past thirty years. *Dialogue*, 3, 53–66.
- [28] Pearson, D., & Fielding, L. (1983). *Instructional implications of listening comprehension research* (Reading Education Report No. 39). Retrieved from <http://www.eric.ed.gov/PDFS/ED227464.pdf>
- [29] Richards, J. (1983). Listening comprehension: Approach, design, procedure. *Tesol Quarterly*, 17(2), 219-240
- [30] River, W. (1966). Listening Comprehension. *The Modern Language Journal*, 50, 196-204
- [31] Rost, M. 2002. *Teaching and Researching Listening*. London: Longman.
- [32] Schwartz, A. M. (1998). *Listening in a foreign language*. Washington, DC: Center for Applied Linguistics.
- [33] Shang, H.-F. (2008). Listening strategy use and linguistic patterns in listening comprehension by EFL learners. *International Journal of Listening*, 22(1), 29–45.
- [34] Sze, P. (2006). Developing Students' Listening and Speaking Skills through ELT Podcasts. *Educational Journal*, 34, 115-134.
- [35] Thorne, S. L., & Payne, J. S. (2005). Evolutionary trajectories, Internet-mediated expression, and language education. *CALICO Journal*, 22(3), 371–397.
- [36] Trinkle, C. (2008). Listening comprehension leads to reading success. *School Library Media Activities Monthly*, 24, 43-45.
- [37] Sze. (2006). Developing Students' Listening and Speaking Skills through ELT Podcasts: *Education Journal*, v34 n2 p115-134 2006
- [38] Underwood, M. (1989). *Teaching Listening*. New York: Longman.
- [39] Ur, P. (1984). *Teaching listening comprehension*. New York, NY: Cambridge University Press.

- [40] Vandergrift, L. (2002). *Listening: Theory and practice in modern foreign language competence*. Retrieved from www.llas.ac.uk/resources/gpg/67
- [41] Vandergrift, L. (2007). Recent developments in second and foreign language listening comprehension research. *Language Teaching*, 40(3), 191-210.
- [42] Zhao, Y. (2003). Recent developments in technology and language learning: A literature review and meta-analysis. *CALICO Journal*, 21(1), 7-27.

The Benefits and Challenges of Study-Related Global Mobility Programs in Teacher Education: A Case Study

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Abstract

Over the last decades three aspects have gained interest in our globalized societies: the importance of competences, particularly intercultural competence, the growing number of study-related stays abroad among students of all subjects, and their added value in terms of personal and professional development, and the high expectations and requirements put on (future) teachers, to possess a range of knowledge and skills, including effective and appropriate approaches to diversity. Teaching and learning in a heterogenic and intercultural classroom puts challenging demands on teachers to meet the various needs of their students. Studies have shown that study-related stays abroad might not only contribute to language skills but also to a range of other knowledge, skills and attitudes. All of these are also included in the concept of intercultural competence – the 21st century skill which has meanwhile become key factor in private as well as in professional domains, including the educational system and schools. Based on the previous research this thesis seeks to illustrate the subjectively evaluated experiences of four teacher training students from the University of Education Karlsruhe in Germany, each having completed a stay abroad. Two took part in the project “Teaching English in Laos”, one stayed in Argentina the fourth in Israel. The analysis of one-to-one post interviews pays attention to possible increases in learning, but also to difficult situations. Confirming findings from previous studies, it was found that the teacher training students affirmed the potential value of study-related stays abroad regarding personal growth, intercultural competence and academic knowledge. Especially with regard to personality development, the interviewed students see great potential in a study-related stay abroad. Moreover, teaching-specific knowledge and competencies were mentioned. Nevertheless, positive growth is not achieved automatically. It seems that students often do not realize the full potential that a study-related stay abroad has to offer. Appropriate preparation and follow-up work offered by the higher education institutions educating future teachers and support in the host country could contribute to make a study-related stay abroad an authentic and reflected cultural experience. The project “Teaching English in Laos” is used as an example to briefly depict a possible implementation.

Keywords: student mobility, teacher education, higher education, global citizenship, study-related stays abroad

Introduction

Over the last decades three aspects have gained interest in our globalized societies: the importance of competences, particularly intercultural competence, the growing number of study-related stays abroad among students of all subjects, and their added value in terms of personal and professional development, and the high expectations and requirements put on (future) teachers, to possess a range of knowledge and skills, including effective and appropriate approaches to diversity. It is not far that these three aspects are interrelated and can influence each other. Consequently, based on previous research, my paper seeks to illustrate the subjectively evaluated experiences of four teacher training students from the University of Education Karlsruhe in Germany, each having completed a stay abroad.

Methodology

For this investigation it was chosen to conduct semi-structured one-to-one post interviews by talking to the participants face-to-face. Four teacher training students from the University of Education Karlsruhe in Germany, each having completed a stay abroad, were asked to subjectively evaluate their experiences. In the process, attention was paid to possible increases in learning, but also to difficult situations. Since this was a qualitative study, no measuring instrument was used to quantify intercultural competence, competences in general or knowledge. Nevertheless, special attention was paid to whether the statements of the interviewees had an intercultural dimension.

Results and Discussion

Since the study did not claim to measure certain learning increases of the students, but only to examine how students assess their stays abroad themselves, the results suggest that each individual has grown in her own way through the study-related stay abroad. With small exceptions, no major problems were reported. However, two students showed that they could not reconcile some of their own views with those of the people of the target country. However, they found ways to deal with them. The students all unanimously report personal growth. Especially with regard to flexibility, spontaneity, acceptance, empathy and patience, they see changes in themselves. Some are able to maintain this back in Germany others do not always succeed well but they are nevertheless aware of it and try to reflect on it. With regard to the intercultural dimension, it became clear that during the conversation typical examples of the country or culture were mentioned, which indicates that they had consciously or unconsciously become aware of them. In terms of learning growth with regard to their later profession, personal aspects like patience, flexibility, ambiguity tolerance, acceptance, which are considered particularly valuable. Teaching-specific aspects are not addressed to the same extent, however. The use of methods or special knowledge about a religion or culture are mentioned.

Especially with regard to personality development, the interviewed students see great potential in a study-related stay abroad. Moreover, teaching-specific knowledge and competencies were mentioned. Ideas about what kind of attitudes they would like to have as a teacher and how to interact with their future students were developed. Moreover, difficulties that learning processes can cause, particularly with regard to learning a foreign language were recognized. They have experienced how difficult this process can be and seem to have developed an understanding with regard to students learning a second or a foreign language.

All our study participants agree that the mastery of the national language is decisive for how well one finds one's way, how well one can communicate and how well one can understand motives and actions of others. It is also seen as an appreciation of the country.

All in all, all students appreciate the stays abroad as a very valuable experience, which is also shown by the fact that everyone agrees to recommend a stay abroad during their studies to other teacher training students. They are also all convinced that they have developed further and that they have increased their learning. It was recognized that a stay abroad gives access to important competences and offers the possibility to get a different view on things. One point of criticism, however, was that the students who were abroad outside a project wished for better support and consultation. Preparation and follow-up seemed to have been easier for the students in the project with Laos, as they were guaranteed this support. The project "Teaching English in Laos" is a promising example of the successful and profitable implementation of study-related stays abroad.

Conclusions

By immersion in a different culture than one's own, study-related stays abroad provide students with experiential learning, opportunities for learning-by-doing - an extensive and heterogeneous context for experiences. A semester or an internship abroad can thus also be described as an experience-oriented element during the course of study. The opportunities that are offered mainly result from the fact that things are different - that life is different. Ideally, students should be able to immerse themselves in the reality of the host country and not only stay there, but live there even if it is only for a limited time. Students abroad naturally navigate in a new, culturally different context. Often the same activities take place as at home: encounters with people, learning, teaching, working, daily life, but all this is happening in a new framework in which different cultural backgrounds, values and beliefs are prevailing. Learning how to deal with these unfamiliar conditions is not only important or necessary but also might give the impulse for gains in any respect.

What has emerged is that stays abroad during their studies do not leave individuals unchanged and can also be phases that shape their professional biographies and can have a lasting influence on the professional identity of teacher training students.

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I hereby declare that I am the sole author of this paper and that I have not used any sources other than those listed in the bibliography and identified as references.

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References

- Auernheimer, Georg (ed.) (2008). *Interkulturelle Kompetenz und pädagogische Professionalität*. Wiesbaden: VS Verlag für Sozialwissenschaften.
- Bargel, Tino, Frank Multrus, Michael Ramm, and Holger Bargel (2009). *Bachelor-Studierende Erfahrungen in Studium und Lehre: Eine Zwischenbilanz*.

- https://www.bmbf.de/pub/Bachelor_Studierende_Zwischenbilanz_2010.pdf (accessed October 1, 2018).
- Beck, Ulrich (1997). "Was ist Globalisierung? (Suhrkamp, Edition Zweite Moderne)." *Sicherheit und Frieden (S+F) / Security and Peace* 15 (4):291.
- Bender-Szymanski, Dorothea (2008). "Interkulturelle Kompetenz bei Lehrerinnen und Lehrern aus der Sicht der empirischen Bildungsforschung." In: Auernheimer, Georg (ed.). *Interkulturelle Kompetenz und pädagogische Professionalität*, 201–228. Wiesbaden: VS Verlag für Sozialwissenschaften.
- Bertelsmann Stiftung (2008). *Interkulturelle Kompetenz - Die Schlüsselkompetenz im 21. Jahrhundert?. Gütersloh/ Mailand: Bertelsmann Stiftung und Fondazione Cariplo.*
- Blömeke, Sigrid (2014). "Forschung zur Lehrerbildung im internationalen Vergleich." In: Terhart, Ewald, Hedda Bennewitz & Martin Rothland (eds.). *Handbuch der Forschung zum Lehrerberuf*, 441-467. Münster, New York: Waxmann.
- Boye, Sarah (2016). *Intercultural communicative competence and short stays abroad*; Dissertation. 1. Aufl. Band 35 of *Münchener Arbeiten zur Fremdsprachen-Forschung*. Münster/ New York: Waxmann.
- Bracht, Oliver, Constanze Engel, Kerstin Janson, Albert Over, Harald Schomburg & Ulrich Teichler (2006). "The Professional Value of ERASMUS Mobility." <https://www.eumonitor.nl/9353210/d/belang%20erasmus%20onder%20professionals.pdf>
- Brandenburg, Uwe, Obdulia Taboadela & Mihaela Vancea (2015). „Mobility Matters: The ERASMUS Impact Study.“ *International Higher Education* 82: 5-7. <https://ejournals.bc.edu/ojs/index.php/ihe/index> (accessed Sep 30, 2018).
- Bologna Follow-Up Group Secretariat. "The three Cycle System". <http://www.ehea.info/pid34438/three-cycle-system.html> (accessed Jul 31, 2018).
- Bucharest Ministerial Conference (2012). "Mobility for Better Learning. Mobility strategy 2020 for the European Higher Education Area (EHEA)." http://www.ehea.info/media.ehea.info/file/2012_Bucharest/39/2/2012_EHEA_Mobility_Strategy_606392.pdf (accessed Jul 31, 2018).
- Carlson, Jerry S. & Keith F. Widaman (1988). "The Effects of Study Abroad During College on Attitudes Toward Other Cultures" *International Journal of Intercultural Relations* 12: 1-17.
- Cushner, Kenneth (2007). "The Role of Experience in the Making of Internationally-Minded Teachers." *Teacher Education Quarterly* 34: 27-39.
- DAAD. "Resolution zur Internationalisierung der Lehramtsausbildung." <https://www.daad.de/veranstaltungen/lehrerbildung/lb/de/26676-resolution-zur-internationalisierung-der-lehramtsausbildung/> (accessed Jul 27, 2018).
- DAAD & DZHW (eds.) (2018). *Wissenschaft weltoffen 2018: Daten und Fakten zur Internationalität von Studium und Forschung in Deutschland ; Fokus: Internationalisierung des nicht-wissenschaftlichen Hochschulpersonals = Facts and Figures on the International Nature of Studies and Research in Germany ; Focus: Internationalisation of non-academic university staff*. Bielefeld: wbv Media.

- Deardorff, Darla K. (2008). "Intercultural competence: a definition, model and implication for education abroad." In: Savicki (2008), 32-52.
- Dehmel, Alexandra, Yi Li & Peter F. E. Sloane (2011). "Intercultural competence development in higher education study abroad programs: A good practice example." *Interculture Journal* 15: 11-36.
- Denscombe, Martyn (2014). *The good research guide: For small-scale research projects*. Fifth edition. Open UP study skills. Maidenhead, Berkshire: Open University Press.
- Dräger, Jörg, Volker Meyer-Guckel, Ekkehard Winter & Frank Ziegele (n.d.). "Mobilität in der Lehrerbildung – gewollt und nicht gekonnt?!: Eine Sonderpublikation aus dem Projekt >>Monitor Lehrerbildung<<". <https://www.telekom-stiftung.de/sites/default/files/mobilitaet.pdf> (accessed Jul 31, 2018).
- Dreyer, Wilfried & Ulrich Hößler (eds.) (2011). *Perspektiven interkultureller Kompetenz*. 1. Aufl. Göttingen: Vandenhoeck & Ruprecht.
- Edelmann, Doris & Rudolf Tippelt (2004). "Kompetenz – Kompetenzmessung: ein (kritischer) Überblick." *Durchblick* 3: 7-10.
- Ehrenreich, Susanne (2008). "Auslandsaufenthalte quer gedacht - aktuelle Trends und Forschungsaufgaben: Anmerkungen aus deutscher Warte." In: Ehrenreich, Woodman & Perrefort (2008), 29-38.
- Ehrenreich, Susanne, Gill Woodman & Marion Perrefort (ed.) (2008). *Auslandsaufenthalte in Schule und Studium: Bestandsaufnahmen aus Forschung und Praxis*. Münster: Waxmann.
- Eichhorn, Monika, Raluca Feroiu, Radu Marin & Julia Ollinger (2002). *Persönlicher und volkswirtschaftlicher Nutzen des ERP-Stipendiums. Befragung ehemaliger und aktueller Teilnehmer/innen des ERP-Stipendienprogrammes*. Trier: Universität Trier.
- Engle, Lilli & John Engle (2003). "Study abroad levels: Toward a classification of program types." *Frontiers: The Interdisciplinary Journal of Study Abroad* 9: 1-20.
- Erzberger, Christian (1998). *Zahlen und Wörter: Die Verbindung quantitativer und qualitativer Daten und Methoden im Forschungsprozeß*. Weinheim: Dt. Studien-Verl.
- European Commission (2006). *The history of European cooperation in education and training: Europe in the making - an example*. Luxembourg: Office for Official Publications of European Communities.
- European Union (2014). *Effects of mobility on the skills and employability of students and the internationalisation of higher education institutions*. Luxembourg: Publications Office of the European Union.
- Finger, Claudia & Nicolai Netz. "Neue Ungleichheiten im deutschen Hochschulsystem?: Internationale Studierendenmobilität zwischen 1991 und 2012." *WZBrief Bildung* 34. https://bibliothek.wzb.eu/wzbbrief-bildung/WZBriefBildung342016_finger_netz.pdf (accessed August 14, 2018).
- Fischer, Veronika (2009). "Interkulturelle Kompetenz: Ein neues Anforderungsprofil für die pädagogische Profession." In: Veronika Fischer (ed.). *Interkulturelle Kompetenz*:

- Flotzinger-Aigner, Silvia (2016). *Das pädagogische Auslandspraktikum als biographisch geprägte Lern- und Entwicklungsmöglichkeit. Eine gegenstandsbegründete Theorie zur Teilnahme von Lehrerinnen am bilateralen Fremdsprachenassistenzprogramm*. Wien: Universität Wien.
- Franklin, Kimberly (2010). “Long-Term Career Impact and Professional Applicability of the Study Abroad Experience.” *Frontiers: The Interdisciplinary Journal of Study Abroad* 19: 169-190.
- Freed, Barbara F (1998). “An Overview of Issues and Research in Language Learning in a Study Abroad Setting.” *The Interdisciplinary Journal of Study Abroad* 4 (2): 31-60.
- Friese, Heidrun & Peter Wagner (1999). “No All that is Solid Melts into Air: Modernity and Contingency.” In: *Featherstone, Mike & Scott Lash (eds.). Spaces of culture: City, nation, world, ed.. Theory, culture & society*, 101–15. London, Thousand Oaks, Calif: SAGE.
- Garbati, Jordana F. & Nathalie Rothschild (2016). “Lasting Impact of Study Abroad Experiences: A Collaborative Autoethnography.” *Forum Qualitative Research* 17 (2). <http://www.qualitative-research.net/index.php/fqs> (accessed Aug 22, 2018).
- Gemeinsame Wissenschaftskonferenz (2013). “Strategie der Wissenschaftsminister/innen von Bund und Ländern für die Internationalisierung der Hochschulen in Deutschland.” https://www.bmbf.de/files/aaaInternationalisierungsstrategie_GWK-Beschluss_12_04_13.pdf (accessed Aug 18, 2018).
- Gogolin, Ingrid & Marianne Krüger-Potratz (2010). *Einführung in die Interkulturelle Pädagogik*. Stuttgart: UTB GmbH.
- Gold, Andreas (2015). *Guter Unterricht: Was wir wirklich darüber wissen*. Göttingen, Bristol, CT: Vandenhoeck & Ruprecht.
- Hahn, Karola (2004). *Die Internationalisierung der deutschen Hochschulen: Kontext, Kernprozesse, Konzepte und Strategien*. Wiesbaden: VS Verlag für Sozialwissenschaften.
- Hammer, Mitchell R., Milton Bennett & Richard Wisemann (2003). “Measuring intercultural sensitivity: The intercultural development inventory.” *International Journal of Intercultural Relations* 27: 421-443.
- Haynes, Carolyn (2011). “Overcoming the Study Abroad Hype.” *Journal of the National Collegiate Honors Council* 305. <http://digitalcommons.unl.edu/nhcjournal/305> (accessed Aug 02, 2018).
- Helfferrich, Cornelia (2011). *Die Qualität qualitativer Daten: Manual für die Durchführung qualitativer Interviews*. Wiesbaden: VS Verlag für Sozialwissenschaften.
- Hochschulrektorenkonferenz (2012). “Bausteine für den internationalen Erfolg. Stand und Perspektiven der Internationalisierung deutscher Hochschulen.” https://www.hrk.de/fileadmin/redaktion/hrk-audit/Broschueren_und_Flyer/HRK_Bausteine_fuer_den_internatioanlen_Erfolg.pdf (accessed Aug 22, 2018).

- Hoff, Josepg G. 2008. "Growth and Transformation Outcomes in Intercultural Education." In: Savicki (2008).
- Holzbrecher, Alfred & Ulf Over (eds.) (2015). *Handbuch interkulturelle Schulentwicklung. Pädagogik*. Weinheim und Basel: Beltz.
- Hopkins, J. R. 1999. "Studying Abroad as a Form of Experiential Education." *Liberal Education* 85 (3): 36–41.
- Hu, Adelheid & Michael Byram (eds.) (2009). *Interkulturelle Kompetenz und fremdsprachliches Lernen: Modelle, Empirie, Evaluation = Intercultural competence and foreign language learning ; models, empiricism, assessment*. Tübingen: Gunter Narr Verlag.
- Huber, Josef (ed.) (2014). *Developing intercultural competence through education: Développer la compétence interculturelle par l'éducation*. Strasbourg: Council of Europe Publ.
- Hutchins, Marsha M. (1996). *International Education Study Tours Abroad Students' Professional Growth and Personal Development in Relation to International, Global and Intercultural Perspectives*. Ohio State University.
- Ingraham, Edward C. & Debra L. Peterson (2004). "Assessing the Impact of Study Abroad on Student Learning at Michigan State University." *Frontiers: The Interdisciplinary Journal of Study Abroad* 10: 83-100.
- Jalowiec, Anne (2003). "Te Jawlowiec Coping Scale." In: Dilorio, Colleen & Ora Strickland (eds.). *Measurement of nursing outcomes: Volume 3: Self care and coping*, 71–87. New York, NY: Springer Pub. Co.
- Jaritz, Gerit (2011). "Developing a Culture of (Inter)National Mobility in Initial Teacher Training: Expectations, Limitations and Ways Forward." In: Goetz, Thomas (ed.). *Pains and gains of international mobility in teacher education*, 7–24. Rotterdam: Sense Publ.
- Kauffmann, Norman L., Judith N. Martin, Henry D. Weaver & Judy Weaver (1996). *Students Abroad: Strangers at Home ; Education for a Global Society.s* Yarmouth, ME.: Intercultural Press.
- Kehm, Barbara M. (2005). "The Contribution of International Student Mobility to Human Development and Understanding." *US-China Education Review* 2 (1): 18-24.
- KMK (1996/2013). "Interkulturelle Bildung und Erziehung in der Schule." https://www.kmk.org/fileadmin/Dateien/pdf/Themen/Kultur/1996_10_25-Interkulturelle-Bildung.pdf (accessed Aug 9 2018).
- Knight, Jane (2012). "Student Mobility and Internationalization: Trends and Tribulations." *Research in Comparative and International Education* 7 (1): 20-33.
- La Brack, Bruce (1993). "The Missing Linkage: The Process of Integrating Orientation and Reentry." In: Paige, Michael R. *Education for the intercultural experience*, 241-280. Yarmouth, ME: Intercultural Press.
- Legutke, Michael, Andreas Müller-Hartmann & Marita Schocker-v. Dittfurth (2009). *Teaching English in the Primary School*. Stuttgart: Klett.

- Leutwyler, Bruno & S. Lottenbach (2009). "Normalitätsreflexionen – Das lehrerbildungsspezifische Potential von Mobilitätsprogrammen." *Journal für LehrerInnenbildung*, 9 (1), 66-74.
- Leutwyler, Bruno (2014). "Between Myths and Facts: The Contribution of Exchange Experiences to the Professional Development of Teachers." *Journal of Curriculum and Teaching* 3 (2): 106-17.
- Leuven Communiqué (2009). "The Bologna Process 2020-The European Higher Education Area in the New Decade." https://www.tsu.ge/data/file_db/xarisxis_martvis_dep/Leuvenn%2020-29%202009.pdf (accessed Aug 10 2018).
- Martin, Judith N. (1993). "The Intercultural Reentry of Student Sojourners: Recent Contributions to Theory, Research, and Training." In: Paige, Michael R. *Education for the intercultural experience*, 301–28. Yarmouth, ME: Intercultural Press.
- Meyer-Kalkus, Reinhart (1990). "Auslandsstudium in Europa. " *Dokumente* 6: 504–13.
- Middendorff, Elke, Beate Apolinarski, Karsten Becker, Philipp Bornkessel, Tasso Brandt, Sonja Heißenberg & Jonas Poskowsky (2017). *Die wirtschaftliche und soziale Lage der Studierenden in Deutschland 2016. 21. Sozialerhebung des Deutschen Studentenwerks*
– durchgeführt vom Deutschen Zentrum für Hochschul- und Wissenschaftsforschung. Berlin: Bundesministerium für Bildung und Forschung (BMBF).
- Ministerium für Kultus, Jugend und Sport (2018). "Verwaltungsvorschrift des Kultusministeriums über die Einstellung von Lehramtsbewerberinnen und Lehramtsbewerbern." <https://www.lehrer-online-bw.de/site/pbs-bw-new/get/documents/KULTUS.Dachmandant/KULTUS/lehrer-online-bw/Downloadliste%20EINSTELLUNG/VwV%20Lehrereinstellung%202018.pdf> (accessed Sep 18, 2018).
- Nash, Dennison (1976). "The Personal Consequences of a Year of Study Abroad." *The Journal of Higher Education* 47 (2): 191-203.
- Netz, Nicolai (2018). "Auslandsaufenthalte und Karriere.: Wer macht einen studienbezogenen Auslandsaufenthalt und welche Auswirkungen hat dies auf den Berufsweg?" *oead.news* 106: 22–23.
- Neumann, Ursula & Lutz Rainer Reuter (2004). "Interkulturelle Bildung in den Lehrplänen - neuere Entwicklungen." *Zeitschrift für Pädagogik* 50 (6): 803-817.
- Niehoff, Esther, Linn Petersdotter & Philipp Alexander Freund (2017). "International Sojourn Experience and Personality Development: Selection and Socialization Effects of Studying Abroad and the Big Five." *Personality and Individual Differences* 112: 55-61.
- Nothnagel, Steffi (2010). "Auslandssemester." In: Straub, Jürgen, Arne Weidemann & Steffi Nothnagel (eds.). *Wie lehrt man interkulturelle Kompetenz?: Theorien, Methoden und Praxis in der Hochschulausbildung. Ein Handbuch*, 433–61. Bielefeld: transcript Verlag.

- Paige, Michael R. (ed.) (1993). *Education for the Intercultural Experience*. Yarmouth, ME: Intercultural Press.
- Porsch, Raphaela & Sebastian Lüling (2017). "Reentry-Erfahrungen durch Lehramtsstudierende mit einer modernen Fremdsprache nach einem Auslandsaufenthalt." *Zeitschrift für Fremdsprachenforschung* 28 (2): 259-284.
- Rathje, Stefanie (2006). "Interkulturelle Kompetenz—Zustand und Zukunft eines umstrittenen Konzepts." *Zeitschrift für Interkulturellen Fremdsprachenunterricht* 11 (3).
- Rathje, Stefanie (2007). "Intercultural Competence: The Status and Future of a Controversial Concept." *Language and Intercultural Communication* 7 (4): 254-266.
- Risager, Karen (2007). *Language and Culture Pedagogy: From a National to a Transnational Paradigm*.
- Rotter, Carolin (2005). *Internationalisierung von Studiengängen: Typen – Praxis – Empirische Befunde*. Bochum: Ruhr-Universität Bochum.
- Rumbley, Laura E., & Philip G. Altbach (2016). "The Local and the Global in Higher Education Internationalization." In: Jones, Elspeth, Robert Coelen & Jos Beelen (eds.). *Global and local internationalization*, 7–13. Rotterdam: SensePublishers.
- Ryan, Marilyn E. & Renee S. Twibell (2000). "Concerns, values, stress, coping, health and educational outcomes of college students who studied abroad." *International Journal of Intercultural Relations* 24: 409–35.
- Savicki, Victor (ed.) (2008). *Developing intercultural competence and transformation: Theory, research, and application in international education*. Sterling, VA: Stylus Publ.
- Savicki, Victor, Eric Cooley & Rosemary Donnelly (2008). "Acculturative Stress, Appraisal, Coping, and Intercultural Adjustment." In: Savicki (2008), 173–91.
- Savicki, Victor, Frauke Binder & Lynne Heller (2008). "Contrasts and Changes in Potential and Actual Psychological Intercultural Adjustment." In: Savicki (2008), 111-127.
- Selby, Robert (2008). "Designing Transformation in International Education." In: Savicki (2008), 1–12.
- Smolcic, Elizabeth (2011). "Becoming a Culturally Responsive Teacher: Personal Transformation and Shifting Identities During an Immersion Experience Abroad". In: Johnson, K. & Golombek P. (eds.). *Research on Second Language Teacher Education*. New York: Routledge
- Steinberg, Michael (2007). "The Place of Outcomes Assessment in Higher Education Today and the Implications for Education Abroad." In: Bolen, Mell C. (ed.). *A guide to outcomes assessment in education abroad*, 7–22. Carlisle, PA: Forum on Education Abroad.
- Stewart, Yvonne (2008). "Mainstreaming the European Dimension into Teacher Education in England: enabling and disabling factors." TEPE 2nd Annual Conference: *Teacher Education in Europe: Mapping the Landscape and Looking to the Future*. University of Ljubljana, Slovenia, 21-23 February.

- Straub, Jürgen, Arne Weidemann & Steffi Nothnagel (eds.) (2010). *Wie lehrt man interkulturelle Kompetenz?: Theorien, Methoden und Praxis in der Hochschulausbildung. Ein Handbuch. Kultur und soziale Praxis*. Bielefeld: transcript Verlag.
- Straub, Jürgen, Arne Weidemann & Steffi Nothnagel (eds.) (2010). *Wie lehrt man interkulturelle Kompetenz?: Theorien, Methoden und Praxis in der Hochschulausbildung. Ein Handbuch. Kultur und soziale Praxis*. Bielefeld: transcript Verlag.
- Streitwieser, B., E. Le & V. Rust (2012). "Research on Study Abroad, Mobility, and Student Exchange in Comparative Education Scholarship." *Research in International and Comparative Education* 7(1), 1-4.
- Sutton, Richard C. & Donald L. Rubin (2004). "The GLOSSARI Project: Initial Findings from a System-Wide Research Initiative on Study Abroad Learning Outcomes." *Frontiers: The Interdisciplinary Journal of Study Abroad* 10: 65-82.
- Szkudlarek, Betina (2010). "Reentry—A review of the literature" *International Journal of Intercultural Relations* 34: 1-21.
- Teichler, Ulrich (1996). "Student Mobility in the Framework of ERASMUS: Findings of an Evaluation Study." *European Journal of Education* 31 (2): 153-179.
- Teichler, Ulrich (2015). "The impact of temporary study abroad." In: Mitchell, R., N. Tracy-Ventura & K. McManus (eds.). *Social interaction, identity and language learning during residence abroad*, 15-32.
- Teichler, Ulrich, Jean Gordon & Friedhelm Maiworm (2000). "SOCRATES 2000 Evaluation Study: Study for the European Commission." <http://ec.europa.eu/smart-regulation/evaluation/search/download.do?documentId=2729> (accessed Jul 31, 2018).
- Terhart, Ewald (2001). *Lehrerberuf und Lehrerbildung: Forschungsbefunde, Problemanalysen, Reformkonzepte*. Beltz-Pädagogik. Weinheim: Beltz.
- Terhart, Ewald (ed.) (2000). *Perspektiven der Lehrerbildung in Deutschland: Abschlussbericht der von der Kultusministerkonferenz eingesetzten Kommission*. Beltz-Pädagogik. Weinheim: Beltz.
- Udeani, Chibueze C (2015). "Interkulturelle Bildung: Unser Versuch die Grenzen des Verstehens zu weiten." In: Lechleitner, Ilse Born & Evelyne Glaser (eds.). *Interkulturelle Kompetenz: vermitteln, erwerben, anwenden: Teaching, acquiring and applying intercultural competence*, 7–18. Wien, Berlin: LIT.
- UNESCO (2001). "Universal Declaration on Cultural Diversity". http://portal.unesco.org/en/ev.php-URL_ID=13179&URL_DO=DO_TOPIC&URL_SECTION=201.html (accessed Aug 4)
- Vande Berg, Michael, Michael R. Paige & Kris H. Lou (eds.) (2012). *Student learning abroad: What our students are learning, what they're not, and what we can do about it*. Sterling, VA: Stylus Publishing.

- Vande Berg, Michael; Jeffrey Connor-Linton & Michael R. Paige (2009). "The Georgetown Consortium Project: Interventions for Student Learning Abroad." *Frontiers: The Interdisciplinary Journal of Study Abroad* 18: 1-75.
- Vereinigung der Bayerischen Wirtschaft (2017). *Bildung 2030 – veränderte Welt. Fragen an die Bildungspolitik: Gutachten*. Münster: Waxmann.
- Weaver, Gary R. (1993). "Understanding and Coping with Cross-Cultural Adjustment Stress." In: Paige, Michael R. (ed.). *Education for the intercultural experience*, 137–67. Yarmouth, ME: Intercultural Press.
- Weichbrodt, Michael (2014). *Ein Leben lang mobil?*. Münster: Verl.-Haus Monsenstein und Vannerdat.
- Wernisch, Diana (2017). "Diskrepanz zwischen Interesse und Realisation von Auslandsaufenthalten im Lehramtstudium." *ZEP: Zeitschrift für internationale Bildungsforschung und Entwicklungspädagogik* 40 (4): 8-12.
- Wernisch, Diana V. (2016). *Internationalization and Student Mobility in Teacher Education: Internationalization Models, Diffusion Barriers, and Recommendations for Policy and Higher Education Institutions*. Freiburg: Pädagogische Hochschule.
- Wilkinson, Sharon (1998). "Study Abroad from the Participants' Perspective: A Challenge to Common Beliefs." *Foreign Language Annals* 31 (1): 23-39.
- Woisch, Andreas & Janka Willige (2015). "Internationale Mobilität im Studium 2015: Ergebnisse der fünften Befragung deutscher Studierender zur studienbezogenen Auslandsmobilität." https://www.daad.de/medien/der-daad/analysen-studien/daad_dzhw_internationale_mobilit%C3%A4t_im_studium_2015.pdf (accessed Sep 18, 2018).
- Wolf-Almanasreh, Rosi (2006). "Diskriminierung in der Schule." In: Nicklas, Hans, Burckhard Müller & Hagen Kordes (eds.). *Interkulturell denken und handeln: Theoretische Grundlagen und gesellschaftliche Praxis*, 196–201. Frankfurt/Main: Campus-Verl.
- Wolff, Fabian (2017). *Interkulturelle Kompetenz durch Auslandsaufenthalte: Längsschnittanalyse der Wirkung dreimonatiger Auslandserfahrungen*. Wiesbaden: Springer Fachmedien.
- Woodman, Gill. 2008. "The Intercultural Project: Reflections." In: Ehrenreich, Woodman & Perrefort (2008), 139-152.
- Zemach-Bersin, Talya (2008). "American Students Abroad Can't Be 'Global Citizens'." *The Chronicle of Higher Education*, 07 March.

A Study the Problems of Learning and Teaching History, Historical Teacher Major in Faculty of Education, Savannakhet University in year 2016-2017

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Abstract

This research this time was the survey research that the purpose was a study of the A Study the Problems of Learning and Teaching History, Historical Teacher Major in Faculty of Education, Savannakhet University in year 2016-2017 and interview the history teacher and history students. The sample group there are 100 people, using simple random sampling and define the sample group of Krejcie and Mogan theory. The instrument of data collections were questionnaires that are divided into 3 parts: the questionnaire of 5 rating scale and interview. The statistics used in data analysis were percentage, mean, standard deviation and *ANOVA*

The results of the survey showed 6 major problems in learning and teaching history, namely 1) content, 2) history teacher, 3) history student, 4) material and instruction medias, 5) learning and teaching activity and 6) assessment, the overview of mean was 3.50 that is in the good level. The comparing all 6 major problems, the material and instruction medias and learning and teaching activity were different in statistic was 0.05

The results of interviewing the history teachers were some history in curriculum were same, some contents of subject were different to search, some information was not clear such as date/month/year, some subject there are more content but less credit, some subject there are not enough document. The history student side, mostly they don't understand the lesson some topics and cannot answer the lesson, lack of intention. The history teacher side, they are new teacher, do activity not various, create the inspire of students not enough, no have many instructional medias, just only explain, less searching knowledge, explain not clear, make lesson plan not good enough.

The result of interviewing the history students were the teacher has their knowledge and has many activities to teach, make in spire for students, friendly, give a good chance to student to answer the lesson, good character, and come to teach on time. In week point, the history subject is subject that has more content, some teacher has no enough knowledge, some documents still lack of some contents and some teacher only explain more than do activity, the students themselves, the good student they pay attention to study, note what teacher teach, review the old lesson, do homework, search and study more. In week point, they don't have enough time to study, confusing some documents that hat information not clear such as date/month/year, no have instructional medias, not enough classroom, environment not good. The week students, they don't pay attention to study, not read and review the old lesson, don't dear to answer the lesson, don't like to study more and play other things more such as with friend and smartphone.

Background

History subject is one of science that is important for other subject and searches the expansion of all human each period. The situation of history each period is worth, therefore, it's necessary for all people have to have knowledge about history because history is resource for people should know and understand the nature and scope of human. Besides, people use the situation of history in the past come to develop the life, society to the good future. If people make understanding the background of problem, it help people have the way to solve the problems or learn how to protect them then bring the situation of history in the past by mindfulness and wisdom come to make new worth experience for happiness in proceeding the life in the present and future.

Faculty of Education, Savannakhet University proceeded the teaching and learning in 2013 that has the objective to create teacher of nature science and teacher of social science for education work of 3 provinces: Savannakhet, Savannakhet, Khanmmouane and Bolikhamxay in Lao country Faculty of Education produce teacher to achieve according to 5 majors of education by emphasizing the knowledge of academic linking to the good teaching, pretty good in information technology, pay attention to English and follow to socialism, Emphasizing the mathematic teaching to be excellent and to be resource for historical research in local and Asia country.

Curriculum of history is opened in 2014-2015 under the Savannakhet University according to the agreement of president of Savannakhet University, No. 1204/SKU.16, issued 08.August.2016 and permitted by agreement of Ministry of Education and Sport that appoint the Faculty of Education, Savannakhet University, No. 3652/MoE, Vientiane Capital City, issued 02/August/ 2017. In order to strengthening Savannakhet University by following the curriculum of Teacher Training Department of Ministry of Education and Sport. The structure of history curriculum has 4 parts: general knowledge 20 credits, basic of specific subjects 45 credit, specific subject 91 credits, and elective subject 4 credits, the total is 160 credits. The credit of Ministry of Education and Sport curriculum can teach since grade 6 to 12 but some subject has complex contents, not clear, some subject is more contents, make student bored, not enough classroom, continually study that make students don't want to pay attention and be tired, history teacher still lack of experience, just only explain, and they are still younger teacher, not expert in teaching history, doing activity not various, lack of media instruction, lack of understanding and cannot make student interest history enough.

According to real teaching and learning in history major above the researcher is interested in studying the Problems of Learning and Teaching History, Historical Teacher Major in Faculty of Education, Savannakhet University in year 2016-2017 in order to developing the teacher's teaching and learning and students in history major.

Objective

- 1) For studying problems of students' learning history, history teacher major in Faculty of Education, Savannakhet University in year 2016-2017
- 2) For studying Problems of teachers' teaching History, History Teacher Major in Faculty of Education, Savannakhet University in year 2016-2017
- 3) For compare For studying Problems of teaching and Learning History, History Teacher Major in Faculty of Education, Savannakhet University in year 2016-2017

Benefits

1) Having knowledge and understanding students' learning history, history teacher major in Faculty of Education, Savannakhet University in year 2016-2017.

2) Having knowledge and understand teachers' teaching history, history teacher major in Faculty of Education, Savannakhet University in year 2016-2017.

3) Know the way how to solve the problem in learning-teaching history of teacher and student correctly.

Methodology

This research is survey research in order to study the problem of teaching the math in upper secondary school in Savannakhet and Khammuan province as follow:

1. Population and sample groups
2. Instrument
3. Data Collection
4. Analysis of data and statistic

1. Population and sample groups

Population and sample groups that have been used in this research are the teachers who teach in history subject and historical teacher students in first year, second year and third year. There are population 100 by determining according to Krejcie and Morgan and simple random sampling.

2. Instrument

The research instruments are interview, and questionnaires. The questionnaires there are 3 parts:

1. The basic information questionnaires
2. The problem of teachers' teaching questionnaires by using the rating scale of Likert
3. The general opening question

3. Data Collection

- Team of researcher ask for cooperation with student in 1st -3rd
- Explain them to understand then give them questionnaires amount 95 for ticking, after that take questionnaires back
- Interview the historical teacher students: 9 good students, 9 middle students and 9 weak students about learning and teaching history subject.
- Interview 5 history teachers that teach in Faculty of Education about learning and teaching history subject.

4. Analysis of data and statistic

Data analysis and statistic, the researcher team has brought the questionnaires putting in program for carrying on analyzing and doing as the tabulation of analysis results and explain them.

The statistic that use is percent, mean, descriptive statistic, and ANOVA.

Literature review

1) Meaning of history

History is one of science about history in the past, that mean history is to search and explain about the past of human society in each age. Besides, history is source of human experience that they try to create also by historian has searched, analyzed, define from evidences then use reason according to reality in order to next generation study and use this for living to develop society in present and future.

2) Values of historical significance

Historical sciences sector is a vital sector and search to growing all social human in time, therefore history is valuable and necessary for human beings need to know: This is because history is a source of experience valuable help us to know and understand the nature and extent of a human. It also uses experiences in the past to develop life and society to a better future.

3) significance of the history teaching method

Historical teaching methods are the teaching methods of other disciplines that are important because historical knowledge is needed for a person in society. In particular, students who are the forces of society in the future need to be knowledgeable and manipulate the right knowledge to contribute to the society. When it comes to the importance of history as a valuable source of experience that enables people to understand and see how it originated? What is the reason for that? History is one of the keys to addressing problems in society, including problems that arise with the problems that are going on and the problems that will arise next. Teaching history that is learning history logical future of the nation will not overshadow the fact the mission of teaching history is teaching the history of the history of the world who conducted must choose fen, analysts reason to be the reason for both the role of God and subjective, Therefore, the aim of the teaching of history is to teach people to have a self-concepting attitude, without accepting the consequences of other people's ideas that have a negative impact on the society and the people of the country.

4) Teaching “how to teach”

Those who teach history need to take into account the teaching methods that are different in other fields of science, for example in mathematics and physics, learners need to learn from difficult problems, to learn in order, from low to high, to skip, but teaching history is not so, it can not teach the students in all matters, or all history lessons must be chosen. The teaching is useful and will teach how effective teaching and teaching methods are, so teachers must know the basics of looking at the same issues with different perspectives by analyzing those perspectives, and for example, enabling them to grasp clearly the most important stage. The instructors need to know how to combine teaching methods. Be in good teaching. Determining how teaching is as important as content to teach, if the content of good teaching methods is minimal.

5) Content of teaching history methods

1. It is necessary to determine the contents of the course that are appropriate for the purposes of the course of the society and to be valid in a sense. In addition to the content that is intended for students in the curriculum, the content of history will also be required to study the history of the local community, different communities according to the proper and unique character of its unique identity.

2. There is a set of content that will teach each class to be rigorous and appropriate to the age of the student, meaning that the content will be adapted to age, level of recognition - the intellectual capacity and understanding of the students at each grade level, the content as this is because each student has intellectual ability, experience and different backgrounds. Some students have the ability to recognize problems quickly and easily, but some are slow to recognize. Therefore, the teaching method has a role to study in this area to consider the content of teaching to be thoroughly taught, not to be confused or too easy to integrate with the curriculum. At this stage, the amount of knowledge that the teacher must choose must be tailored to the age and class of students.

3. Research shows an effective way to teach each type of grammar and set out an intricate teaching plan of history. It means that the content of the teaching methods indicates the teaching methods of each kind, because the nature of each history is different. Therefore, teachers need to work out a way to deliver knowledge and to combine teaching methods that are tailored to each subject, each class ensures the expansion of students' thinking, selecting this approach affects the analytical, selective, logical, historic, and profound benefit of learning the wisdom.

4. Identifying historical content that is associated with other fields of science in the curriculum means that the content of the teaching must be combined and lead to a realistic concept. In addition, it is the development of learning that allows students to have a basic knowledge that leads to understanding the content of other disciplines, which are relevant and necessary to explain the history of history.

6) Features and preparation for a historic teacher

1.1 Characteristics of Historical Teachers

Historical teaching has a great influence on the education and conceptual development of the learners because historians have the responsibility to bring knowledge, experiences, and deeds of humanity in the past, to the people in the present and future generations. Therefore, the missionary must have the right qualities, not that anyone can teach. Some historians may have a sizable degree of research, some may have some teaching skills, but some are less skilled in both, and those who have a good history of teaching must have the following properties:

- Must be disciplined, honest, trustworthy and reasonably prudent.
- Must be someone who understands the significance and purpose of historical history.
 - Must always have modernized self-improvement.
 - Must be well-known people as good instructors and good researchers for the benefit of preparing concepts and teaching lessons that are interesting and easy to learn.
 - Must be virtuous, fair and impartial in teaching

The precepts of teaching, which are often found in the teaching, include social biases, especially in race and culture, both in terms of popularity and hatred, and the teaching of ordinary people, as well as ordinary people, who are born with love, greed, anger, or bias in any way. So, the problem is that the teacher will have to minimize the bias. The proposals for bias in historical studies are as follows:

- Study the causes of war without stressing the causes of war. So that humans will try to avoid less conflict in the future.
- Teaching history must admit to the students' comments and arguments, even if they are mistaken or misinformed, and try to use the reasons supported by the information that correct the misunderstandings of the student.
- If a high-level instructor should have specialized knowledge of the branch sufficiently to understand the relevant bibliography and references in order to be able to identify the various issues in history and can encourage students to study on their own.
- Teach cooperation with other instructors on opportunities to share knowledge and experience in the same group of professors, both in institutions and outside the institutions, as well as opportunities to attend academic seminars.

2.4 Relevant research

In this research, researchers reporting the research findings related to the study of the problem of students with the following issues are:

Paul Kramchan Ching (2001) Problem of organizing teaching history of Thai history at secondary level Early education, Bangkok, from the research findings found that 1). In the course of managing the history of Thai teaching, teachers in social studies have practiced in the fields of curriculum, teaching, teaching, teaching, teaching, measuring, and teaching performance, and less practice in the use of teaching materials and learning resources at the local level. 2). The study results show that teachers in social studies have a lot of problems in the use of curricula for teaching, organizing activities, using teaching materials, learning resources, and local learning resources. The measurement and performance of teaching is less problematic.

From the results of research, researchers found that students' opinions on the situation and the problems in organizing classroom teaching found that most educators found that the situation in the classroom was at the highest level of practice at the time of the study. It is found that in the aspect of teaching and teaching techniques, measurement and evaluation techniques and teaching materials are practiced at the most cost-effective level, consistent with the comments on the problem of organizational learning, which shows that all aspects of the problem are at the smallest level.

Result

❖ Problem of learning-teaching

Table 1 Contents of history

Contents of history		Most	More	Middle	Little	Least	M	S.D	Opinion
1	History subject is interesting	28	37	30	0	2	3.89	0.88	More
2	Contents of history accord with subject	16	44	31	2	2	3.73	0.84	More
3	Contents of history is interesting	33	33	26	0	3	3.97	0.95	More
4	History subject there is contents that is easy to understand	5	32	46	8	4	3.27	0.85	Middle
5	History subject creates the wide vision	20	39	31	2	3	3.74	0.92	More
6	Students enjoy studying History subject	9	33	43	5	5	3.37	0.92	Middle
total							3.66	0.86	More

From the table 1 has showed 6 indicators, all mean is 3.66. if consider the problem from more to least, have seen that history subject there is contents that is difficult to understand, mean is 3.27, next students still enjoy studying History subject little, mean is 3.37 that is in middle and Contents of history still has accordance with subject, mean is 3.73 respectively.

Table 2 History teacher

History teacher		Most	More	Middle	Little	Least	Mean	S.D	Opinion
1	Teacher has knowledge about history	25	41	23	4	2	3.87	0.92	More
2	Teacher determines the compact topic and accord with the topic	11	41	37	6	0	3.60	0.77	More
3	Teacher create the inspire for students as teaching	11	31	43	9	1	3.44	0.85	Middle
4	Teaching teaches by taking student center	17	37	37	2	2	3.68	0.86	More
5	Teacher explains the lesson fluently and understandingly	17	38	29	11	0	3.64	0.90	More
6	Teacher can defines the words in history	13	27	46	6	3	3.43	0.91	Middle
7	Teacher speaks and dress politely	35	36	20	4	0	4.07	0.86	More
8	Teacher give students chance to the opinion	31	28	30	5	1	3.87	0.97	More
9	Teacher cultivates consciousness for students	17	33	34	5	6	3.52	1.05	More
total							3.68	0.70	More

From the table 2 has showed 9 indicators, all mean 3.68. if consider the problem from more to least, have seen that teacher cannot defines the words in history good enough, mean is 3.43, next teacher still create the inspire not enough for students as teaching, mean is 3.44, and Teacher cultivates consciousness not enough for students, mean is 3.52 respectively.

Table 3 History student

History student		Most	More	Middle	Little	Least	Mean	S.D	Opinion
1	Students know and understand about history	7	35	48	3	2	3.44	0.76	Middle
2	Students understand the custom, culture in area and other area	14	39	34	6	2	3.60	0.89	More
3	Students know and understand about changing of each age	12	36	38	7	2	3.51	0.88	More
4	Students can remember and understand content of history	4	29	52	10	0	3.28	0.70	Middle
5	Students know and understand each situation in the past and present	10	34	40	9	2	3.43	0.88	Middle
6	Student has good behavior to study	7	32	47	6	3	3.35	0.83	Middle
7	Students know the source of predecessor and others	20	34	28	9	4	3.60	1.05	More
8	Students can apply in their daily life	8	35	41	10	1	3.41	0.83	Middle
9	Students become good citizen and decide intelligently	8	43	34	7	3	3.48	0.87	Middle
Total							3.45	0.62	Middle

From table 3 has showed 9 indicators, all mean is 3.45. if consider the problem from more to least, have seen that Students cannot remember and understand content of history good enough, mean is 3.28, next Student has good behavior to study not good enough, mean is 3.35 and Students know and understand each situation in the past and present not good enough, mean is 3.43 respectively.

Table 4 Instruction media

instruction media		Most	More	Middle	Little	Least	Mean	S.D	Opinion
1	Material and instruction media are comfortable to use	6	32	50	7	0	3.38	0.71	Middle
2	Document for learning-teaching there is enough information	8	30	47	9	1	3.36	0.81	Middle
3	There are pictures, map, video, voice and memorial chart of history learning-teaching accord with content of history	19	36	32	8	0	3.69	0.88	More
4	There is Internet for searching information	9	26	39	19	2	3.22	0.94	Middle
5	There is always improving instruction media	5	37	41	12	0	3.36	0.77	Middle
6	Library has various information that demand	13	17	33	22	10	3.01	1.18	Middle
Total							3.34	0.63	Middle

From table 4 has showed 6 indicators, all mean is 3.34, if consider the problem from more to least, have seen that library has no various information that demand, mean is 3.01, next there is no Internet for searching information, mean is 3.22, and document for learning-teaching there is no enough information, mean is 3.36 respectively.

Table 5 activity

Activity		Most	More	Middle	Little	Least	Mean	S.D	Opinion
1	Doing activity ask and answer individually	19	36	34	6	0	3.71	0.85	More
2	There is group activity	19	34	35	7	0	3.68	0.87	More
3	There is going to education tour that relate to history subject	14	13	37	17	14	2.95	1.22	Middle
4	There is training some history subject	8	19	44	13	17	3.00	1.07	Middle
5	There is testing the memory by playing game	5	24	40	16	10	2.97	1.03	Middle
6	There is fun and happiness in learning-teaching	10	25	45	8	4	3.33	0.92	Middle
Total							3.27	0.69	Middle

From table 5 has showed 6 indicators, all mean is 3.27, if consider the problem from more to least, have seen that there is going to education tour that relate to history subject not enough, mean is 2.95, next There is testing the memory by playing game not enough, mean is 2.97 and There is training some history subject, mean is 3.00 respectively.

Table 6 Assessment

Assessment		Most	More	Middle	Little	Least	Mean	S.D	Opinion
1	There is suggestion for students know score criteria	29	33	26	7	0	3.88	0.93	More
2	There is inform for students know before giving examination every time	29	40	21	4	1	3.96	0.89	More
3	There is suggestion the detail of taking examination	26	34	30	3	2	3.83	0.94	More
4	There is criterion clearly	24	29	35	6	1	3.72	0.95	More
5	There is using various assessment	3	34	40	18	0	3.23	0.79	Middle
6	There is assessment before and after learning	8	32	39	16	0	3.33	0.85	Middle
7	There is assessment at the end of after teaching	5	23	46	16	2	3.13	0.83	Middle
8	The examination there is accordance with content of subject	18	45	27	5	0	3.80	0.80	More
Total							3.61	0.65	More

From table 6 has showed 8 indicators, all mean is 3.61, if consider the problem from more to least, have seen that there is assessment at the end of after teaching not enough, mean

is 3.13, next there is using various assessment not enough, mean is 3.23, and there is assessment before and after learning not enough, mean is 3.33 respectively.

The problem of teaching mathematics in upper secondary school on 8 main points that was ranked from more problems to less problem as:

Sequence of opinion

No	Content	N	Mean	S.D	Sequence of opinion
1	Content of history subject	95	3.66	0.68	more
2	History teacher	95	3.68	0.70	more
3	History student	95	3.45	0.62	middle
4	Instruction media	95	3.34	0.63	middle
5	activity	95	3.27	0.69	middle
6	Assessment	95	3.61	0.65	more
Total		95	3.50	0.55	more

From the table above showed the problem of learning-teaching, there are 6 main problems, the overall mean is more 3.50. If considering the sequence of problem more to less: the activity has mean 3.27, the instruction media has mean 3.34 and the history student has mean 3.45 respectively.

Comparing all 6 main problems

٢/٣	Content	year	N	Mean	S.D	F	Sig.	Difference
1	Content of history subject	1	25	3.58	0.86	0.32	0.72	Not different
		2	33	3.66	0.71			
		3	37	3.72	0.51			
		Total	95	3.66	0.68			
2	History teacher	1	25	3.684	0.83	0.01	0.98	Not different
		2	33	3.66	0.73			
		3	37	3.69	0.60			
		Total	95	3.68	0.70			
3	History student	1	25	3.48	0.87	0.19	0.82	Not different
		2	33	3.49	0.61			
		3	37	3.40	0.42			
		Total	95	3.45	0.62			
4	Instruction media	1	25	3.51	0.71	3.08	0.05	different
		2	33	3.42	0.56			
		3	37	3.14	0.60			

		Total	95	3.34	0.63			
5	activity	1	25	3.00	0.64	3.19	0.04	different
		2	33	3.44	0.68			
		3	37	3.31	0.68			
		Total	95	3.27	0.69			
6	Assessment	1	25	3.51	0.76	1.32	0.27	Not different
		2	33	3.54	0.70			
		3	37	3.75	0.50			
		Total	95	3.61	0.65			

Compare the problem that separate the according to each semester all 6 main problems as below:

1. Content of history subject, 2. History teacher, 3. History student, 4. Instruction media, 5. activity, 6. Assessment, can see that content of history subject, history teacher, history student, assessment are not different but Instruction media, activity are different.

1) Result of interviewing the student about learning history

From interviewing 9 good students, 9 middle good students and 9 poor students, summarize as follow:

❖ Good point

History teachers mostly they have knowledge about history, teach in group, model, ask question and student find the answer, use instruction media, give them inspire by giving points, come to teach on time, friendly, good personality, give students chance to be participatory, admonish student and give example to remind the students.

❖ Weak points

History teachers come to teach late sometime over 15 minutes, they don't remember and understand some contents because history has more content, some documents are not enough, they don't emphasize the poor students, cannot control the classroom, and they less give them chance and teach just explain only.

❖ Suggestion

Students want teacher to specifically emphasize the student who doesn't dear to answer the question, want one teacher per one subject in order to remember knowledge strongly then not forget, want more teacher, improve explaining knowledge clearly and explain slowly, use many questions, review and summarize the lesson. Students want to have map, video, and scenario in each era and library about history more, and want teacher train political concept for students more and more.

❖ Good point

Students pay attention to listen and take note the explanations of teacher, review the old lesson after school, do homework, read lesson in the morning and before class, review the old lesson before examination, search more information about history from book and internet.

❖ Problem of students

Mostly, students don't have time to review the old lesson, be tired because study continually. Teachers don't brief the lesson. There are more over content, not like to search more information, some information in document is not same such as date/month/year, there are not sources of information about history and instruction medias, not enough classroom,

environment is not good, not pay attention, not read the lesson before examination, not dear to answer and when teacher ask because cannot define the lesson, play smartphone and friends more.

2) Result of interview from history teacher

From interviewing 5 history teachers, summarize as follow:

❖ Curriculum

In the curriculum, there are same topics, some topics there are not information and difficult to find also. Some information is not clear such as date/month/year of history. Some subject there are more content but credit is less and some subjects are not enough document

❖ Problem of student

Some students mostly don't understand the content, cannot answer and define the lesson, lack of being active and paying attention, be absent studying, not do homework by themselves, they are tired and hungry because they continue to study at noon. There are some don't like to study in history major, students those who are not good studying mostly come from rural area.

❖ Weak point of teacher

History teachers hardly never give students real practice, doing activity not various, just explain the lesson only, give inspire for students not enough, less instruction media, cannot remember the lesson well because new teacher and new lesson, some questions teachers cannot answer for students, one teacher has many responsible works, search the lesson late before class, and explain lesson not clear.

Discussion

From studying the problem of learning and teaching history, historical teacher major in Faculty of Education, Savannakhet University in academic year 2016-2017, there are some points to discuss as follow:

The problem of learning and teaching history, history major, mostly is in the middle, the sequence of problem more to less: activity, instruction media, history student, assessment, content of history subject, and history teacher respectively. In the activity point, it still has problem because it's according to interviewing from history teacher, the history teachers do not do various activities, just explain the lesson only. In the instruction media point, it still has problem because it's according to interviewing from history teacher and history students that in learning-teaching there are less instrument media, they want to have map, video, and scenario in each era and library about history more. In history students point, it still has problem because it's according to interviewing from history students and history teacher that some students mostly don't understand the content, cannot answer and define some words in the lesson, lack of being active and paying attention, be absent studying, not do homework by themselves, they are tired and hungry because they continue to study at noon, there are some students don't like to study in history major, students those who are not good studying mostly come from rural area.

Comparing all 6 main problem: content of history subject, history teacher, history student, instruction media, activity, assessment, can see that content of history subject, history teacher, history student, assessment are not different but Instruction media, activity are different, it's according to interviewing from history teacher and history students that in learning-teaching there are less instrument media, they want to have map, video, and scenario in each era and library about history more and it's according to interviewing from history teacher, the history teachers do not do various activities, just explain the lesson only.

Suggestion from result

- The teachers are firmly in history teaching, more paying attention to teaching the more.

- The students should be focused on the value of history and the concept of the firm's attention to the red light more.
- The instrument media should be diverse, such as pictures, video, location and source of learning in real doing to achieve the new experiences.
- In activities for teaching history has to have diversity such as theater, dance, explain, debate and so on that has meaningful history.

Suggestion from research

- Research on the development of history should be deep in a unique historical course research, such as American History, History of International Relations, History of Southeast Asia I & II, Chinese History, Japanese History, Russian History, Modern European History, Modern-Day History, Africa History, Ancient History, Ancient Elephants, Modern Independence for Siam, It is the capital of Laos, the modern history of Laos, the history of race, history, ancient history and the history of early civilization.
- it is important to study specific problem that affects to teaching history for clear meaning in history.
- It is important to compare the situation and problems of students with other major that is different from the history teachers in University of Savannakhet.

Reference

- Ministry of Education and Sport, Secondary Curriculum grade 6-12 (2013). History Teacher, Teacher Department.
- Souksomephone Anothay (2015). A study the problem of teaching Mathematics of secondary school, academic year 2015-2016.
- Salernsack Phaboutdy (2001). History methodology for History in Bachelor degree. Curriculum and Methodology of Faculty of Education, Lao National University.
- Somyot Chato (2555). A study of the problem of Citizenship learning-teaching management. Rajavinit School, Thailand.
- Phonkamon Jansy (2543). Problem of Thai history learning-teaching, lower secondary school, Thailand.
- Houkan Jaivongya (2014). A study of 301 statistic learning-teaching. Faculty of Science. Maejo University, Thailand.
- Phimphone Fonglum (2554). Problem of general Mathematics learning-teaching management. Faculty of General Management, Sipathoum University.
- Nuttha Savaviboun (2011). A study the problem of learning design subject, design major, Faculty of Architecture, Sipathoum University. Thailand.
- Sitharn Soukhavong (2000). A study of the problem in learning and teaching mathematics, primary school, grade 5, Vientiane Capital City. Laos.
- Thamsouk Noumnon (2545). Searching history evidence in Thailand, Aksonejalernthut, Bangkok.
- Collingwood, Robin George (1956). The Idea of History. London: Oxford University Press.
- Cohen, L., and Manion, L. 1989. Research method in education. 3rd. Ed. London: Routledge.

Comparison English Teaching Methods between Laos and Germany

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Abstract

The current study compares L2 English teaching methods and classroom interaction processes between Laos and Germany to determine areas for improvement in the Laos L2 English classroom. To this aim, three student teachers (under the supervision of a university English professor and a professional English teacher) were observed over a 14 week period in their classroom interactions with 22 second grade primary school pupils. The evaluated data is based on: observation, teacher interviews, and the personal reflections of the author related to his own teaching experience. Basic differences in approach were found between the two cultures. While teaching methodology in Laos primarily focuses on written translation with little speaking, German approaches emphasize oral communication providing creative situations for the pupils to speak and interact with each other in English. The results provide both theoretical insight and practical advice for L2 English teachers in Laos.

Keywords : Comparison, Teaching, Methods

Introduction

Teaching English Method is the notion of a systematic set of teaching practice based on a particular theory of language and language learning. (Richards & Rodgers 2001, 1). And Teaching style is the specific and unique way a teacher plans and instructs a lesson (cf. Heydarnejad 2017, 26). In September 2017, Lao leaders in education visited universities in Germany. Main objectives of visiting to improve Lao teaching Method from theoretical teaching to practical teaching as the teaching method in Germany does as students oriented, sophisticated didactic equipment and students have more confidence of learning and learning method is affected. The integration into the ASEAN, Lao younger generation needs good educational, knowhow training and a university education with sufficient English skills. these will need to be able to communicate in the international language as English to cooperate with new foreign partners in the Western world. (cf. Assoc. Prof. Vixay Vankham n.p.). Pedagogies universities in Germany intervene in general education to strengthen science. As Teaching Methods, interaction in classroom between a teacher and students, The currently research in English teaching methods between Laos and Germany to determine the areas for improvement in Lao English classroom. This research is therefore important to add in the teaching English in Laos and to upgrade the ways of teaching English by the teachers. Even though this research focuses on the comparison teaching methods, it is not only compared teaching methods, and it is also as a part of teaching English in Asia. In this study, we will first compare the good teaching methods from the class observation which can be adapted for the teaching English in

Laos and then identify teaching for adjustment needed, especially for Lao students' English background knowledge context.

Methodology

The teaching English in Grade 2 at Muggenstrum primary school in Karlsruhe. There are three major teachers who teach English for students grade 2, The researcher was interested in teaching English. Prof Dr. Isabel Martin, she has helped to contacted school authorities via an email, on the phone and in person. The school authorities will be informed of purposes of the observation.

There are 22 students in the observation class, and three teachers who teach English for students grade 2 will be observed, four observers for monitoring the teaching English, including two Lao teachers. The observation is purposive sampling (Phayao, 2011).

The data will be collected from April to August, 2019. The researcher was interested in teaching English. Prof Dr. Isabel Martin, she has helped to contacted school authorities via an email, on the phone and in person. The school authorities will be informed of purposes of the observation. The teaching English in Grade 2 at Muggenstrum primary school in Karlsruhe. There are three major teachers who teach English for students grade 2, Three of them will be informed by emails and StuIP programs that is used in Karlsruhe University of Education. It perfectly modernizes IT program. All staff teachers and students will be known as major academic communication. Then will be obtain the approval of the school authorities, the researchers administered the observation in person and also helping from Prof Dr. Isabel Martin in class observing of teaching. Especially, it will be observed in timely teaching English, during the observation of teaching English to students grade 2, the researchers will comply with the following phases:

1. Will be informed the participants in Muggenstrum Primay school that the observation will put in research-used only.
2. Telling the participants the purposes of the observations will understand how teachers prepare for English class, and how they teach English.
3. Will introduce the content of the observations. Telling them that there are eight phases of the observations as teacher's behavior & non-verbal communication, use of media & materials, teacher's language & language input, timing, lesson goals & structure, student's behavior, intercultural aspect, social forms & methods, and reflections.
4. Will group for the reflection after teaching. Especially, the researcher reminds them that there is teaching for the next day or week.
5. All the information will be taking notes by the researcher. If some pictures are needed, the researcher will inform the participants for permission. Especially, Principal of school is allowed. Then the data will be collected, all data will be noted in the notes book and typing into Word files in computer (Chih-Sheng Chen 2005, 71)

The data will be analyzed in the qualitative interpretation, there are eight phases of the observations as teacher's behavior & non-verbal communication, use of media & materials, teacher's language & language input, timing, lesson goals & structure, student's behavior,

intercultural aspect, social forms & methods, and reflections. The observation was confirmed by washback methodological triangulation. (Liyong Cheng et al. 2004, 35;120). There will be grouped the terms, calculate frequencies, (Liyong Cheng et al. 2004, 134) explanation of the logical teaching process, description of teaching phases, and triangle will be used in this research, and it also use the interpretative results of observation teaching (Liyong Cheng et al. 2004, 139)

Results

In this observation, researchers observed the teaching English in classroom of primary school in Germany, the phases of the observation are to log down the ways of teachers teach students in the teaching times since class initiates until completion, and group reflection by professionally teaching, there has major themes appeared as centering how much the teacher can do the preparation for the classes. And the observation of those will be compared to the researchers have some experiences teaching in Laos. The findings of the observation mainly teaching methods. The results were collected by Thaithanawanh Keokaisone. Napha Khotphouthone is an assistant. Weekly transportation, it mainly encouraged and supported by Professor Doctor. Isabel Martin. All sets of data were analyzed by Triangles meaning, explanation, and comparison teaching methods that researchers have done in previously teaching in their classes. These collections were used the cards that mentioned the teaching details, classroom reflections and interviewing teachers.

There are 3 teachers of English teach students in a class. How did teachers teach? The observation for teaching of teachers so connection all the phases perfectly completed in the professional job which initially introduced the phases that begin of the class was really designed for the classroom arrangement, there uses the classroom as the place decorated by the difference colors, it makes the fresh classroom environment. The teaching materials also ready to start. The pictures were also posted the on the board, and then it perfectly closed the hand boards. It seemed to be surprised and coverage the boring the old lesson that students had learned before that, it was not that reason, otherwise teachers announced the students what inside of the board were, they are the pictures of the colors of eggs. These phases, teachers initiated the lesson by asking the students what they could see by the colors of egg. It reminded students for connecting the new words as the Easter eggs and how to connect the preposition words as “ in, on, next to, in front of, behind and under. It created a picture to connect to other picture very well. As the Easter eggs connect the new word as Easter basket, the teachers and students concentrated as well controlling class naturally, In personally, It looked so great, Teachers help students all step that they plan to do in the lesson, there are plan for activities, times, goal to achieve for the class. I was interested in the practicing step that teachers have planned before class starting. They divided students into the groups for completely practice. They were sure that students could understand how to do that due to teachers escorted their students during moving to new room for practical the words they have learned, there are some phases that teachers did in details as following below;

There are 6 major issued for the practicing as firstly handing out the mini-book with pictures of the Easter basket, it was amazing drawing for the students, what they should do there is to draw the eggs by following the preposition that teacher announced to draw as The Easter egg is in the the Easter basket, but teacher just say ‘egg in the Easter basket’, and repeat In two time for each preposition, all students could completely draw the pictures where the Easter is, This phase telling us the completely connection, then teachers and students moved to the new room for

practice as real situation as when are arriving room, teacher will allowed students to do as freely, teacher have to ask the students for sure they really understand it, then teacher asked the students to repeat the word again, then hand out the worksheet that they have drawn, after that teacher allowed the students go to get the preparing of the Easter basket for each preposition word. Moreover, the students must telling the teacher what they taking and saying together in the end of the activity, this observation can be missing some the step that teacher doing very well. However the observation believe that the way of teaching by the picturing to be better than writing. This also new creation for my opinion, due to see the pictures remember all and writing all forget all, it just my experience have learned about writing that I have writing lots in English, but remember least. This teaching by the picture should be prepare and helping us open the eyes to see how the thing big or small, new or old, fast or slow, then I imagine that my professional job as challenging for facing the crucial period of teaching so many years that happening with our children, but some realized that teachers should be good preparation for the lesson plan and noticed the students do not work well, some teachers have good plan but it is not really well in practical.

The preparations of teaching L1 and L2 as the same time are not easy to deal with, how the teacher does in this classroom to teach students with her own class management. Using the mediation as pictures of realistically daily lives by introducing the pictures in L1 as the teacher shows the number of houses, students have their own numbers of the houses, then teacher asks the questions for the students as “ Do you have the number of your house? Yes, of course, students have the house number due to pictures related to their daily lives. There on the board also indicated the national flag (German) as representative what language they have learned before start the lesson. The starting of L2 as an English language, there was the national flag of England. It appeared on the board by pinning on it, then initially use the pictures that having animals around home as dogs, cats, cows, roosters, asking the questions what the students can see. And teachers pretend to say as presentation the lessons in the class. For instance the teacher said that “I can see a cow, two cows, three cows and four cows etc.” Then telling the behaviors of the animals, as they can jump, while saying the names of animals, all students in the classroom, they ready to jump, for instance, while saying a cat, all of them jumping and doing it so on. The things need to focus on is the teacher controlling the activities, while doing these, the teacher pretends to doing this first, then students will be followed as saying intonation sound in one word, how are saying while you are tired, angry, and scared. For example; a cat, a cow, a dog, a rooster, a pig and a sheep(saying quick, slow and slower). The materials also are showed on the board as the pictures of home and the pets are around the house where they live. All of these pictures are glued on the board, the teacher uses the question techniques to asking the students. What is it on the picture map? Of course, the question expects the answers. All students are very active to answer this question, almost half of the number of the class raising the hands to share the ideas. The reasons why they really like this lesson, it relates to their daily routines. There are a few students answer the question, they said they have these pets at home, they have learned and they have their own pets at home, and they know the names of animals. After answering the questions, teacher uses the questions as checking their comprehension as “ Do you have some questions? The students keep quiet, that means they all understand what they did. The students were verified how they understand that lesson they have practiced during the introduction. Teacher uses the technique to calling the names of students, then asking and pointing on the pictures, what is this? If the sounds are not clear while saying the names of

animals. Students will say out lowly and clearly. Then teacher checking how students remember the names of animals or not, Teacher just asking students to close the eyes, while they do that, teacher removes one the picture of animals. After that, teacher asking to open their eyes, what is the animal missing? Or what animal is not on the board. What animal you can not see? Doing these activities until students remember all of the names of animal are called in English. The incidents happening while practicing as “ closing and opening eyes” a few students are called the names and they still not sure what to pronounce the names of animal. This time, teacher uses the students orientated by helping each other, they can quickly say the word correctly than following the teacher. The materials using in this class, teacher find out from the books, and adding some pictures which are necessary for the class. The pictures that teacher uses in the class this time is drawn in the books or special one for the living style and culture. This time, students look at the pictures and asking the question what they can see and saying out loudly in their German language. They can explain what kinds of animal they have at home, during this time, they can show what they know and don't know the animals. Then will be turned to the English language and the German flag is also turned to the flag of English. The classroom language as instruction or the word using in the classroom was taught, due to students can follow the instruction quickly, they do the activities in class quickly and It can save the time. The dancing is enjoyment activity, these steps, how to do this, the teacher modeling first before starting this activity, it is called “ dancing with pictures” Teacher preparing the music and handing out the pictures, and asking the students in generally, what animals did we study and all students can answer the question. They can repeat the names of animals, then teacher checking the students hands and see them holding the paper with pictures on, then asking students to stand up and come in front of the classroom and teacher start playing the music and they dance when the music stopped they show the pictures and telling the partner what pictures of animal they have in the hands and saying out loudly. It is really enjoy activity. The students opportunities to talking to their partner what they have learned from teacher, this activity is great connection between teacher, time and students are completely, after ending of the activity, all students still enjoy with their activity, then all student go back and seats, they still holding the pictures, all students were asked; “What can you see on your paper, students say out loudly with single noun then plural noun. For example, I can see a cat and I can see two cats. Then showing the picture again, what can you see on the pictures by saying the single and plural numbers and the pictures were pointed by teacher. Teacher corrected the mistakes by the lesson plan. This observation summarizes as three major trips as the first, Teacher always standing in front of class balance controlling class. Secondly, planning the activity smoothly connection. Finally, it can develop new words if the time remaining.

The board was glued the picture of the sun in different colors as indicating the morning, day time, and night. The class was prepared and seats were arranged as the group learning as the half circle, the students(ss) faced to the teacher. The picture chart of animals also glued on the central of the board. The worksheets have been arranged in sequence each activity. The class was started by the students sang the morning song, the end of singing the song, students were asked to sit on the arrange seats, the teacher showed chart of animals, then teacher questioned them. “what do you see?” the teacher said “ I can see a dog.” And “ I can see two dogs”. The teacher stood in the position of right hand side. The teacher started saying first, then students repeated after the teacher. Next, the teacher showed the new pictures of animals. These pictures to observe the action of animals such as sleep, wake up, run, swim, jump..., then Ss looked at

the pictures and said the cat voiced, the teacher modeled the sounds. Then teacher selected one dog to explain the action by using the sleep, wake up, run, swim, jump..., Teacher showed the action of saying run teacher (ran, danced...). The ss understood how to do, they were asked to bring the chair back the normal seat, however, the ss were not allowed to sit, they were standing at the back of the chair to show up the action by facing the pictures in front of the class. All of them practiced saying as the angry sounds, happy and tired. The more practical, the ss said and did the action as “jump”, they jumped and so on. The ss must said the words correctly, the teacher asked the students to repeat the words until they said correctly. The teacher checked the students understanding by saying the opposite with doing action. Then teacher glued the pictures on the board, teacher pointed to the picture of one cow and two cows, and saying “one cow runs and two cows run” after that, the ss repeated after the teacher, the ss were explained the different single and plural used, the ss explained in German and teacher encouraged them. During the explanation, the English flag were swept to German flag, after completely explanation the usages, the teacher turned to the English flag, the students spoke in English, the ss were asked, “ what do you see in the pictures?” the ss saw the animals and did the action what the animals did as jump, run, sleep etc. Teacher asked the ss to say it loudly and clearly. The ss were called the names and said the following the pictures. And whole class also did, the teacher only pointed the pictures, the ss said each picture correctly, teacher called a student’s name to say the word with animals’ action and whole repeated after him. This time, the ss understand how to do with the task, the ss worked in pairs, the pictures of animals were outside of the cage. The students asked and said correctly then took animals into the cage. The teacher put the pictures on the board for modeling as the singular and plural nouns were said and took it correctly to the cage. The ss were observed the models. This final activity did smoothly in the class and the materials were collected back and keep it properly. The class quitted by singing the song of animals’ names.

The reflection, the teacher introduced the plan following the teaching in the class, the teacher reached the high goal. Observer one liked the picture and explanation in German the students understand clearly, they could explain the rules and teacher did as well. Observer two said the good reputation as the clearly voice, the students understand the rules, the use of words and sentences structured well. Observer three arranged the classroom well, and it worked well. Observer four used the grammatical rules, the ss did well and it started connecting the single nouns and the plural nouns.

The class starts by the teacher explain how to do in their own language, then students must pay attention, they start singing the song after ending of the song, students starts by seeing the pictures, teacher called the name of students and asking the questions “What you see?” teacher showed the pictures and asking what is this in the pictures, and calling the names of students to answering the questions, teacher encourage students when they answer the questions. And teacher said in single and plural numbers, then teacher also said in strong voice, like happy voice and sadly voice, students repeat after teacher. Students were called the names for the answering the question, if the students cannot answer the questions, the students were asked to repeated after teacher, after that teacher use the textbook as teaching materials to show them the pictures inside the book as the story book with the picture. It describe the actions of animals, this showing the learning of the verbs indirect way. Teacher the voice as the action of animals on the picture book, students more pay attention and teacher question them every pictures,

students repeat the teacher, then they could describe the pictures and teacher keep describing the pictures. Students also whole group repeat after teacher. Teacher showed the action of the animals, and teacher showed the pictures and telling the animals actions, then students turn back to the seat all students stood at the back of the seat to repeat what animals did the actions by following the teacher. The students use the body language and saying it out loudly. And teacher checks the pronounced for each student. Teacher focused on what students need to do. The students were asked the questions, how did you dance? Students danced in whole class. Teacher encouraged the students. Teacher show them how to do with the single and plural in sentences, teacher careful said correctly in single and plural and then students repeat after teacher. Teacher turn back to German language to explain the grammar rules as “one cow runs and two cows run” after the did clearly the grammatical rules and then turn to English, whole class was repeated after teacher as “ one dog swims, and Five dogs swim” so on. The students speak out loudly and clearly. Then teacher turn back to the pictures on the board. The students were asked to repeated the whole class by saying the single and plural numbers and the verbs as jump, dance, swim..., following the pictures, then teacher asked the students what they have seen in the pictures to say the names of animals and telling the actions, the students said the action of the animals’ pictures. The one student was called his name to read the pictures and whole class repeat after him. Teacher make sure student understanding again. The students were asked to answer the question, a few students could not answer the questions, the students were asked to help from classmates. The next activity is to put the animals in the cage, Teacher showed on the board. The students listen and look at the board, what teacher need students to do is to asking the partner to put the animals in the cage by the single and plural. Teacher acted on the board, students did this activity so well, they keep speaking, students and teacher did well interaction, they just see the numbers of animals and telling the partner to pick up and put into the picture cage, a few students need practice the vocabs, then activity end, the materials was collected and whole class sing the animals ‘song.

Inclusion of teaching to today, it consists of materials as picture chart, flag and sun, and the activity as group and pairs, the reflection of teaching, teacher felt the lesson prepared, a few things to improve the input as single and plural or verbs with single and plural, they can be one chose to be better, there have the words in the pictures, however, only a few students can not correct.

Discussion

The manual book that teachers use to prepare the lesson plans have completed designing for the school grades under context of primary school, especially teachers can follow the textbook and create their own teaching plans for each semester. The new teachers also must follow the textbooks as the guide of teaching, they can create new materials for the appropriations in class activities. Teaching English in Germany, the A1 level of English in grade 1-5 must study the speaking skill, there is not writing, why is that? It has two reasons, First reason, German students in grade 1-5 learn to speak two languages as the same time, they are possible to learn English quickly, and it has some of their German are similarities in English language. The second reason is to protect the written German language, due to some words in German, the sounds and spellings are closely to English. Therefore, the teaching English language in speaking skills for the childhood must be the priority in primary school, and it is more significant than other skills. On the other hand, Teaching English speaking skills to children as

the first priority, due to German Language is more similar than other languages, especially, in German written and spoken language, If the English language writing skills is taught, the children will not identify what their language is. So that, the way of teaching English here in Germany is to encourage the children to speak English, and the written must taught in German language accordingly.(Interviewed 15/5/2019 Teacher A)

Conclusions

The own experiences of teaching methodology in Lao class primarily focuses on written translation with little speaking, practicing English by writing and reading English in the class, teacher takes the opportunities of students in speaking English. For the German, teaching English language in speaking skills for the childhood must be the priority in primary school, and it is more significant than other skills due to German Language is more similar than other languages, especially, in German written and spoken language. Thus, German approaches emphasize oral communication providing creative situations for the pupils to speak and interact with each other in English.

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References

- Christopher, N. Candlin (1987). *Observation in the Language Classroom: Observation as the basic research procedure*. Dick Allwright: Macquarie University.
- Kumiko, Murata & Jennifer Jenkins (2009). *Global Englishes in Asian Contexts Current and Future Debates*. Japan: Waseda University. UK: University of Southampton.
- Rajiv Rao (2011). "Intonation in Spanish Classroom Style Didactic Speech." *Journal of Language Teaching and Research* 2 (3): 493-507.
- Afsaneh, Rahimi Tehrani., Hossein, Barati & Manijeh Youhanaee (2013). "The Effect of Methodology on Learning Vocabulary and Communication Skills in Iranian Young Learners: A Comparison between Audiolingual Method and Natural Approach." *Theory and Practice in Language Studies* 3 (6): 968-976.

OLIVER, P. JOHN., ALOIS ANGLEITNER & FRITZ OSTENDORF (1988). "The lexical approach to personality: a historical review of trait taxonomic research." *European Journal of Personality* 2: 171-203.

Liyang Cheng, Yoshinori Watanabe & Andy Curtis (2004). *Washback in Language Testing: Research Contexts and Methods*.

Cambridge University Press 978-0-521-00843-3. "Approaches and Methods in Language Teaching." Second Edition Jack C. Richards and Theodore S. Rodgers. (accessed Apr 30, 2019)

Teresa Cremins & James Arthur (2014) *Learning to teach in the Primary School: Organizing Effective Classroom Talk*.

Larin Florian & Natasa Pantic (2017) *Teacher Education for the Changing Demographics of Schooling*.

Technology integration as Google Apps in teaching English, Faculty of Education, Champasack University

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Abstract

Technology is necessary to improve language ability. Teachers need to consider the right applications to deliver their teaching and learned to design meaningful teaching experiences by merging technology. Technology typical incorporated into teaching in this study was Google apps. The teachers at Champasack University applied Google Drive to create Google docs including text files, spreadsheets, presentations, and forms supporting their teaching. It is a real-time collaboration tool that allows teachers and students to work on the same document from remote locations, and automatically save every change made. The target population for this study was English teachers at Champasack University. Data collection administered via Google form with multiple choice and checkbox option. The data were analyzed with Microsoft Excel. The majority of the questions made the distribution of answers formatted into a pie and graph for each individual question. They were described respectively. The survey found that technology integration assisted lesson clarification and deliver learning and teaching. Technology deployment able to alter the pattern of learning styles raised stimulation and built an energetic learning environment. Google apps allowed more opportunity for communicating between students and teachers. They encouraged collaboration, facilitated for teaching plan manipulation, created the test and administered it to students. They were an authentic education and enabled to produce teaching performance much more effective.

Keywords: Google apps, Learning language, Teaching, Technology integration, Technology savvy

Introduction

Teaching a foreign language is not an easy task. In the past, EFL teachers depended only on the use of traditional methods. With the technological development, educational technology is used in the field of EFL teaching and learning. Therefore, new methods in teaching and learning have been introduced. At the present time, the deployment of educational technology plays an important role in education because it provides several technological tools that can increase instruction process more effective. The application of educational technology has got a significant place in EFL teaching and learning. In fact, there are different points of view pertaining to its effect on the teachers' role and the learners' level. Thus, the present research work is an endeavor to pronounce the role of educational technology in EFL teaching and learning. It seeks to distinguish between traditional and modern education. It attempts to find out the technological tools that teachers and students use and describes how it can facilitate

the learning and the teaching process. The role of technology has been recognized as vital in the education of the English language, and many areas of the world have noted the importance of information technology within the context of English education, which has facilitated and augmented English learning to a great extent.

According to Graddol (2012) indicated that “technology lies at the heart of the globalization process, affecting work, education and culture”. Technology has always been an important part of teaching and learning environment. It is an essential part of the teachers’ profession through which they can use it to facilitate learners’ learning. When we talk about technology in teaching and learning, the word ‘integration’ is used. The technology integration assists teachers choose their own favorite multimedia and software that creates more interactive lessons. The application of technology in education can be a great benefit for instructors. Instructors now have the ability to work together to create more meaningful instruction for all learners without having to arrange planning time. Instructors can use websites to assign requirements and samples for learners [22]. Moreover, Technology becomes an integral part of the learning experience and a significant issue for teachers, from the beginning of preparing learning experiences through to teaching and learning process [7].

Pourhosein Gilakjani and Sabouri (2014) emphasized that through using technology, learners can control their own learning process and have access to many information over which their teachers cannot control. By including technology in their classes, teachers will have the opportunity to engage more learners and lead more energetic classes. Many researchers stated that technology can be used as an instructional tool in teaching and learning skills. Pourhosein Gilakjani (2013) and Bruce and Levin (2001) expressed that technology can be useful in classroom by helping communication, making teaching products, and assisting learners’ self-expression. Friggard (2002), Miner (2004), and Timucin (2006) confirmed that technology increases the development of teaching methods and learners’ knowledge. Technology plays a key role in promoting appropriate activities for learners and has a significant impact on teachers’ teaching methods in their classes. Kurt (2010) stated that technology can be used as a tool for performing meaningful projects to engage learners in critical thinking and problem solving. Technology increases learners’ cooperation. Cooperation is an effective tool for learning. Learners cooperatively work together to create projects and learn from each other through reading their peers’ work [14].

Google has come up with a variety of constructive services that help the industry and education to perform their work effectively. Google apps can be described as an integrated suite of cloud-based solutions, driven by Google app engines, designed to achieve specific educational goals with the aim of transforming the 21st-century educational system. Google Apps were designed to facilitate the provisioning of the Google suite of applications and other collaborative tools, such as Gmail, Google Drive, Google Sites, Google Calendar, Google Docs, Google+, and Google Chat, among others. To meet the challenge of 21st-century educational goals, dramatic alteration should be directed toward the applicability of apps in teaching, research, learning, and administration of universities. Therefore, Educational apps have been instrumental in transforming educational institutions. Google Apps have been central in facilitating collaboration and advancing knowledge. Furthermore, Google Docs facilitates ease of collaboration with multiple editors so users can simultaneously make changes to the same document in real time. Regarding time management and scheduling of collaborations, users now have the ability to add calendar entries directly from their Gmail accounts. Additionally, Google Sites provides faculties and students both communication and collaboration capabilities to achieve optimum productivity within the classroom environment- both traditional brick and mortar and virtual learning environments. Particularly, the real-time editing in Google Groups can make it easier for students to work collaboratively to share projects regardless of their physical location.

Technology that is incorporated into the classroom for the purpose of enhancing the learning process is referred to as technology enhanced learning [6]. The incorporation of

technology in the classroom can be quite useful, as “the use of virtual environments for collaboration and learning can result in unprecedented flow of ideas, leading to higher levels of productivity” Google Drive has a simple promise, but its impact is revolutionary. The basic idea is this: rather than creating files on one’s local computer and sharing them with others via attachments through email, documents are created online and the files are made available by email documents by sharing access through a secure to link to others for collaboration. Google Drive consisted of Docs, Sheets, Slides, Forms and drawing. Instructors are capable of creating documents from or upload existing files. Moreover, instructors can add on the tools in Google Drive with the third-party apps and extensions. The objective of this study about technology integration as Google Apps in teaching English, Faculty of Education, Champasack University.

Methodology

The target population for this study was teachers in the English Department, Champasack University. The online survey was used for data collection and administered via Google form of Google apps. Google form was used to create the survey with multiple choice and checkbox option. These options were used to measure each item on the questionnaire.

Data Collection

This quantitative study was completed using a questionnaire that contained two parts. The questionnaire was divided into two parts. The first part collected demographic data about the participants including general questions about educational level and teaching experience. The second part included specific questions regarding the technology application, experiences in Google Apps, obstacles integrated Google Apps in teaching English as well as the expectation of using the internet at Champasack University. The Likert scale format was used for the second part.

Data analysis

The data were analyzed by Microsoft Excel. The results were drawn with charts and graphs to see where the majority of people fell in this debate. The majority of the questions made the distribution of answers formatted into a pie and graph for each individual question. It was described respectively.

Result

This section described the results of data collection with the target group. Almost questionnaire in this survey pertinent to technology integration in teaching English, questionnaire respondents demonstrated their opinion to Google apps in education, its importance and classroom transformation when they were integrated into teaching. The data illustrated on pie and bar chart with the brief description in the following. Demographic and descriptive statistics.

1. Teacher teaching experience

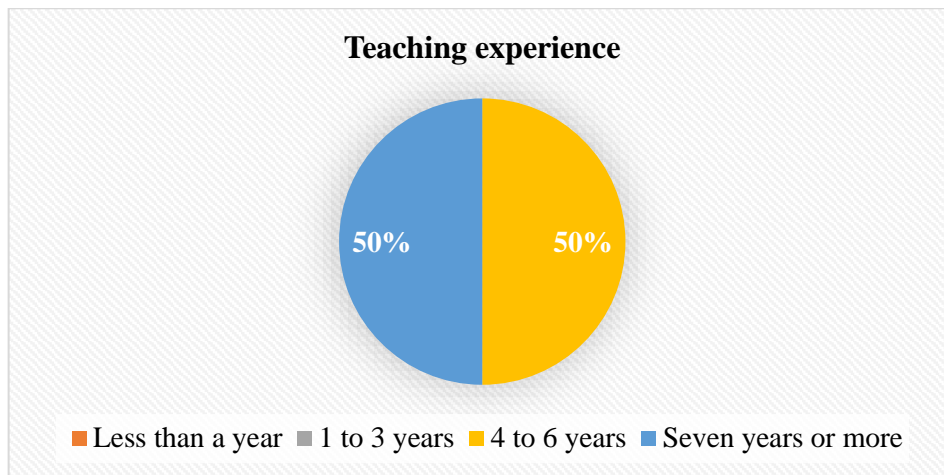


Figure 1: The pie chart illustrated teaching experience

Teaching experience of CU teachers varied. The year ranged was one year to seven and more. The half of teachers had teaching experience ranged from four to six years. Another was more than seven years. It affected instruction and knowledge deliver to students. They have accumulated their capability, knowledge, and skill through teaching.

2. Frequency of technologies integrated into teaching

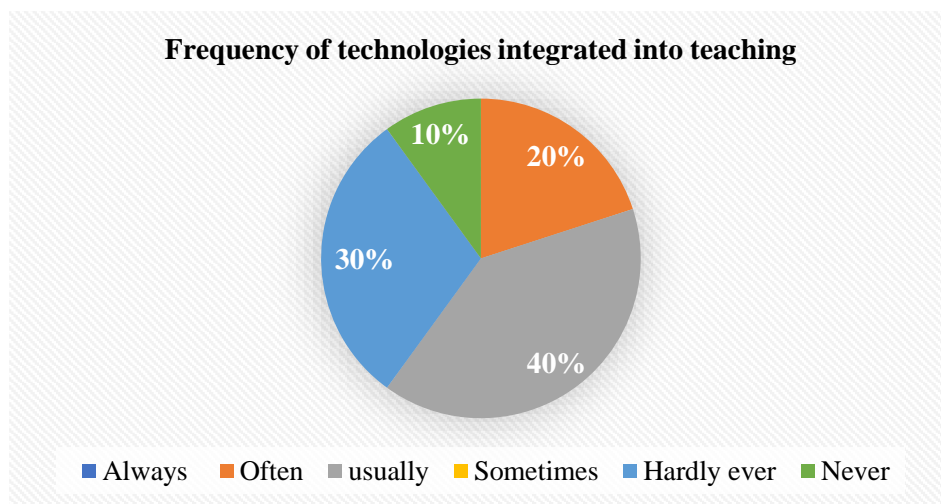


Figure 2: Pie chart showed frequency of technologies integrated into teaching

Technology facilitated teaching and created a motivated learning environment. Students expected their teachers incorporate technology into instruction. That was disappointed when technology unable to integrate only 40% due to many factors. Occasionally, it was hardly ever applied in the classroom because of its inconveniences, primary technology resources uninstalled in the classroom. As a result, it was not supported to deploy other devices in teaching. 20% of them replied they used it when it really needed to deliver some lesson.

3. Types of technology integrated into teaching

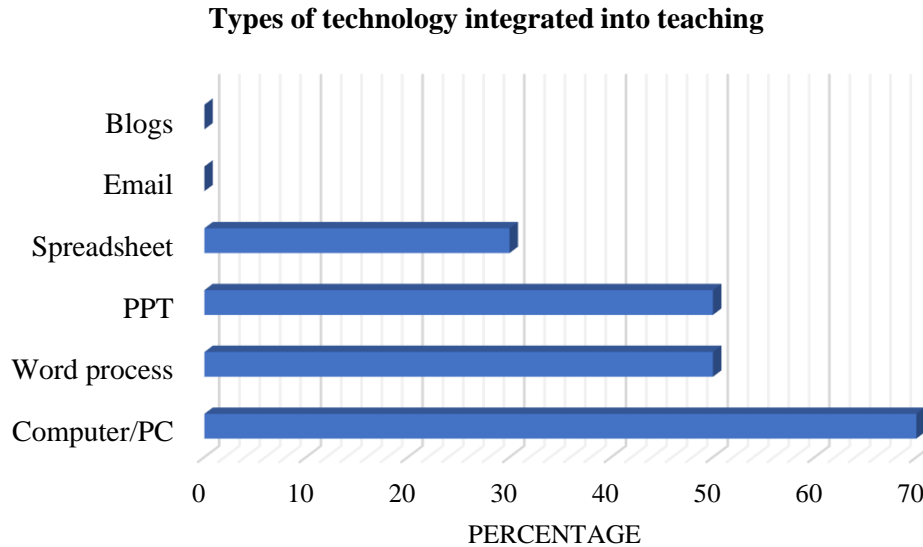


Figure 3: Types of technology integrated into teaching

There are a wide range of technologies in education and have different purposes of employment. But there were only four kinds of technologies mention by respondents. The most frequent use was computer/PC. This type was daily use for document, lesson plan and report. 50% of usages were word process and PPT. Teaching required PPT to present a typical lesson and deliver it to maximize the understanding. It did not rely on course books and a green board to explain the content. Last technology was Spreadsheet which used to calculate grades or even statistics. Mentioned tools in this survey had different purposes of uses.

4. Platforms used to connect to students

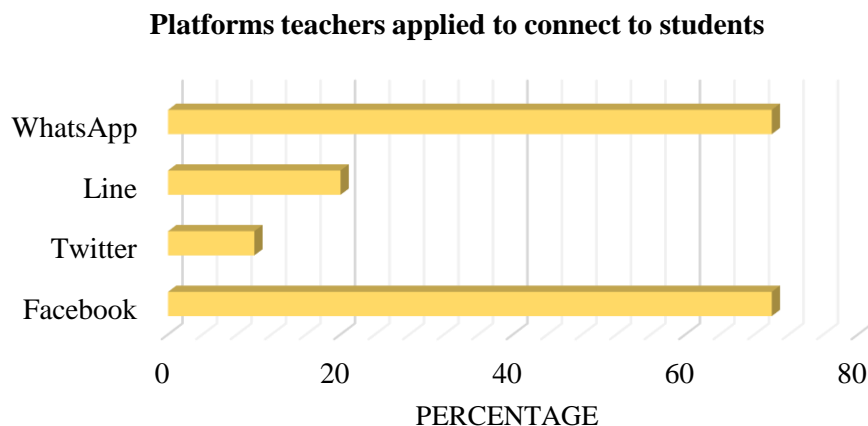


Figure 4: Bar chart illustrated platforms used to connect to students

Technology integration to deliver learning and teaching assisted lesson clarification and increased learning outcomes. Teachers demonstrated their thinking associated with technology merging into their teaching. They approved technology deployment able to change learning style of students, increased motivation and supported individual development as well as teaching method alternation. The technology platform for education designed for collaboration

between students and teachers. As a result, it enabled to encourage actively and cooperatively based on learning. It helped students build cultural bridges and improve communication skills. More technology in the classroom tends to expose interaction.

5. The needs to integrate technology into the classroom

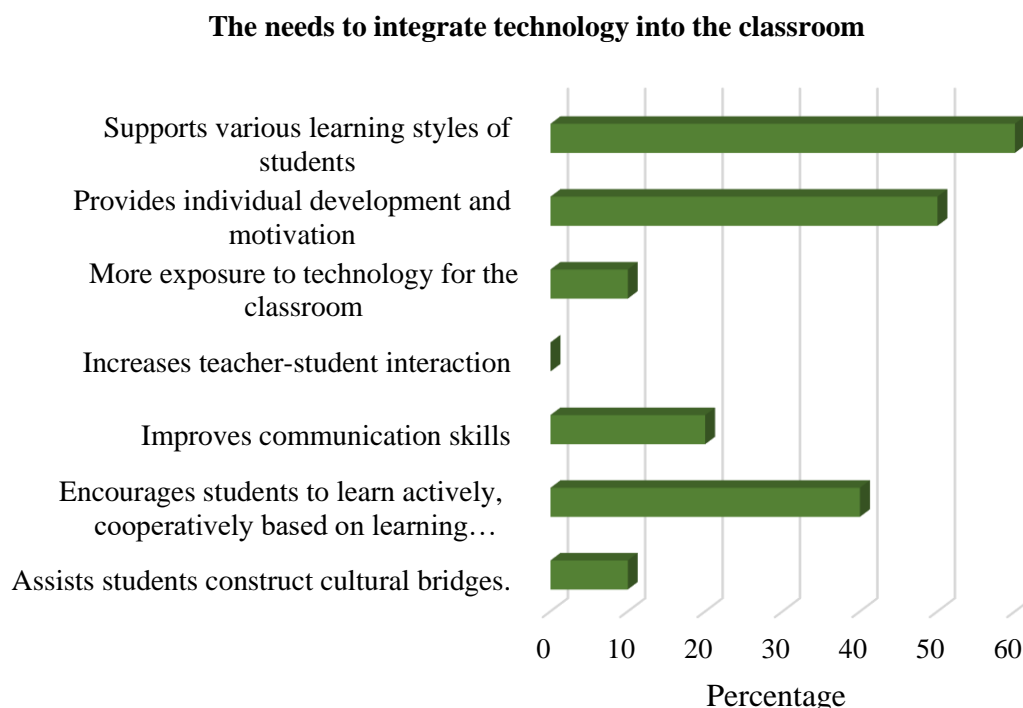


Figure 5: Bar chart illustrate needs to integrate technology into the classroom

Technology integration to deliver learning and teaching assisted lesson clarification and increased learning outcomes. Teachers demonstrated their thinking associated with technology merging into their teaching. They approved technology deployment able to change learning style of students, increased motivation and supported individual development as well as teaching method alternation. The technology platform for education designed for collaboration between students and teachers. As a result, it enabled to encourage actively and cooperatively based on learning. It helped students build cultural bridges and improve communication skills. More technology in the classroom tends to expose interaction.

6. Google apps applied the most

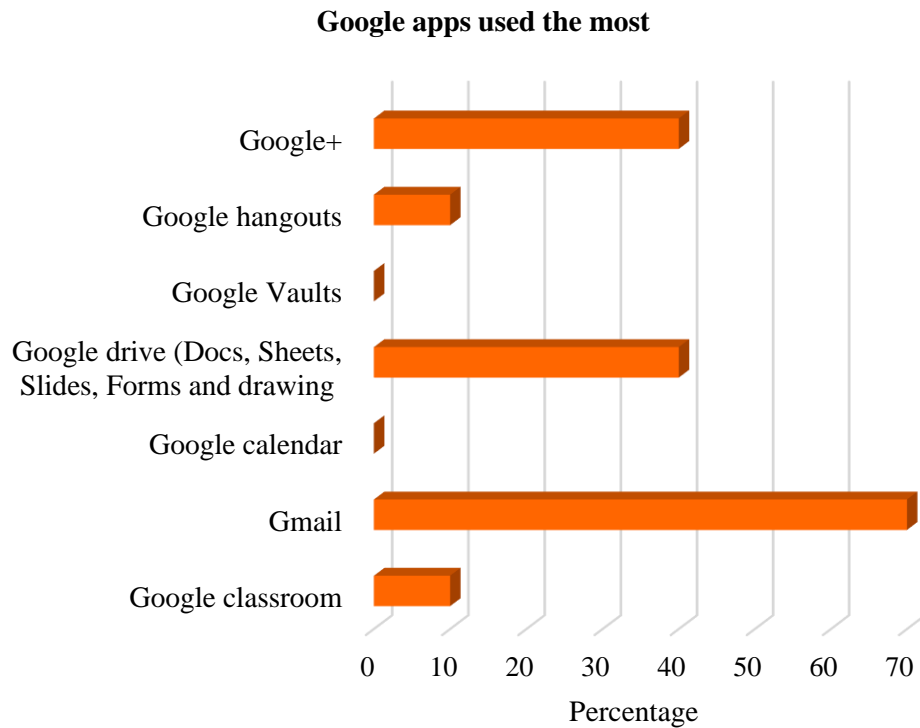


Figure 6: Bar chart illustrated Google apps applied the most

From the bar chart above, 70% of total respondents used Gmail to contact with others. 40% of them applied Google drive for teaching and working. Teachers revealed that they usually employed Google Quiz application to build the tests instead of paper print. They accepted Google apps facilitated lesson plan organization and preparation. They could select apps to fit with their working purpose and produce more outcomes. Apps in Google drive is simple to use even new users. They did not worry file damage and losing because all fills created were saved in it. Additionally, Google + and Google hangouts were used in communication like other social media. Google classroom was applied only 10%.

7. The problems in accessing and applying Google apps

The problems in accessing and applying Google apps

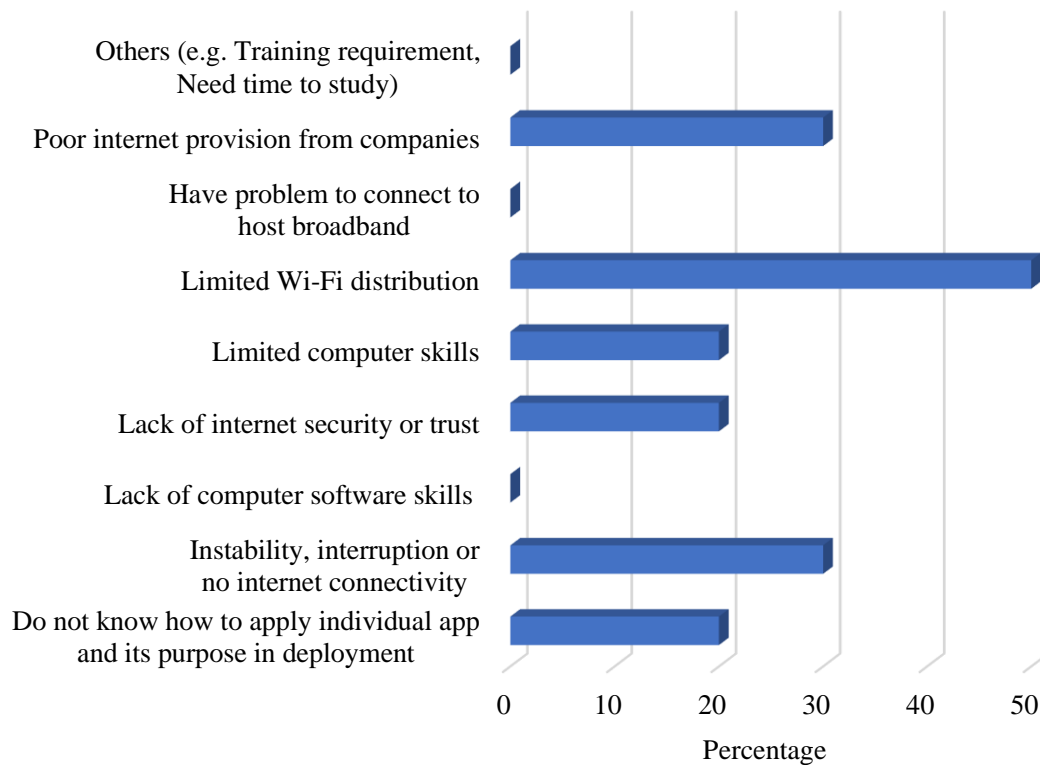


Figure 7: The problems in accessing and applying Google apps

Google apps were common use in the classroom today but they were dependent on the internet to access and use the apps. 50% of survey respondents replied they had problems to access apps due to Wi-Fi distribution to classrooms or office were not strong enough to stable work on apps. They were unable to escape from this obstacle, even they directly connected to internet company provider. Furthermore, internet in Champasack University campus was often interrupted and no internet connectivity when the weather was fluctuated (30%). 20% of them said they had problems with apps usage and needed time to make understanding in real practice. They mentioned they are poor computer skills leading to trouble with using Google apps.

8. Reasons using Google apps for teaching and working

Reasons of using Google apps for teaching and working

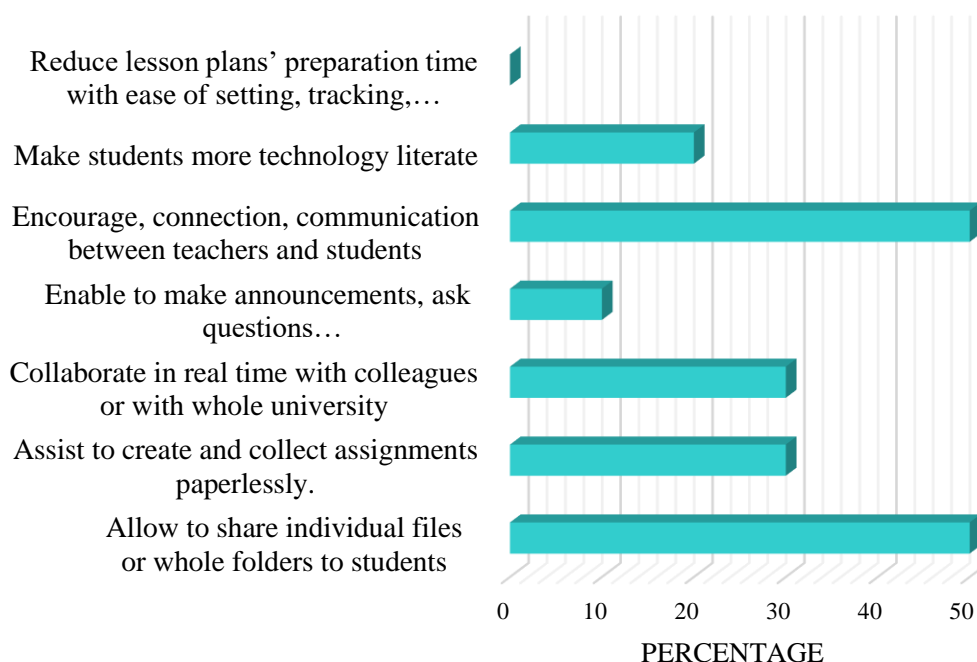


Figure 8: Reasons of using Google apps for teaching and working

According to the bar chart above, it revealed a range of reasons for applying Google apps for teaching and working. The main reason for 50% used for communication and connection through the application. Another uploaded files into Google drive and contributed them to students without flash drive which brought viruses to the computer. Apps also helped teachers build forms, quizzes and lesson plan paperlessly and they enabled to use them in real time cooperation with colleagues. Much more technology merged into the classroom increase awareness of the importance of deploying the technology. Students interacted with authentic use and encouraged technology savvy and literate (20%).

9. The expectation associate with technology integration

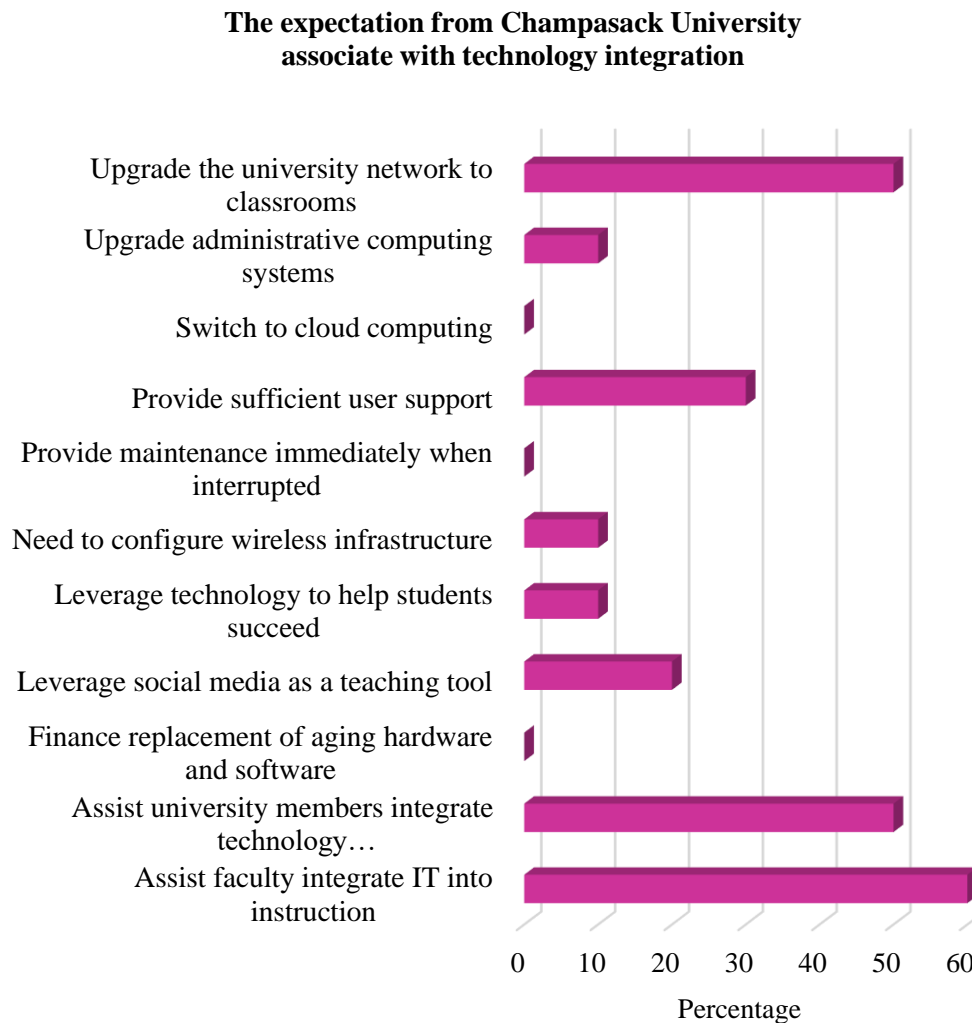


Figure 9: The expectation associate with technology integration

All teachers described the needs and reasons for technology integration above, and this section encompassed the expectation of CU teachers in using technology, internet, and Wi-Fi distribution. More than 50% of survey respondents expressed they needed experts integrated IT into the classroom and upgraded university network more efficiency and usability. They needed university to support technology use, improve and maintain Wi-Fi infrastructure when interrupted. 20% of them needed to incorporate social media into teaching. So, they required institute to upgrade university network, administrative computing systems, configure wireless infrastructure and leverage Wi-Fi distribution more access.

Discussion

According to the survey, participants stated that provide sufficient user support Wi-Fi distribution to faculties in Champasack University is slowly. Teachers are unable to integrate technology into their teaching because there is limited internet connection and teachers still lack of knowledge in applying technology. They also revealed the application of Google apps to facilitate learning-teaching process at CU is currently limited. This is due to a number of factors including low speed of internet, many lecturers still lack computer software skills, and the internet access is still limited as it is not available for students. They hope that CU should improve internet Wi-Fi faster and higher more than this because it will make students and teachers use it for their work in learning and teaching comfortably. Today, having the

technology integration in learning and teaching is vital, and numbers of teacher using it in their work. Moreover, the provision of the internet is sometime inconvenient.

Conclusion

Technology integration needed to take account of consideration to increase learning and teaching outcomes. Technology as Google apps for education facilitated teachers organized their tasks, increased effectiveness in teaching and build a motivated learning environment. The frequency of using Google apps raised student technology literacy. Much more technology embedment facilitated learning and teaching performance.

Acknowledgement

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References

- [1] Baytak, A., Tarman, B., & Ayas, C. (2011). Experiencing technology integration in education: children's perceptions. *International Electronic Journal of Elementary Education*, 3(2), 139-151. <https://www.iejee.com/index.php/IEJEE/article/view/233>. Date accessed: 17 June 2018.
- [2] Bruce, B., & Levin, J. (2001). Roles for new technologies in language arts: Inquiry, communication, construction, and expression. In J. Jenson, J. Flood, D. Lapp, & J. Squire (Eds.), *The handbook for research on teaching the language arts*. NY: Macmillan.
- [3] Chapelle, C. (2003). *English language learning and technology: Lectures on applied linguistics in the age of information and communication technology*. London: John Benjamins Publishing.
- [4] Costley, K. C. (2014). *The positive effects of technology on teaching and student learning*. Arkansas Tech University.
- [5] Dockstader, J. "Teachers of the 21st century know the what, why, and how of technology integration." *T.H.E. Journal* 26(6) (1999): 73-74.
- [6] Dror, I. E. (2008). Technology enhanced learning: The good, the bad, and the ugly. *Pragmatics & Cognition*, 16(2), 215-223
- [7] Eady, M. J., & Lockyer, L. (2013). *Tools for learning: technology and teaching strategies: Learning to teach in the primary school*. Queensland University of Technology, Australia. pp. 71-89. <https://scholars.uow.edu.au/display/publication76376>
- [8] Frigaard, A. (2002). *Does the computer lab improve student performance on vocabulary, grammar, and listening comprehension?* ERIC Document Reproduction Service No. ED476749 Timucin, M. (2006). Implementing CALL in the EFL context. *ELT Journal*, 60(3), 262-271. <https://doi.org/10.1093/elt/ccl006>
- [9] Gaudin, S. (2010, May). Google exec: Microsoft too far behind in cloud apps. *Computer*
- [10] Google. (2013). Discover a better way of learning: Free web-based email, calendar & documents for collaborative study anytime, anywhere. Retrieved from <http://www.google.com/enterprise/apps/education>

- [11] Hennessy, S., Ruthven, K., & Brindley, S. (2005). Teacher perspectives on integrating ICT into subject teaching: Commitment, constraints, caution, and change. *Journal of Curriculum Studies*, 37(2), 155-192.
- [12] Ionita M, Pastae V, & Stoica A. (2014). Benefits of Setting up Academic Portals on Google Apps. *Proceedings of the 10th International Scientific Conference eLearning and software for Education*, Romania, pp. 252-255.
- [13] Kaimuloa Bates, B. (2011). Using Google Apps in Professional Learning Communities. *Proceedings of the 16th Annual TCC Worldwide online conference*, Hawai, USA.
- [14] Keser, H., Uzunboyly, H., & Ozdamli, F. (2012). The trends in technology supported collaborative learning studies in 21st century. *World Journal on Educational Technology*, 3(2), 103-119.
- [15] Kurt, S. (2010). Technology use in elementary education in Turkey: A case study. *New Horizons in Education*, 58(1), 65-76.
- [16] Murphy, K., DePasquale, R., & McNamara, E. (2003). Meaningful Connections: Using Technology in Primary Classrooms. *Young Children*, 58(6), 12-18. Retrieved June 17, 2018 from <https://www.learntechlib.org/p/101494/>.
- [17] Patel, C. (2013). Use of multimedia technology in teaching and learning communication skill: An analysis. *International Journal of Advancements in Research & Technology*, 2(7), 116-123.
- [18] Pourhosein Gilakjani, A. (2013). Factors contributing to teachers' use of computer technology in the classroom. *Universal Journal of Educational Research*, 1(3), 262-267.
- [19] Pourhossein Gilakjani, A. (2017). A review of the literature on the integration of technology into the learning and teaching of English language skills. *International Journal of English Linguistics*, 7(5), 95-106. doi: <https://doi.org/10.5539/ijel.v7n5p95>
- [20] Pourhossein Gilakjani, A., & Sabouri, N. B. (2014). Role of Iranian EFL teachers about using *Pronunciation Power* software in the instruction of English pronunciation. *English Language Teaching*, 7(1), 139-148. doi: <http://dx.doi.org/10.5539/elt.v7n1p139>
- [21] Raihan, M. A., & Lock, H. S. (2010). Technology integration for meaningful learning-the constructivist view. *Bangladesh Educational Journal*, 11(1), 17-37.
- [22] Rodinadze, S., & Zarbazoia, K. (2012). The advantages of information technology in teaching English language. *Frontiers of Language and Teaching*, 3, 271-275.
- [23] Sviridova, T., Sviridova, L., & Tymoshenko, B. (2011). Google Apps as solution of communication issues in educational process. *Proceedings from IEEE 7th International Conference*, 183-184.
- [24] Wolf, C. (2012). Privacy and data security in the cloud: What are the issues? *IP Litigator*, 18(6), 19-28.
- [25] Woodbridge, J.L. (2003). Technology integration as a teaching strategy. Doctoral dissertation. Walden University.

PROBLEMS IN DEVELOPING TEACHER PROFESSION BASED ON THE POLICIES OF THE PARTY AND THE GOVERNMENT

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Abstract

This academic article was to study a professional development based on the policies of the Party and the Government by studying the related documents and literature of Lao and international. The instrument used to study was the content analyses and the analyses unit were documents and literature of Lao and international. Results revealed that Lao teachers had been continuously developed both quality and quantity in line with the policies of the Party and the Government. Anyway, professional development faced 3 main challenges to improve. Firstly, quality challenges: teachers' low qualification and unskilled instruction. Secondly, relevant challenges: low inspiration in the teaching profession and the curriculum was not applied to real circumstances of a community. And lastly, management challenge: applying decrees to be used as the action plans, the implementation plan, and the detailed projects was hardly proper to the real circumstance of a locality.

Keyword: *Teacher, professional development, decrees of the party and the government.*

Introduction

"Teacher" means the right teacher or conveyor of knowledge to his disciples, which comes from the word "Kru". In Pali, the word translated as "heavy" means the responsibility of the teacher's teaching as a hard burden. Because before anyone grows up to be an educated and good person of society, the teacher must be less dedicated and impatient than any parent. In the life of someone other than our parents, who are like our "first teacher", for children to grow up and function in society, there is a great need for a "teacher" to master the science of knowledge to pave the way to a thriving future.

The so-called "teacher" is a very important person in the national youth development mission because the teacher determines the quality of human resources in the society and the quality of the resources in the community: resources, success in economic, social, political, governance, education, science, culture, education, culture, culture. The teacher is recognized as the "teacher of the nation", "the teacher of the party", and "the teacher of the quality of education", saying that the teacher is a good creator who is a person of moral values, behavior, lifestyle, and social guidance. As the case of education scholars, who have always said, "Build teachers to create people, to create nation," which the Party and the Lao government have put most importance to, in defining national teachers' standards, teacher education philosophy, and teacher ethics as a guide to teaching practice and education (Ministry of Education, 2010).

But from the realities of the present profession, it's less popular or relatively small indicating that the premium students who take the first exam of each province each year choose to study other fields of study rather than choose the profession of teacher and parent, with good financial position being more likely to send their child to another school. A whole show that the values or ideas of students and parents against teachers are not consistent with the attitude of the party at any time raise teachers such as its policy to increase salaries for teachers. However, this policy will not be able to change the beliefs of most people, yet this may be due to understand that teachers are the heavy profession but low returns. Another striking picture is that some teacher professionals are so poor and burdened with so many popular songs and sayings, "feeding a pig is better than having a husband as a teacher." Well-educated and well-meaning parents are not willing to let their children go on to fill the teaching profession. Young people who are good enough to have completed Grade 7 are less likely to apply to the teaching profession. Applicants in the teacher professional field are often those with low academic achievement, for example, students who are unable to enroll in another profession and apply to become teachers. The teaching profession has become the last resort for most parents and students. Therefore, the chances of recruiting talented people in the early stages of the country for teacher education are limited and do not meet the party and state guidelines as appropriate. In particular, the Ministry of Education's policy outlines.

Methodology

This academic article was to study a professional development based on the policies of the Party and the Government by studying the related documents and literature of Lao and international. The instrument used to study was the content analyses and the analyses unit were documents and literature of Lao and international.

Results

The Ministry of Education and Sports (2000) summarizes education issues in three areas: 1) The quality of Lao education found that teachers at all levels of low quality and low levels of education have high rates and shortage of teachers in some subjects, the rate of drop-out and stay-in-school education is low; 2) Relevance found that the curriculum was not tailored to the realities and needs of the community, especially at the elementary level, the motivation for many of the graduate students to pursue other occupations, and the return to teaching of their ethnic minority teachers; and 3) Management found that the fluctuations between the centralized and distributed management methods were not adequately prepared. Solid-state management at all levels of staff lacks formal management skills, ineffective and regular monitoring, lack of legislation, standards, and training systems for planning and management consistent with the 2030 Vision Report, a 10-year socio-economic development strategy and a five-year socio-economic development plan in part stated that the 4 breakthrough (four breaking-through) that the Party Congress once IX of the set is not comprehensive and deeper integration of the resolutions to plan programs and projects of resolution to the persistent real sector. The Ministry of Education and Sports' document (2014) that, through the use of six education measures and quality measures, it was noted that teachers with limited knowledge of parents do not see the importance of education as much as school-based, inter-ministerial, and child-to-parent communication is lacking. The authors were able to distinguish the problem of teacher professional development into three main groups:

1. Production process problems, such as problems due to the input of teacher production processes, such as fake certificates and pulling some strings. Issues in the teaching

process of teacher education students are: teachers lack the skills to teach at all levels, the quality of education is low and the teacher education rate is high and teachers are lacking in some subjects;

2. Issues related to teacher use processes such as budget support issues, teacher incentives, good teachers' recommendations, performance monitoring, how teachers' classroom instruction is lacking. Due to the knowledge limitations in teacher education content, low teacher motivation, many graduates choose to pursue other occupations, and the return to teaching ethnic minority students remains small.
3. Issues of management to produce effectively teacher-student to service a society, such as fluctuations between centralized and distributed management methods, lack of proper planning, poor management of staff at all levels, lack of management skills, and monitoring, inefficiency, and lack of planning, discipline and planning, a lack of involvement in community administration, a lack of administrative resources, including a lack of professional executive development centers.

Government's and Party's Policies to Solve the Problems.

1. Select teachers with experience teaching in high schools to teach at the colleges, promote teachers in teacher education institutions with higher education and qualifications to be eligible for the teacher education curriculum teaching at each teacher institution, and build institutional partnerships with technical institutions both locally and internationally to enhance teacher training in teacher education institutions;
2. Improve the management of teaching and learning in teacher education institutions by emphasizing learner centricity and incorporating ICT into teaching and promote a way to conduct teacher education in teacher education institutions, enabling students to develop a sense of self-exploration and to apply the knowledge and spirit of true teacher-hood;
3. Build and enhance infrastructure, educational buildings, auditoriums, teachers' offices, laboratories, libraries, students and teachers' residences, and teaching media to meet the needs of the community and facilitate the working conditions of teachers in teacher education institutions, as well as better manage students' education and livelihoods;
4. Improve and develop the system of management and management of teacher education institutions to develop some teacher training institutions that qualify as centers of excellence or centers of development and encourage each teacher education institution, in addition to conducting teacher training, to conduct research studies and provide services to the community, enabling one teacher's college to be a teacher-training university;
5. Continue to upgrade the teacher education curriculum in accordance with established teacher training standards. Continue to reform the vocational teacher training program, ensuring a continuous professional development system with network upgrades, comprehensive professional development to promote the teaching system in the school, and to establish a partnership between the teacher education institute, and the teachers in the high schools, and to make the Lesson study to be a model of enhancing the teacher's knowledge and ability to meet the teacher's performance;
6. Develops student and teacher quality monitoring system from within and outside the institution, coordinating with all stakeholders including teachers producing teachers, users, and teachers professional development partners to enhance the quality of teacher education.

Thus, to meet the teacher professional standard mentioned above, the Ministry of Education and Sports (2010) defines the standards of the Lao teachers as follows:

1. Moral and ethical are the standards of good, right, virtuous, and ethical behavior, having a good and good standard of living for students and society;
2. Knowledge of the learner is: the teacher knows each student's background, abilities and intellectual level to help students develop common and successful learning together and;
3. The knowledge and skills of teaching are the standards that determine the teacher's knowledge of teaching: teachers must be knowledgeable, capable of conveying knowledge to students

Meanwhile, the Ministry of Education and Sports (2012) has defined the philosophy of teacher education in eight areas: 1) well-conducted and politically qualified: core ideology, understanding party ideology, and ideology, defending the regime, adherence to the rule of law, the courage to fight against negative publicity. The teacher must have a good idea and a transparent living style that includes both virtue, responsibility, and solidarity; 2) love the teacher profession: be enthusiastic, proud of self-employment, attentive to student learning regardless of race, class, gender, religion, and special needs; 3) The virtue is that the teacher must be honest, confidential, transparent, avoid receiving material objects; 4) Advanced knowledge and skills: Good technical knowledge in accordance with the principles of the principle and good to pass on to others as well as teaching skills that can teach others and enrich others' learning; 5) beautiful personalities such as dress, courtesy of teacher, respect, goodwill, preservation and enhancement of the fine arts of the nation and the local community, with a strong mental state and strong physical condition; 6) Dedication to education is: Knowing your self-sacrificing interests, collectively aim to acquire advanced knowledge, develop self-discipline, education, and professionalism; 7) a faith society: Lao teacher must be respected, trusted, trusted, and accepted by his students, colleagues, parents, and the local community; and 8) Being a good developer is like being an innovator, having good people, meeting community and locals as well as being a good environmental developer.

In the Ministerial Agreement (Ministry of Education and Sports, 2015), the qualifications and ethics of teachers in Article 8 stipulate that: Lao teacher ethics consists of 5 attributes: 1) pure honesty; 2) loving the profession; 3) loving the learner; 4) being proactive, and 5) self-development. For Decree on Civil Servants of the Lao Government (Government, 2012) article 28 defines teachers' behavior as 1) a good example for learners and society in general political, ideological, principled, deliberate and polite ; 2) have a good work ethic and justice; 3) honesty and transparency in the profession; and 4) be generous, considerate, respectful, and respectful of learners in line with the Ministerial Decree (2013) on the 3 Competencies of Education and Sports, Article 2 of the 3 Competitions is as follows: 1) well learning and teaching; 2) counteract the phenomenon; 3) Create good environments in schools, centers, and educational and sports institutions.

The vision of the Lao Education Strategy to 2020 (Ministry of Education and Sports, 2000) has identified that the main goal of development is to reduce poverty in developing countries by keeping the rate of economic growth in the middle and secure and developing human resources in a sustainable manner. The urgent need for education development is to focus on quality improvement for human resources that meet the country's socio-economic development plans. In particular, education is a key driver of poverty reduction, with his vision of education focusing on three key issues: 1) equitable access, 2) improvement in quality and relevance, and 3) planning and management.

In addition, industrialization and modernization strategies, including international integration, the IX Congress of the Lao People's Revolutionary Party have identified four main goals known as four breaking-through: (1) Imagination, (2) human resources development, (3) management systems executives, and (4) poverty reduction, from which the four individuals identified human resource development is considered to be the most important factor in the country's development. By requiring education to continue to grow, both in terms of quantity and quality, continue to seriously reform the national education system (Ministry of Education and Sports, 2014).

As "education" is central to the development of human, social and national resources, it is essential that the Lao or Lao people become highly valuable and competent to compete with the region and the world. All stakeholders need to achieve education, invest in education to achieve their goals, to bring people to national socio-economic development, regional and international integration. The main targets for achieving human resource development are: Education and human resources development is an important factor of development, ensuring continuous quantitative and qualitative education, and continuously reforming the national education system.

The Party and the government promote and enhance the status and prestige of teachers, promote gifted learners to higher levels, enhance scientific research in educational institutions, improve the management system of education, and improve the educational institutions to create a different field of human resources (MoEs, 2012).

In line with the Party and Government policy, the Board of Education has collaborated to develop a teacher-training philosophy in the Lao PDR, which states: "Lao teachers are clean, have the highest quality of teachers, love the profession, apply their knowledge, advance skills,

Personality, dedicated to education, faith society, a good developer ". And teacher education practices must be aligned with three characteristics and five national education principles of which three characteristics are: 1) national character; 2) scientific and modern characteristics; 3) progressive mass-based attitude characteristics. And five principles (five dimensions) include 1) educational qualifications (moral dimension); 2) intellectual dimension; 3) labor dimension 4) physical education; and 5) artistic dimension.

Year 2014 marks the fourth year of the implementation of the Party's IX Congress and the Seventh Five-Year Social Development Plan and the Government's Eighth Socio-Economic Development Plan especially the VIII Five-Year Education and Sport Development Plan (2016-2020). Implementing a quality education strategy in the Phase II education system, which focuses on quality, including teacher training, vocational training and legislative development to support professional staff, comprises six programs: 1) Good Student Recruitment Program for Teacher Students; 2) Curriculum and Program Improvement Program; 3) Teacher Capacity Development and Teacher Training Program; 4) Continuing Teacher Training and Professional Development Program; 5) Teacher Training and Quality Improvement Program; and 6) a program to improve the management of teacher education institutions and the promotion of teachers in society in accordance with the Agreement of the Ministry of Education and Sports. Article 1 stipulates that "this Agreement sets forth the principles and regulations of the Education and Sport Competition to establish a competitive atmosphere for the selection of the Department and the person of excellence and make the competition in accordance with the goals and in accordance with real performance. It is a great stimulus for bettering the generations and

the society as well as improving the quality of education on a regional and international level (Ministry of Education and Sports, 2013) in teacher education curriculum to be more in line with the high school curriculum and more practical. The most recent achievement is that all teacher education institutions have increased their English teaching hours in the primary teacher education system and in the course of their training, English teachers and elementary pre-service teacher can teach English at a basic level. In addition, a 12 + 4 undergraduate teacher education program has been completed that emphasizes the effectiveness of the high school curriculum and its integration with ASEAN countries, and has also completed the revision of the primary teacher education curriculum from primary to middle and upper middle class to better quality and also the ability to teach English at the primary level. In higher education, the curriculum continues to be open to both the academic and the teaching media (Ministry of Education and Sports, 2013).

Discussion

From a sound policy perspective in the professional development of teachers, all sectors of the sector must strictly adhere to a system of education mechanism that integrates the system of production, development, teacher management, teacher promotion, and the development of teacher professionalism in addition to improving the teacher education system to meet the needs, quantity and quality of education by developing a new teacher education curriculum and teaching a variety of teaching methods to make teachers more effective for students, society, and the nation. However, Lao teacher professional development will be less effective if the related sectors do not have an understanding that does not break through the party's practices and guidelines, and does not bring the party's policy towards practical implementation. Therefore, all related sectors need to ask themselves by using: what, when, where, and how in order to achieve the understanding and to break through the implementation of teacher professional development in order to achieve the Party's policy and government.

Conclusions

With the aim of providing education as a nation's quality development mechanism, Teacher is a key force in developing the country's capacity, enhancing self-reliance and competitiveness, as well as economic progress and stability in the global community based on Laos. The teacher plays a crucial role in making education to be the leading institution in the quality of the nation. Therefore, the problems of teachers and teacher professions need to be accelerated and accelerated development solutions in order for education to be able to develop a teacher quality, to ensure and meet the ever-changing needs of society, education reform and the country will never be complete without 'teacher' reform because teachers are the key or core to the success of the learning process, the heart of education and country reform. Therefore, the Party and the Government can at any time pay attention to the important role of teacher education and teacher development as a quality and professional teacher, a clean, and polite. to raise the professional standard of teachers to a higher level of professionalism, as a good developer, it is possible to continually evaluate and improve themselves to be a good role model to the learners and society. Organizing learning activities that focus on the learner is essential for students to be competitive and cooperative. There is a sense of internationalism, of being good, good, and happy.

Acknowledgements

This work would not have been possible without the support of a number of people. I would like to express my sincere appreciation and thank to all of my colleagues at Salavan Teacher Training College for helping me to learn what it means to practice the policies of the Party and The Government. Their contributions and support challenged me to become a better teacher, leader, and researcher.

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References

- Ministry of Education and Sports.(2000). Vision of Education Development Strategy to 2020. Vientiane: (n,p). (Copy Document).
- Ministry of Education and Sports.(2015). Minister's Agreement on Teacher Qualifications and Ethics. Number 1728/MoES.TTC, dated 06/05/2015. Vientiane: (n,p). (Copy Document).
- Ministry of Education and Sports. (2014). Teacher Development Program 2016-2020. Dated 06/03/2014. Vientiane: (n,p). (Copy Document).
- Ministry of Education and Sports. (2014). Four Breaking Through Document of the sector of National Education and Sports. Vientiane: (n,p). (Copy Document).
- Ministry of Education and Sports. (2014). The 7th Congressional Session Report, Series VII, dated 11/07/2014 . Vientiane: (n,p). (Copy Document).
- Ministry of Education and Sports. (2013). Document of three characteristics and five education principles. Vientiane: (n,p). (Copy Document).
- Ministry of Education and Sports.(2013). Summary of the Education and Sport Reform Program for the academic year 2012-2013 and the academic and sports reform plan for the 2013-2014 academic year. Vientiane: (n,p). (Copy Document).
- Ministry of Education and Sports.(2014) . Summary of the Education and Sport Reform Program for the academic year 2013-2014 and the academic and sports reform plan for the academic year 2014-2015.Vientiane: (n,p). (Copy Document).
- Ministry of Education and Sports. (2013) . The agreement of the three Educational Competitions of the Ministry of Education and Sports, number 131 /MoES.PD, dated 08/01/2013. Vientiane: (n,p). (Copy Document).

- Ministry of Education and Sports.(2012). Teacher Creation Philosophy , dated 20/07/2012. Vientiane: (n,p). (Copy Document).
- Ministry of Education and Sports. (2010). Minister's Agreement on Approval of Teacher Standards, number 1232 /MoES.TTC, dated 03/06/2010. Vientiane: (n,p). (Copy Document).
- National Parliament. (2016). The Report of Vision to BC 2030,the 10-year socio-economic development strategy (2016-2025) and the 5-year socio-economic development plan (2016-2020) to the XII Congress presented by your excellency Thongsing Thammavong , the central politburo on 18 January, 2016 at National Parliament Hall. Vientiane.
- National Parliament. (2015). Educational Law of Lao PDR , number 113/PRE. Dated 28/08/2015. Vientiane: (n,p). (Copy Document).
- National Parliament. (2003). The Constitution Lao PDR, number 25/NP. Dated 06/05/2003 . Vientiane: (n,p). (Copy Document).
- Government. (2012). Decree on Teacher, number177/GOV, dated 05/04/2012. Vientiane: (n,p). (Copy Document).

The preferences of utilizing between E-book and Traditional book in English Reading

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Abstract

E-books are specified as a book in electronic format that can be read on the screen of a computer or mobile device. They are rapidly attempting to replace the printed books. Readers will have alternatives on which platform they choose to read. The objective was to study the preferences of utilizing between E-book and traditional book in reading English. The study was survey research methodology and the participants comprised of 20 students. The survey is developed with multiple choice questions and checkboxes. The design was to use “forced choice” answers for each question. The data were analyzed with Microsoft Excel, data analysis functions including descriptive statistics, and percentile. The data is also analyzed through charts and graphs. The survey found that 75% of questionnaire respondent indicated they preferred to read from E-books. The convenient factors attributed to read on E-book reached to 80%. Its portability and small space need for saving were the factors to choose E-books (75%). The availability and convenience of E-book platforms support more opportunity to access to reading sources. However, there were many readers chose to read from tradition books reached to 85%. E-book access need to connect to the internet and it could be impossible to on it when they were unreachable internet. Reading from physical books no need any batteries and the limited computer skills attributed to novice users tent to choose a printed book more that an E-book.

Keywords: E-book, Traditional book, Reading skills, Computer skills, Learning English

Introduction

Technology is changing. Education is changing. The resources available are changing. The role of the teacher in education is changing. The role of the student in education is changing. Educators must be prepared to teach a new kind of student. As one of the modern phenomena of the information age, electronic books have caused a rapid evolution in educational media since the early 1990s. The appearance of concepts such as electronic books and electronic learning into the field of education indicates the development of education and creation of the possibility to learn for everyone anywhere and anytime. 21st century learners are very different from 20th century learners. 21st students may need different approaches to instruction and different learning tools to excel. According to McHugh (2013), teachers in all areas of education are constantly dealing with a student make-up that is more strengthened and that grew up in a techno-drenched environment that has trained them to think and process information in different ways. Landouni and Diaz (2003) believe that electronic textbooks are counted as educational tools prepared in an electronic way, which utilize to deliver teaching and learning. In fact, electronic learning allows learners to access information for education easier and wider. It makes coordination and collaboration between instructors and students and shows more rate of success compared to the conventional method as well. However, it should be noted that such a use of modern media in the field of education requires financial support, technology-savvy, and a change in roles. In the past, electronic books had the similar or more prices compared to printed ones. Recently, the prices have decreased taking a positive step towards the use of

electronic books. Undoubtedly, encouraging readers to use electronic books will be much more economical and less time-consuming than making them use printed ones.

Readers of electronic books are able to search for their favorite topics more easily and rapidly compared to those of printed ones [24]. The possibility of accessing to desired content as well as the lack of need for physical presence in the library, time- and energy-saving and, sometimes, users' costs-savings are popular among readers of the electronic book. In addition, students like advantages such as the possibility of moving through the text, flexibility, possibility of saving a lot of resources in cell phone hard disk as well as the possibility of using electronic ink for recording subject matters and notes and prefer them to printed books [6]. The experience of reading an electronic book can be different from that of reading a printed book. Readers have different expectations for the two formats. A study conducted by the Pew Research Center found that people believe printed books to be better for reading with children and sharing books with others, while electronic books are better for reading in bed, having a wide selection of books to choose from, reading while traveling or commuting, and being able to get a book quickly [22].

According to a study done by Jones and Brown (2011), students preferred electronic books over traditional printed text because of the larger range of titles they could choose from as well as the additional text features available. The students in the study became swiftly familiar with the electronic books and welcomed the technology integration into their reading classroom. Reading electronic books comes with a lot of advantages for readers compared to reading printed books. For instance; using less paper, electronic books take up less space and are easy to carry, searching and note-taking is much easier, the font size can be changed as desired, purchasing is much faster and easier, preservation and protection is simple. Electronic books can be printed and published in a variety of file formats (HTML, PDF, LIT, PDB, etc.) [5, 25, 17, 28]

This research attempted to figure out the preference for employing e-books over printed books with English students in Champasack University. In general, traditional reading books are the main resources of reading practice which is far-reaching technology incorporated into learning and teaching. Not many lectures and students know E-books in the pattern of electronic books. It is necessary for university to supplied individual copies of core print books or e-books for students which serve to enhance student satisfaction and perception of value for money. Further potential is offered by E-books to personalize the provision of reading material to enhance the attractiveness of the offer to students. E-books have the potential to engage with strategic priorities to university: to enhance the student experience within technology learning environment, to drive innovation in learning and teaching; and to help to use technology effectively and efficiently.

E-books contribute to this scramble for competitive advantage by offering the exciting possibility of enhancing the student experience and producing better educated students. At a fundamental level, E-books enhance educational benefit by improving access to titles that students are expected to read. The introduction it to the classroom will be able to fulfill the scarcity of reading materials. Moreover, students will be accustomed to technology and learn to use it to support their reading skills. Because a wide range of reading resources typically retrieve from internet sources. Much more technology-savvy encourage them to reach to learning world. As a researcher would like to encourage them to employ more e-books when they are more affordable for them.

Research Objectives

The objective was to study the preferences of utilizing between E-book and Traditional book in reading English

Methodology

Design

The research was to study the preferences of utilizing between E-book and Traditional book in reading English in English Department, Champasack University. The study was descriptive research. The target group in this study comprised of 20 students of reading class. They are randomly assigned to be an experiment group to read with e-books. The orientation session was held to introduce to participants to know electronic reading device with an expectation that they can take full advantage of the multiple functions provided by this innovative reading device. Additionally, Researcher aimed at establishment of reading ability by use of the following reading titles: Arts and Leisure, Culture and History, Environment, Health, Science Facts, People Profiles, Social Science, Sports and Hobbies, Technology, Weird and Bizarre. Readers would read the realm of these titles to familiarize with topics, vocabulary, grammar structure and exercises.

Data collection and data analysis

The survey is developed with multiple choice questions and checkboxes in order for the survey to be self-administered by the participants. Another design choice was to use “forced choice” answers for each question. Therefore, for questions with multiple answers, participants were asked to select many answers relying on the truth. The data were analyzed with Microsoft Excel, data Analysis functions including descriptive statistics, and percentile. The data is also analyzed through charts and graphs to see where the majority of people fell in this debate. The majority of the questions required the participant to choose from a list of predefined responses, making the distribution of answers easily formatted into a graph for each individual question. By looking at the answers that the majority of people chose, it was clear to see whether E-books or print books are preferred.

Result

This survey was designed and conducted to determine evaluation of computer skills, platforms students prefer to read from, reasons to choose traditional books or E-books and characteristics of E-book design. All responses were anonymous.

I. General information

1. Age

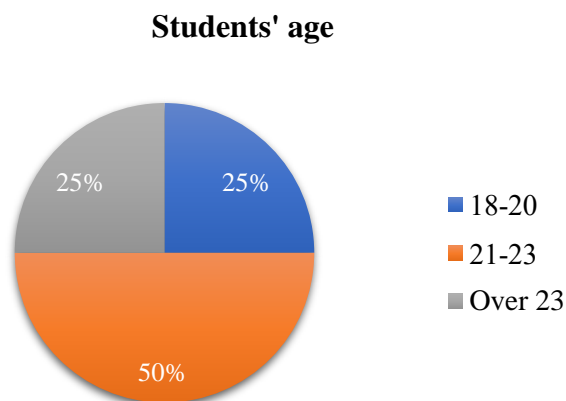


Figure1: The pie chart illustrated a range of students' age.

The target group in this study was students from the English Department, learning English as a major subject. 50% of age between 21 and 23, 18-20 and over 23-year-olds covered 25%.

2. Computer skill evaluation

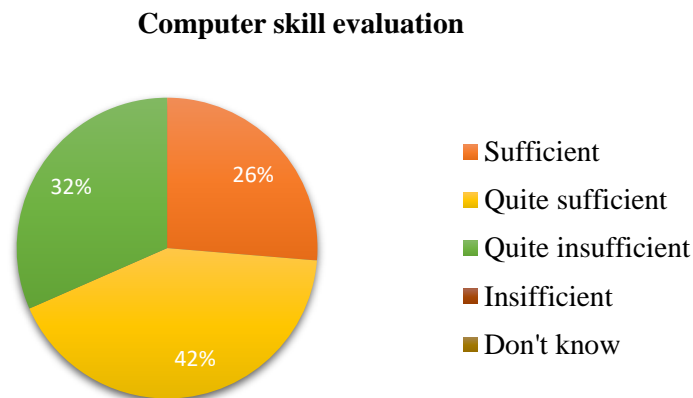


Figure 2: The pie chart illustrated computer skill evaluation

Computer skills in utilizing the computer were important to approach to digital learning world. The capacity and knowledge on it deliver learners using E-book, they can employ these skills to search interested reading topics on E-book sources. The study found that individual students had the different background in computer literacy, knowledge, and experiences. The frequency authentic of applying computer tent to more support reading on E-books. However, there were some students demonstrated they required skills on the computer (32%), whereas 42% of them had quite sufficient skills for learning with the computer. Only 26% stated they had the ability of computer command and had computer proficiency.

II. Information pertinent to E-book utilization

1. Platforms used to read E-books

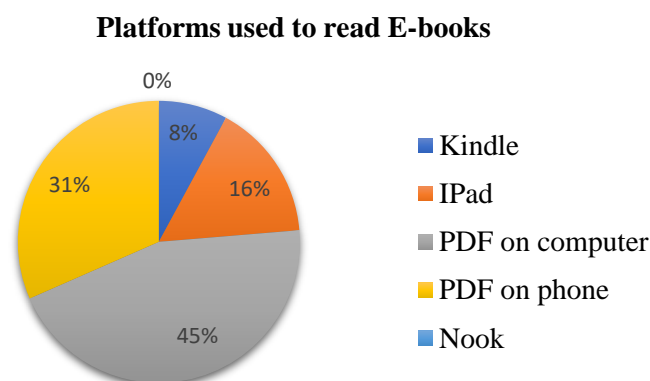


Figure 3: The pie chart illustrated platform used to read E-books

The convenience, approachability, and accessibility of reading platforms popularized and attributed to reading selected for reading on. The platform in this study included Kindle, iPad, and PDF on the computer, PDF on phone and Nook. The computer was a platform that most popular for readers to read on it because of its availability and prevalence (45%). A held-hand device as mobile was the second device selected to read on (31%). Reading on the Kindle platform was less popular because it was reliant on the internet connection to assess its platform. In addition, there was no result from Nook.

2. Printed and E-book on reading preferences

Reading preference on printed books and E-books

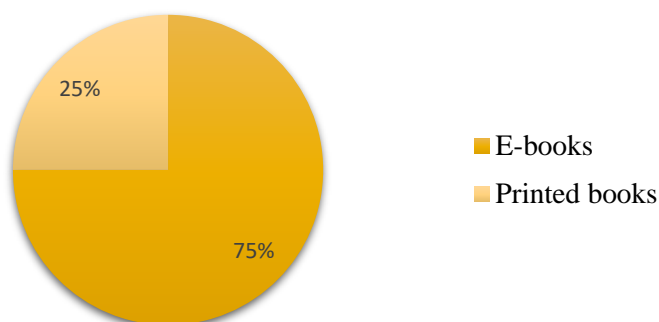


Figure 4: The pie chart illustrated Reading preference on printed books and E-books

Reading materials would come from different sources and offer a wide range of genres, topics, and interest of reader willingness to read for their pleasure and study. E-books would be the best choice for paper books because of its more accessibility to reading sources. Additionally, e-books is a novelty reading channel where they can search for a wide range of topics from platform. 75% of questionnaire respondent indicated they preferred to read from E-books, whereas 25% had the different reading preference. The reasons would be factors attributed to habits of reading preference, and their reasons would empirically explain in the following.

3. Factors to choose an E-book over a printed book

Factors to choose an E-book over a printed book

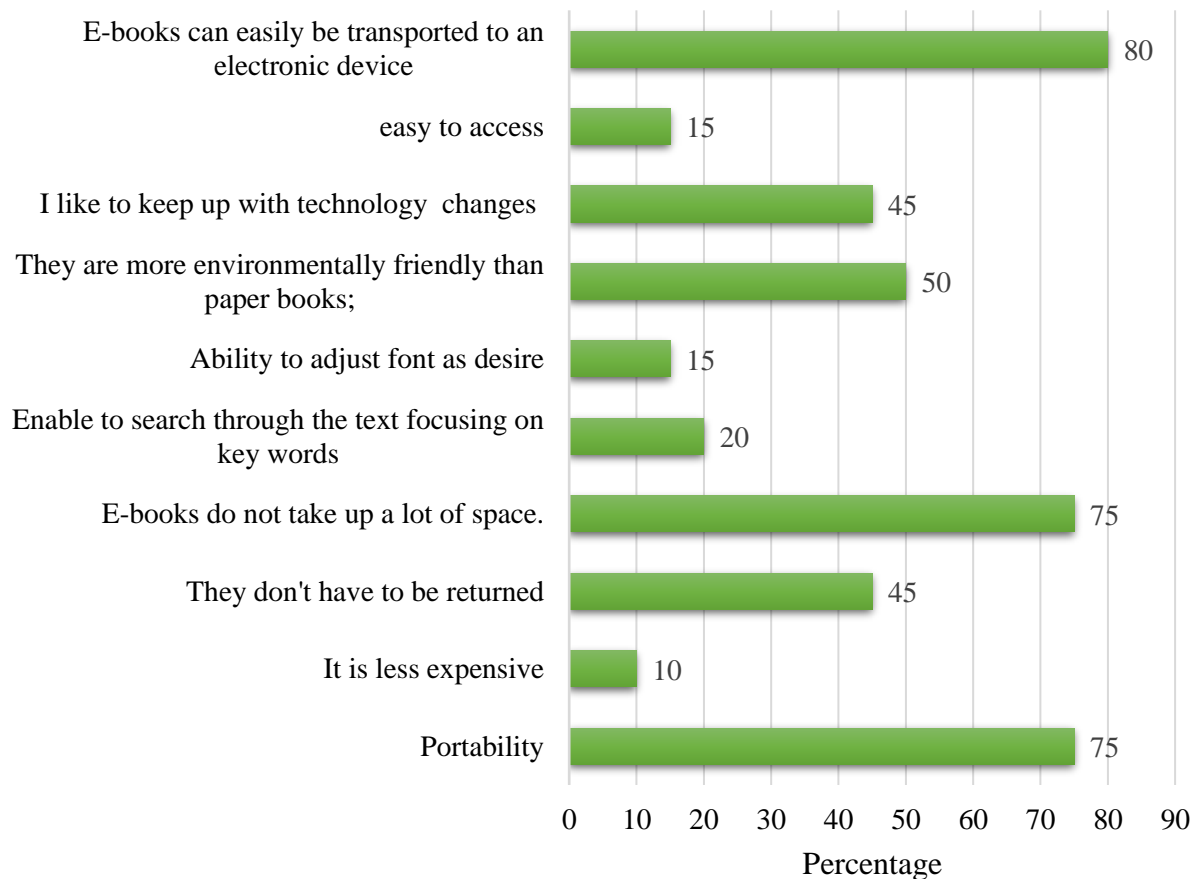


Figure 5: The bar chart illustrated factors to choose an E-book over a printed book

There would have many factors readers selected an E-book over a paper book. From the survey revealed that they decided to read on E-books because of its transportability to other electronic devices. The convenient factors attributed to favorite on reading 80%. Additionally, its portability and small space need for saving were the factors to choose E-books (75%). More traditional books currently transformed into electronic books, ease to contribute to media and more environmentally friendly than paper books led to E-books popularize among readers 50%. Generally, they enabled to save them on the personal device for further reading not to return to the library as printed books, so, they chose E-books instead of waste time to return where they borrow. There were some readers pointed out that they like to keep up with technology transformation (45%). Furthermore, they are able to search by placing keywords to link to texts (20%) The ease to access and font adjustability suitable to eyesight level were options to choose E-books (15%). More technology transformation provided more opportunities for readers to read and pay less for book purchase (10%).

4. Factors to choose a printed book over an E-book

Factors to choose a printed book over an E-book

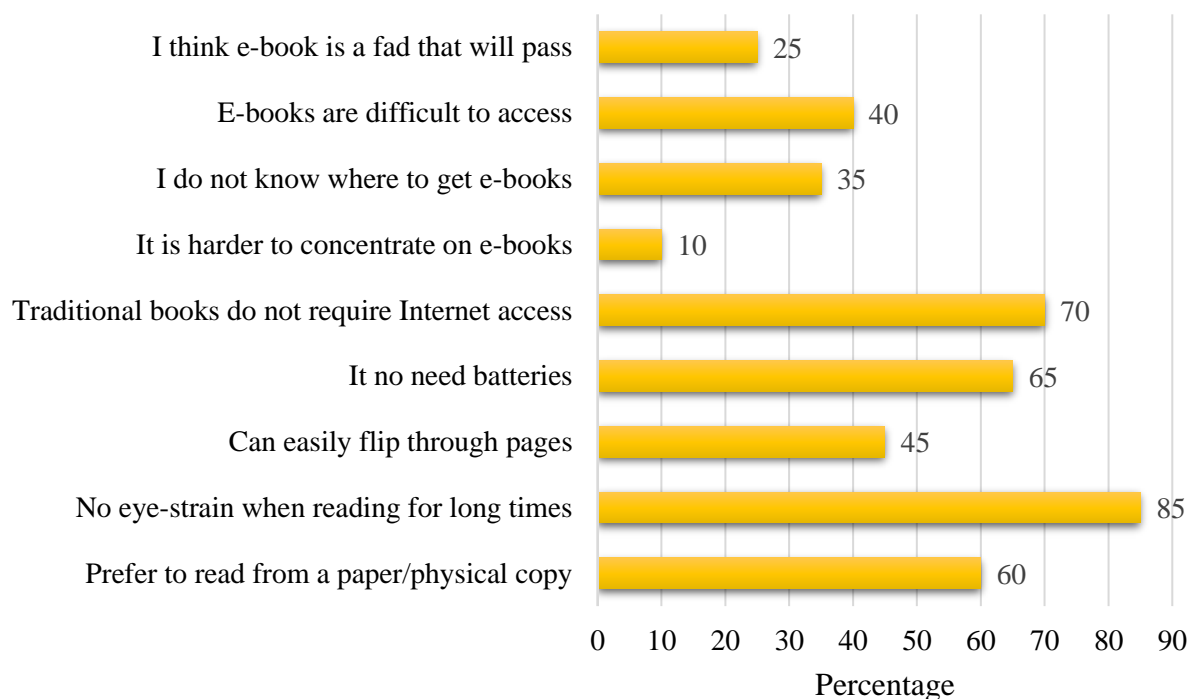


Figure 6: The bar chart illustrated factors to choose a printed book over an E-book

Reading needs eyesight energy to focus on what they are reading and concentrate to comprehend entire ideas. However, reading paper books will consume less eyesight energy and irritation more than read on E-books. According to bar chart above, it showed that many readers chose to read from tradition books reached to 85%. They insisted that the blue ray from electronic devices absolutely damage their eye sights. To protect and care for their eyes reading from paper books would be better. In addition to this, E-book access need to connect to the internet and it could be impossible to on it when they were unreachable internet (70%). They also preferred to read from physical copy or a paper because it easily flips through pages. They could lighten key words, underline or even circle important sentences on paper. Reading from physical books no need any batteries to run devices (65%). The limited computer skills attributed to novice users had the problems to access E-book sources (40%) and 35% of them indicated they did not know platforms available to read and download E-books. They thought that reading from E-books will be unstable innovation in education and then it is gone and unable to replace traditional books. They felt uncomfortable and less concentration when they had to stay on screen to read (10%).

5. Introduction and availability

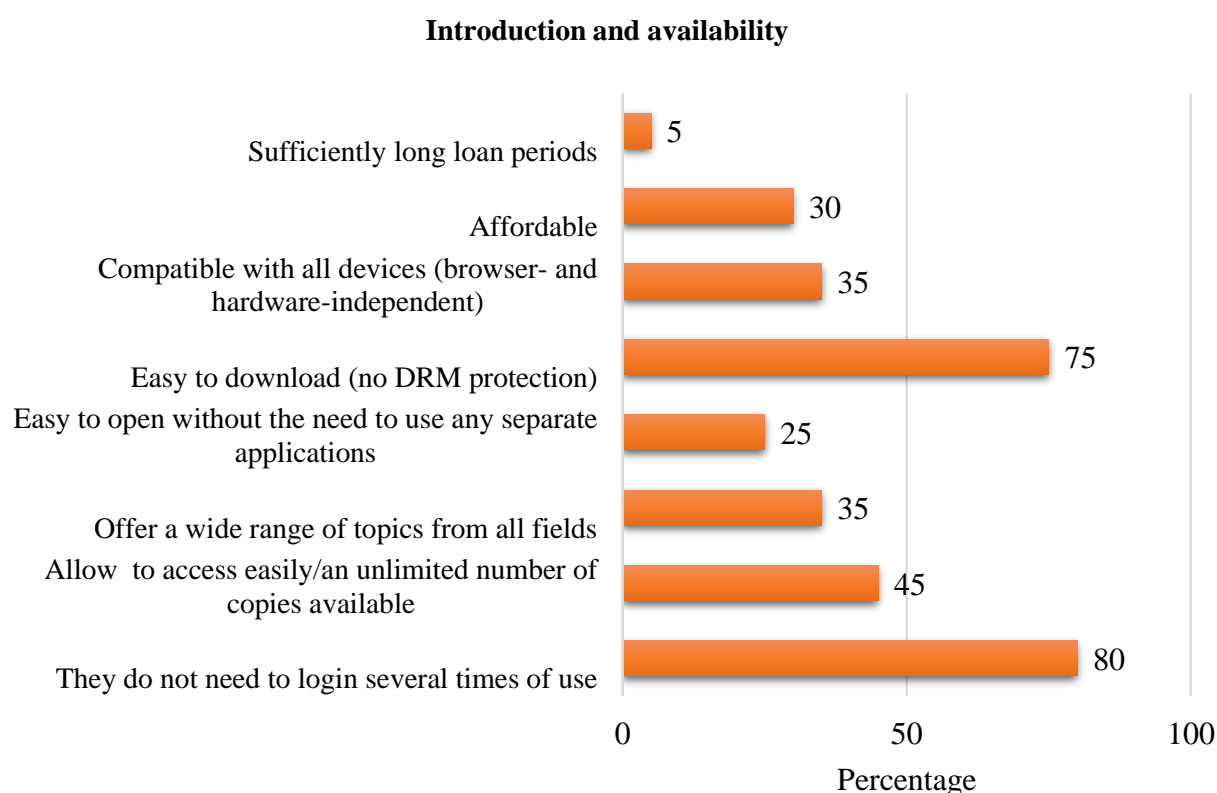


Figure 7: The bar chart illustrated introduction and availability of E-book

The availability and convenience of E-book platforms support more opportunity to access to reading sources. Platform builders deemed understanding the convenience to users. They adjusted platform access without login many times to ease readers reading on their platform (80%). Almost platforms allow readers to download books without DRM protection (75%). They can download a wide range of topics and offer up to date stories in each week. Additionally, file download was transformed to easily open and compatible with all devices (35%). As a result, readers were able to afford E-book.

6. Content, design, and appearance

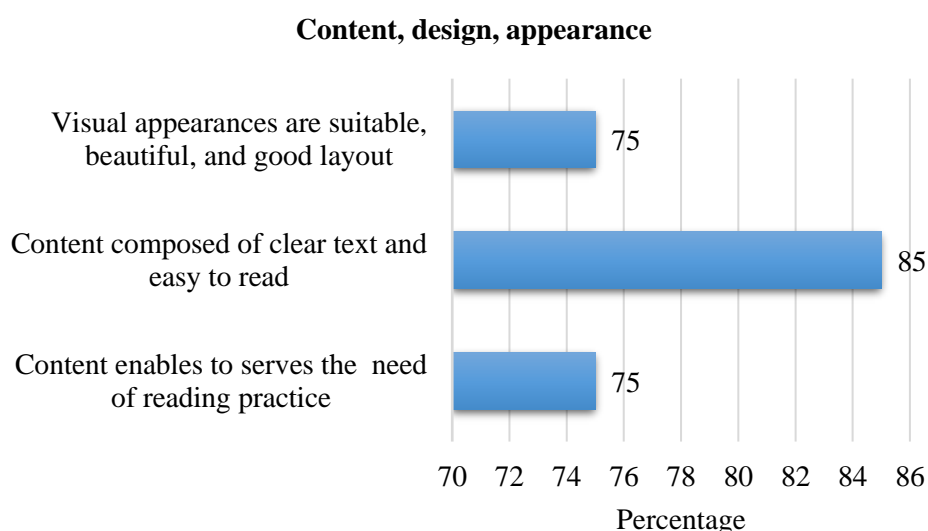


Figure 8: The bar chart illustrated content, design, and appearance of E-book

According to the bar chart above, it showed that clear text position support readers to close to the text. They enjoyed reading in beautiful fonts adjustment that encourages more understand to them (85%). They agreed that a suitable design layout and attractive visual appearances enabled to motivate reading and desire to turn to read it again. Furthermore, appropriate font and content adjustment are capable to serves the reading of reading practice (75%). The good design surged readers' intention on books and desire to read. The E-book design can be shown in the following figure.

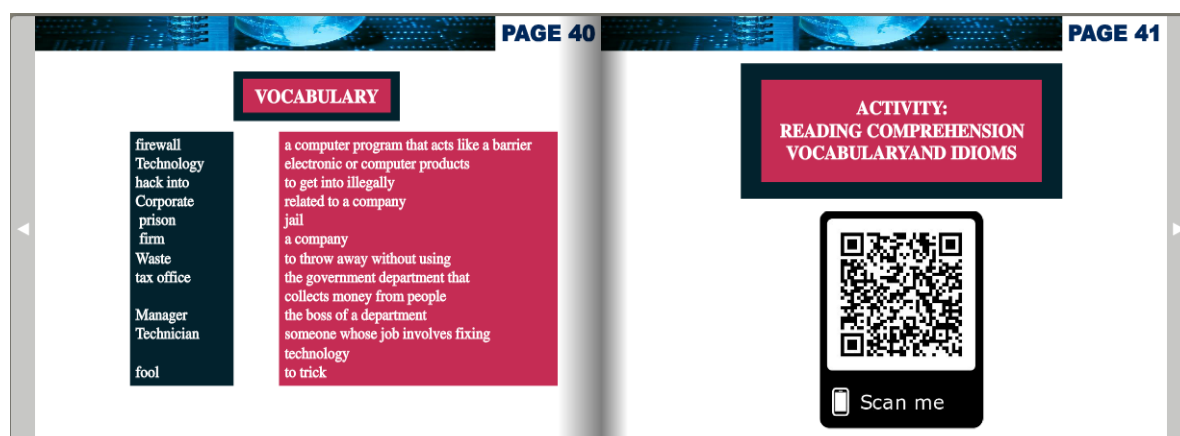
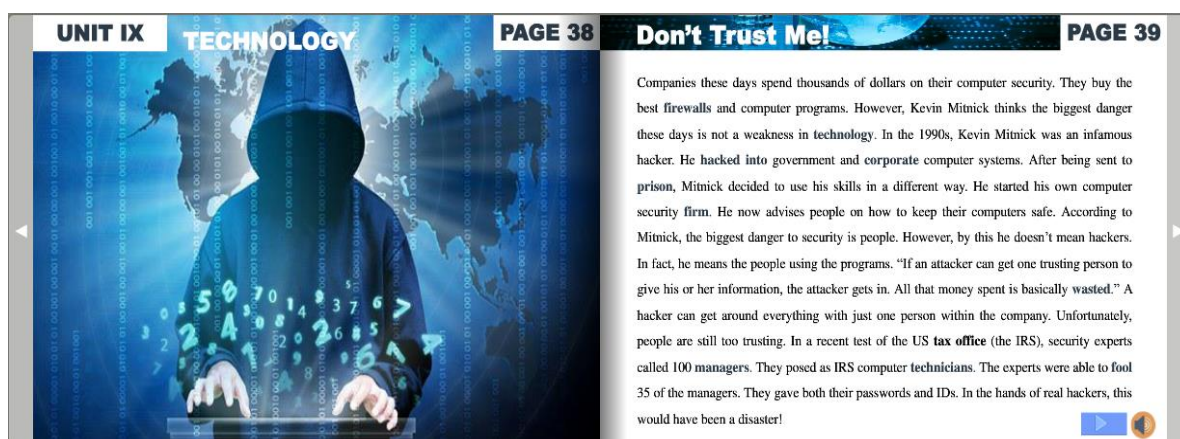


Figure 9: illustrated design of a unit components.

The design applied related picture interpreted to the story and lightened fonts in the content specified to keywords in the story accompanied by their definition explanation. The individual unit included an audio. Readers are able to listen to it on the same page while they are reading. This will increase motivation in reading. There was not only texts and audio accompany but it also included activities that allow readers to review on what they had read. The activities included reading comprehension and vocabulary idioms. They could be shown in the following.

Don't Trust Me!

*Required

Reading Comprehension

Choose the best answer.

1. What is the main idea of this reading? * 2 points

☐ Managers need to be more careful about who they talk to.
☐ Hackers can help us make our computers safe.
☐ Technology is not helpful if people aren't careful.
☐ It's important to get the newest technology.

Don't Trust Me!

*Required

Vocabulary and Idiom Review

A. Choose the best word or phrase to fill in the blank.

1. My cousin fixes pianos. He is a piano _____. * 2 points

☐ computer
☐ technician
☐ technology
☐ engine

Figure 10: illustrated activities accompany in individual unit

7. E-books' features

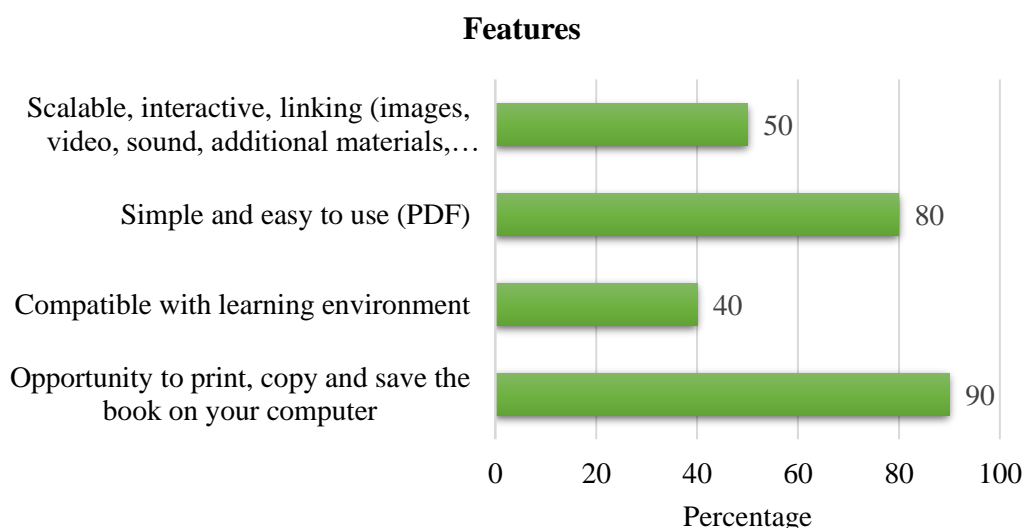


Figure 11: The bar chart showed E-books' features

From the bar chart above, 90% of the total questionnaire respondents answer that they satisfied reading on E-book because it enabled to print, copy and save books for further reading and no need to login on the platform again. The convenience and accessibility allow readers enjoyed reading with various interesting topics. 80% of them prefer to read in PDF version. Moreover, the design of interactive, scalable, linking increase more motivation and caught the attention to read. 40% of them preferred E-books because of its friendly learning environment. Paperless electronic books could save money to purchase them. They are not easily damaged like printed books.

8. Utilization

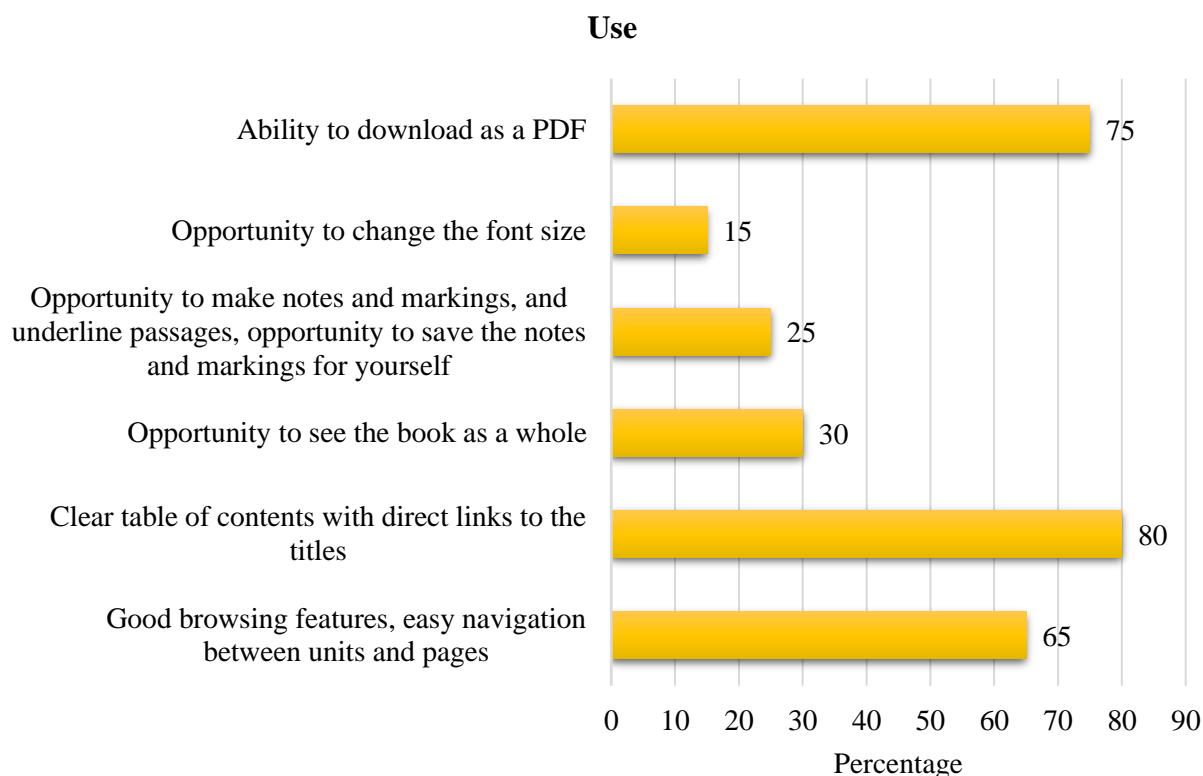
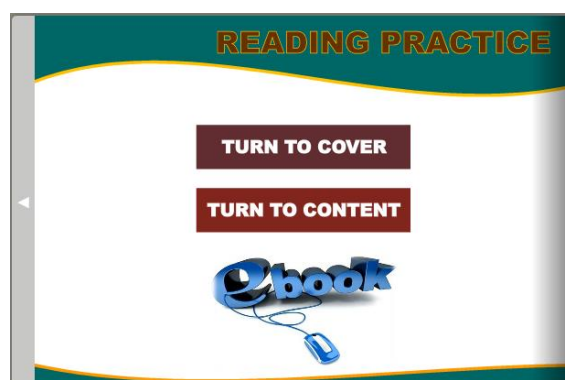
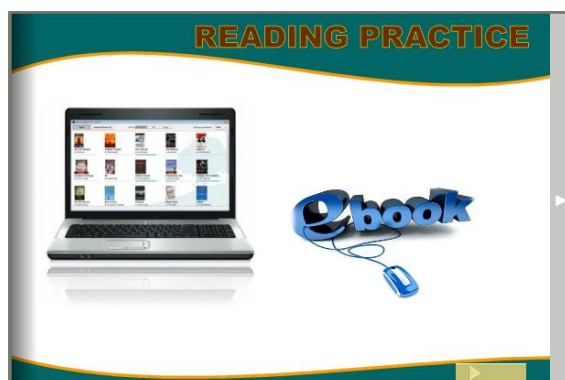


Figure 11: The bar chart showed utilization E-books

According to the bar chart above, it showed that the content quickly directs link to each unit (80%). E-books allowed readers to download as PDF files that more convenience to later reading (75%). The good browsing features, easy navigation between units and pages served the convenience for readers. They did not open page to page but they were able to flip the whole book. They could make notes and markings, underline pages, save the notes and markings while they were reading (25%). Additionally, they were capable of adjust fonts as desire to suit for their eye sight level.



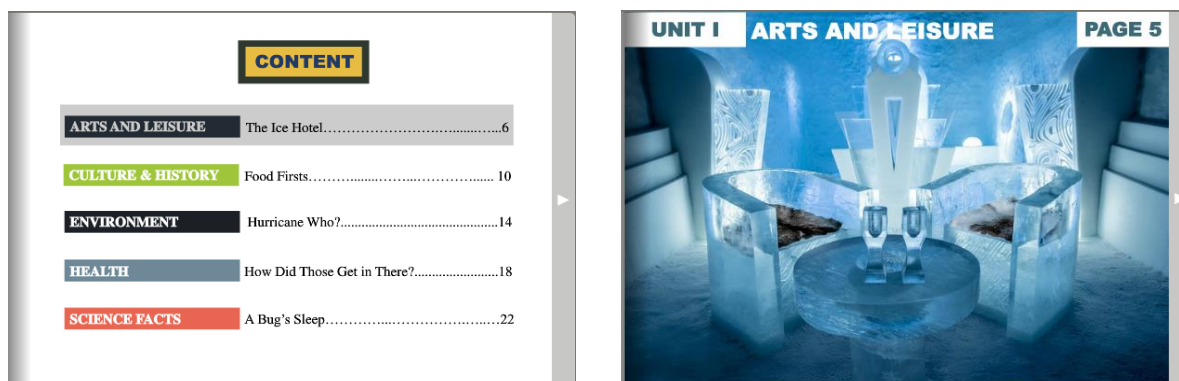


Figure 11: The illustration showed the links among units and pages

Discussion

Traditional texts are passive and unable to respond to individual readers. Software programs embedded in digital reading device offer a greater repertoire of comprehension cues and a fuller context for the story than traditionally printed texts. Many of the software programs allow students to have words, sentences, pages, or the entire book read to them. Many also play music, contain animations, or recite the names of objects as they are selected. Electronic books have the potential to build new learning and teaching possibilities that never appear before. They seem to be more flexible and accessible than paper texts. The benefits of electronic books over printed text are that electronic books cost less than the printed version after the initial cost and more availability. They are also more appealing to students, and allow them to download in form of other formats. The additional features available with interactive electronic books make them a more effective option in the reading classroom than traditional printed text.

Conclusion

The study found that individual students had the different background in computer literacy, knowledge, and experiences. Frequency use a computer impacted to computer skills, 42% of students had quite sufficient skills for learning with the computer. They need skills to access E-book platforms. Reading materials from platforms offered a wide range of genres, topics that readers E-books would be the best choice because of its more accessibility, availability and portability. The convenient factors attributed to favorite on reading 80%. Additionally, its portability and small space need for saving were the factors to choose E-books (75%). The ease to access and font adjustability suitable to eyesight level were options to choose E-books. The availability and convenience of E-book platforms support more opportunity to access to reading sources. Additionally, file download was transformed to be compatible with all devices. 90% of readers satisfied reading on E-book because it enabled to print, copy and save for further reading.

However, readers proposed the impact reading on E-book that it needed to connect to the internet and it could be impossible to on it when they are unreachable internet. They preferred to read from physical copy or a paper because it easily flips through pages. They could lighten key words, underline or even circle important sentences on paper. Reading from physical books no need any batteries to run devices. Furthermore, reading on a printed book facilitated for readers who had limited computer skills.

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References

- [1] Abdullah, N. & Gibb, F. 2006. A survey of e-book awareness and usage amongst students in an academic library. *Proceedings of International Conference of Multidisciplinary Information Sciences and Technologies*, 25-28 October 2006, Merida, Spain. Available at: <http://strathprints.strath.ac.uk/2280/1/strathprints002280.pdf>
- [2] Chong, P.F., Lim, Y.P. & Ling, S.W. (2009). On the design preferences for ebooks. *IETE Technical Review*, 26(3), 213-222. doi:10.4103/0256-4602.50706
- [3] Ciampa, K. (2012). Reading in the digital age: using electronic books as a teaching tool for beginning readers. *Canadian Journal Of Learning And Technology*, 38(2), 1-28.
- [4] Coyle, K. (2008). Managing technology. *The Journal of Academic Librarianship*, 34(2), 160- 162.
- [5] Day, R. (2001). Reading the future. *Popular Mechanics*. 178 (4), 82-85.
- [6] Gibson, C. and Gibb, F. (2011). "An evaluation of second generation e-book readers". *The Electronic Library*, 29(3), 303-19.
- [7] Huang, Y., Liang, T., Su, Y., & Chen, N. (2012). Empowering personalized learning with an interactive e-book learning system for elementary school students. *Educational Technology Research & Development*, 60(4), 703-722. doi:10.1007/s11423-012-9237-6
- [8] Jones, T., & Brown, C. (2011). Reading engagement: A comparison between e-books and traditional print books in an elementary classroom. *International Journal of Instruction*, 4(2), retrieved from ERIC database. (ED522678)
- [9] Landoni, M., Diaz, P. (2003). "E-education: design and evaluation for teaching and learning". *Journal of Digital Information*, 3(4).
- [10] Larson, L. C. (2010). Digital readers: The next chapter in e-book reading and response. *Reading Teacher*, 64(1), 15-22. doi:10.1598/RT.64.1.2
- [11] Larson, L. C. (2010). Digital readers: The next chapter in e-book reading and response. *Reading*
- [12] Maduku, D.K. 2015b. Factors of e-book use intentions: perspective of students in a developing country. *Perspectives on Global Development and Technology*, 14:597-618. DOI: <http://dx.doi.org/10.1163/15691497-12341364>
- [13] Martinez-Estrada, P., & Conaway, R. N. (2012). EBooks: The next step in educational innovation. *Business Communication Quarterly*, 75(2), 125-135. doi:10.1177/1080569911432628

- [14] Martinez-Estrada, P., & Conaway, R. N. (2012). EBooks: The next step in educational innovation. *Business Communication Quarterly*, 75(2), 125-135. doi:10.1177/1080569911432628
- [15] Maynard, S. (2010). The impact of e-Books on young children's reading habits. *Publishing Research Quarterly*, 26(4), 236-248. Doi: 10.1007/s12109-010-9180-5.
- [16] McFall, (2005). Electronic Textbooks That Transform How Textbooks Are Used. DOI: 10.1108/02640470510582754
- [17] McFall, (2005). Electronic Textbooks That Transform How Textbooks Are Used. DOI: 10.1108/02640470510582754
- [18] McHugh, J. (2013). "Connecting to the 21st-century student." *Edutopia*. N.p., 09 Sept. 2005. Web. 08Dec. 2013.
- [19] McKenna, L. D. Labbo, and R. D. Kieffer (Eds.), *Handbook of literacy and technology: Transformations in a post-typographic world* (pp. xi-xxx). Mahwah, NJ: Lawrence Erlbaum.
- [20] Mincic-Obradovic, K. 2010. *E-books in academic libraries*. Elsevier.
- [21] Pearman, C. J., & Lefever-Davis, S. (2006). Supporting the essential elements with CD-ROM storybooks. *Reading Horizons*, 46(4), 301-313.
- [22] Rainie, L., Zickuhr, K., Purcell, K., Madden, M., & Brenner, J. (2012, April 4). The rise of e reading. *Pew Research Center*. Retrieved December 17, 2012 from <http://libraries.pewinternet.org/2012/04/04/the-rise-of-e-reading/>.
- [23] Reinking, D. (1998). Synthesizing technological transformations of literacy in a post-typographical world. In D. Reinking, M. C.
- [24] Shelburne, W.A. (2009). "E-book usage in an academic library: user attitudes and behaviors". *Library Collections, Acquisitions, and Technical Services*, Vol. 33 Nos 2/3, pp. 59-72.
- [25] Snowhill, (2001). E-books and Their Future in Academic Libraries: An Overview. Volume 7 Number 7/8 *Teacher*, 64(1), 15-22. doi:10.1598/RT.64.1.2
- [26] Weisberg, M. (2011). Student attitudes and behaviors towards digital textbooks. *Publishing Research Quarterly*, 27(2), 188-196.
- [27] Woody, W., Daniel, D., & Baker, C. (2010). E-books or textbooks: Students prefer textbooks. *Computers & Education*, 55(3), 945-948.
- [28] Yildirim et al, (2011). Teacher Support, Motivation, Learning Strategy Use, and Achievement: A Multilevel Mediation Model. <https://doi.org/10.1080/00220973.2011.596855>

Analysis of the situation of English language teaching as a foreign language in a young university: the case of Savannakhet University (Lao PDR).

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Abstract

The aim of this paper is to investigate the determinants of the English teaching situation of Savannakhet University students in order to identify the cruxes that limit students to achieve the acquired level of English proficiency and to seek possible solutions to solve the problems. In order to gather the information for this study, three categories of questionnaires were designed and distributed to the three different groups of participants: policy makers, teachers and students. Both quantitative and qualitative data was analysed. The answers of the three groups of participants were analysed, compared, and intertwined. The solution is not a simple one, but the results show a clear proposal that can be applied.

Keywords: Teachers Training; English language Teaching; Laos Higher education; Teachers language Proficiency; Language teaching in Laos.

Introduction

After Laos established its independency in 1975 (Stuart-Fox, 1997), the French system of education was introduced and taught as a second language in school between the 1910s and World War II (Kounnavongsa, 2015). Later in 1986, when Lao PDR launched a program of structural reform known as the New Economic Mechanism (NEM) to accelerate the transition from the centrally planned to a market-oriented economy, English language became one of the pillars of Lao education (Intarapanich, 2013). However, in Laos as a developing country, it is difficult for the students to seek for opportunities to study or practice their English. Most students merely study at the schools without authentic materials nor practicing with native speakers or experienced English speakers.

In Lao educational system, university students are required to study English as a compulsory subject from the first to the last year of their degree. As a developing country, many international organizations are interested in Lao PDR and this is probably the reason why the demands for English is increasing in Laos (Bouangeune, Sakigawa & Hirakawa, 2008).

Even though English is given high priority in the university curriculum, the students' English level is generally low. Many of the graduate students plan to apply to labour markets which are located in the capital and the big provinces, but their low level of English proficiency affects directly to their finding of jobs. This means that this problem has a negative effect on the internationalization of the whole country, because the economy sectors such as tourism,

industry and business require skilful employees with a proficient level of English language. The result of employers' survey in 2014 showed that quality of graduated students at higher education institutions did not meet the demand of employers due to the lacking of professional skill, analysis, management and working skills (Education Sector Development Plan 2016-2020, Ministry of Education and Sport, Lao PDR, December 2015).

The specific aim of this paper is to investigate the determinants of the English teaching situation of Savannakhet University students in order to identify the cruxes that limit students to achieve the acquired level of English proficiency and to seek possible solutions to solve the problems. The study is going to focus on the following research question: Which are the reasons why students don't seem to progress in their learning process? Paragraph: use this for the first paragraph in a section, or to continue after an extract.

Literature review

One of the main problems in this field is precisely the lack of information. Although English was obviously introduced in Higher Education System after Laos entered into the Association of Southeast East Asian Nations (ASEAN) in 1996 (Kounnavongsa, 2015), this field is still very new in terms of research and results of the new applied policies. The most interesting issue is that the universities have started to include English language in their curriculums, but no needs analysis has been carried out in any of the universities. Each institution allows their English language teachers to create a syllabus according to their knowledge and feelings towards the students' needs, which means that it does not exist a national strategic plan which may serve as a route.

Needs Analysis

The term need analysis is a process of identifying problems of a target population and its potential solutions to these problems (Allison, 2000). It is a valuable analytical technique to define the resource of certain problems that occur in a specific group of participants. As for education, needs analysis aims to better understand the learners need that can contribute to successful curriculum or course planning. It involves carrying out some kind of activities with learners in order to find out which approach will help them to improve their knowledge and abilities in efficient method.

English language in Higher Education in Laos

In 1995, higher education was reformed by Lao government both in public and private education sectors. National University of Laos (NUOL) was established as a key stimulus for the reforms by the Prime Minister's Decree on Private Higher Education first in this year. Later it was subsequently revised in 2000, and established the Decree of the Higher Education Curriculum (National Standard) in 2001 (Seameo Rihed - UNESCO, Bangkok, 2006).

As an international language for communication, the need of learning English has increased in Lao due to the foreign investments in the past twenty years. English even plays a more curial role when Lao PDR became a member of the Association of Southeast East Asian Nations (ASEAN) in 1996 and World Trade Organization (WTO) in 2012 (Thongma, et al 2013a). Accordingly, the government pays now much attention to English in higher education.

Ineffective Second language learning

Confidence plays a crucial role in language acquisition. As Brown (1994) highlights, self-esteem or the level of confidence is a very important element to be a successful learner. Dislen (2013) believes that emotion plays a significant role in language acquisition and can determine success in language learning. Thongma et al (2013a) consider that the fact of not allowing children to express the opinion in the early stages in Laos education, make them lose confidence in using the language: Students become shy and too worried about making mistakes, which is another aspect that makes it difficult for them to have a good level of language.

A good course syllabus and an adequate curriculum design are also key issues according to Thongma et al (2013a), while Thongma et al (2013b) identify that the inappropriate instructional materials, teaching methods and learning strategies cause Lao students poor

performance of their learning English as a foreign language. Khader & Shaat, (2011) also point out that the external reason that affects Lao students' achievement gap in language learning are the disciplines and drills, which relate to the most traditional instructional design.

Research Methodology

Subjects

The subjects of this study belong to three different groups all belonging to the Savannakhet University in Laos: policy makers (N=2), English language teachers (N= 20; 65% males and 35% females) and students (N=33; (72.7 % females, and 27.7% males). The policy makers belong to the governing bodies of the university. The twenty teachers are in charge of academic and administration affair in six English classes from the first to the fourth year. The thirty-three English students are in their third year.

Data collection

In order to gather and investigate the information of the current situation of learning –teaching English at Savannakhet University, three categories of questionnaires were designed and distributed to three different groups of participants. All three questionnaires were passed online to the respondents through a survey link. The return rate was 100% for the policy makers and students, and 85 % for the teachers. All 52 completed questionnaires were used for data entry.

Data analysis

The quantitative data collected from the questionnaire was analysed using the Statistical Package of Social Sciences (SPSS) program. Descriptive analysis of frequency, percentage, mean and standard deviation was conducted for all the quantitative items in the questionnaire.

The qualitative data was analysed by coding and categorizing the information from the open-ended questions in the questionnaires.

Research Instrument

The questionnaires with both quantitative and qualitative questions were used:

- The questionnaire for students includes two main sections (1) general information and (2) the attitudes toward the English language class with a total of 19 questions.
- The questionnaire for teachers contains 3 sections (1) general information, (2) academic data, and (3) the attitudes toward teaching English with a total of 22 questions.
- The questionnaire for policy makers contains two sections (1) academic information and (2) administrative information. There is a total of 8 questions.

All three questionnaires were delivered to participants by an electronic format. The correspondents answered the questions through a link, provided via email, Facebook and Whatsapp sent by the researcher.

Results

In this section, we are going to present the results directly related to the research question.

Students' answers

More than half of students (54.5%) believed to be in the intermediate level (B2.1), a 24.2% stated to be in the beginner level B1.2 and a 12.1% considered themselves in the elementary level (B1.1). There is a 9.1% of students who define their proficiency level as an upper-intermediate (B2.2). When asked about the reasons why they take English language classes almost half of participants (42%) say that the reason is because it is considered a useful subject for their future careers. An 18.8% take the course because they like this field of study, while 17.4% plan to enrol a Master' degree aboard. However, there is a 7.2 % of the participants that selected the course to get an academic certificate.

The results show that more than half of participants (54.5%) think speaking is the most useful skill in English, while 39.4% of the participants consider reading is a constructive skill. Only a 6.1% believe listening is the most useful skill in English.

The survey also gives us an image of their attitudes towards the English language class: students express a good level of attitude towards the class with the average meaningful level between 3.42 to 3.90 which means that the class was interesting and enjoyable. The students also explain that the curriculum used was appropriate for their levels and the activities were

well designed and suitable for the learning context. But even though students had positive attitudes towards the class, they were not very positive towards the teaching-learning process, and when asked if the lesson met their needs the result was an average meaningful level of 2.27, which indicates a low level of satisfaction.

Based on the response of participants, the major challenge they face when learning English is the different language skills. Nevertheless, the second problem students mention is the lack of confidence and therefore, these two factors make them be passive learners.

In terms of their favourite aspect of the course, they like practicing the different skills in different activities. Class activities like group work, listening to songs or having activities in class in which they are the centre of the learning process are the aspects in which they are most interested. As for the instructors, students say that they would like to have some native English teachers.

When asked about the things they do not like in the course, students mention: the use of the mother tongue in class, the lack of proficient language teachers, and sometimes the teaching methods, which make the class boring. Besides the instruction, students also think the teaching materials should be improved.

The questionnaire also asked the students to give suggestions in order to improve learning-teaching process. Their answers were grouped in tags of topics:

- **Instruction:** many students suggest that the teachers should explain the lesson more clearly, they should pay attention while teaching, improve the teaching methods as well as improve their English level. They think that more speaking practices in class is needed and learning from different resources, not only from text books.
- **Skills:** students suggest to focus more on the reading skill, grammar, speaking and listening. It seems that for students, speaking is the most important one.
- **Materials:** students think that the university should provide more teaching materials and use more audio-visual aid in order to improve students' language skills, as they believe that the more practice, the better results.
- **Native teachers:** students show the necessity of having more native teachers.
- **Students attention:** interestingly, students also highlighted the necessity of paying more attention to the teacher in order to have better understanding.

Teachers' answers

The data shows that the teachers are relatively young: a 75.5% are between 24-30 years old and only 4 are between 31-45 years old. All teachers' (100 %) hold a Bachelor degree (all in English Language). More than half of them (58.8%) have merely 1-3 years of teaching experience, and a 23.5% have been teaching for 4-6 years. Only few respondents have more than 6 years of teaching experiences (17.6%).

The university has a training for trainer's program which attendance is highly advisable for the teachers. According to the survey, a 76.5% the teachers have completed the training of trainer (TOT) course.

About the language of instruction, sixteen out of seventeen participants answered that they use English as the language for the instruction in classes, the participant that uses L1 in class, says that it is difficult for student to understand the teacher at the beginner levels. The data also reveals that a 70.6% of the teachers interviewed are confident in teaching English, but there is a 29.4% that feels unconfident because they are inexperienced teachers. All teachers (100%) think they are teaching an appropriate level for university students.

Regarding the type of instruction, all teachers (100%) answered that they plan the lesson before the class: 47.1% say that they follow the index of a book, while a 41.2% create the syllabus on their own; there is only an 11.8% that use an already existing course. When asked in more detail about the materials they use, more than half of participants (52.9%), answered that they use visual aid to teach, while a 23.5% use audio-visual aid in class. The audio aid is used by a 17% of the teachers and only one answered to be using teaching material from the internet.

The survey also contained a question related to the teaching strategies they use: The data gathered reveals that a 33.3% of the teachers asked use Presentation-Practice-Production method to teach, a 25% use Task Based Approach and Communicative approach; there is a 13.9% of the participants who use Grammar Translation to teach in class. Interesting to mention, one participant declared that she uses her own method, but we don't have more details about it.

Teachers were also asked about the contribution of the policy makers at SKU in relation to English language teaching: most teachers (88%) feel they have support from the policy makers. On the other hand, an 11.8% think that they do not have an adequate support from the policy makers, especially because they feel that they do not have enough teaching materials, time and the right support for enhancing their teaching abilities such as training courses.

When asked about their instruction, participants have positive attitudes toward the quality of their teaching: the teachers fully believe that the lesson plans and teaching methods used meet students need (mean=1.70). Also, they think the content of the course book is concise and cover relevant topics (mean=1.76) and the current curriculum is very much appreciated by the students (mean=1.70). Moreover, the three main components of the teaching process that are considered as very much effective, are: the teacher satisfaction with the classes, on the success of their teaching process, the achievement of the goal, teaching quality and skills, the students' cooperation and attention. All of them with means between 2.00 and 2.47.

According to the English teachers' responses in the survey forms (qualitative data), there are some challenges that they are facing at the moment: 1) groups are too big (around 30 students per group), 2) the different levels of proficiency and lack of motivation of the students, 3) the low proficiency of teachers and 4) the low experience in teaching languages, 5) lack of teaching materials and the multiple tasks that the teachers have to fulfil (a part from teaching).

Policy makers' answers

In Savannakhet University, English language is included in the curriculum throughout the degree. As for facilitating learning and teaching processes, these participants state that the university has provided adequate facilities, teaching materials and English native speakers to assist the classes. Nevertheless, 50% of the policy makers were negative about giving more time and opportunities to English teachers to attend the seminars to develop their teaching abilities and skills.

All participants, answered that the university did not involve different stakeholders to create a stronger system, but they developed an own methodology for a better regulation: the university provides special funding to improve teaching quality / selection. Finally, all participants (100%) revealed that the university does not receive enough budget from the government to improve language teaching system.

In relation to the students, all respondents (100%) coincide in that the students do not have an acceptable English level when they finish their degrees. Interestingly, they explain that the possible reason is that the university does not have enough qualified teachers, and inappropriate teaching methods.

According to the policy makers, the circumstances that limit the improvement of the university policies are an inadequate curriculum of both administrative personnel and teachers, insufficient facilities and low budget. The respondents also mentioned that the most urgent matter is upgrading the level of English teachers and improve the English curriculum. Providing additional teaching materials and mobility to teachers and students is considered as a crucial policy to enhance the quality of teaching process.

Discussion

After analyzing all the qualitative and quantitative data gathered from the three group of subjects (students, teachers and policy makers), we can see that the answer to the research question proposed ('Which are the reasons why students don't seem to progress in their learning process?') is really complex, since there are many elements involved in the answer. In this

section, we are going to try to show the main issues that can be the reasons which hinder this improvement of language learning.

One of the main problems that can be easily takeld in this study is that the perception that the students have of their level is higher than what it is in reality: 54.8% of the students consider to have a B2.1 level, and even a 9.1% believe that they have a B2.2. Nevertheless, after reading the students' written answers, the authors of this paper can state that most of the students cannot compose the English basic sentences and many of them noted that they were unable to understand the words and produce an utterance when communicating with foreigners. This fact identified in this research is similar to the work of Thongma et al (2013b) who found that Lao students' English proficiency level was quite low. An interesting aspect is that the teachers state that they consider that they are teaching at an appropriate level, which makes us wonder, what is exactly that level? As far as we know, there is not a level test, or even a diagnosis of their level (we cannot forget that these students are third year students, and they are supposed to have studied English language in the former years). Another factor which is intertwined with the former one, is the students' lack of confidence to use the language, which makes them most of the times, passive learners. Students report themselves as very shy, which impedes interaction with native speakers (or teachers). This finding could be supported by some literature as Tokoz-Goktepe (2014), who found that the speaking problem of students was because they were afraid of making mistakes, but we would also mention the special character of Laos' students: very quiet and shy in class; not very eager to prompt with questions and doubts to the teacher.

The students also stated that they believe that speaking is the most important skill, followed by reading and listening. Since the teachers explained that they used mostly the approach of presentation followed by practice and production (33.3%), task-based approach (25%) and the grammar translation method (14%), we don't see here much opportunities to practice the speaking skill or make students be the centre of the learning process (as they state they would like being). Probably this is also the reason why some students have qualified the teaching methods as "boring". Interestingly, policy makers have also noted that many teachers are not using the right methods in class. Another interesting mismatch is related to the language of instruction: 94.1 % of instructors answered that English was used as the language of instruction. However, according to students' responses, the instructors devoted most of the teaching time using the L1. Even though it is believed that using L1 in the language classroom could be helpful for the students (Scrivener, 2005), the answers of the students in this research report using the L1 as something negative. This finding is supported by Thongma, et al (2013a) who state that the use of first language of the teacher caused students to have low proficiency levels. Moreover, a 29.5% of teachers admitted not to feel confident when using the L2 in the classroom, which is in our point of view, a percentage that should be zero since it comes from teachers with a Degree in English.

As we have seen in the teachers' answers, in opposition to students' opinion (who believed that instructors used inappropriate methods to implement the lesson), teachers have positive attitudes toward the quality of their teaching. Furthermore, the teachers were confident in that they encompassed high teaching quality and had a good teaching skills, but on the opposite, the students said that the class was not interesting, and that the teachers were not qualified enough. Moreover, policy makers believe that students do not have an adequate English level when they finish their degree.

The claim of having good resources and teaching materials is a problem that SKU's students seem to be facing. With respect of the teaching materials, 100 % of the policy makers said that the required learning materials and facilities are correct, however, 41.2% of the instructors hesitated with the sufficiency of teaching resources provided. In the same line, the findings from students' questionnaire show that the classroom does not have enough documents, course books and the use of new technologies is very low, which causes low students' performance in the classroom. Seven and Engin (2007) found that the students that

showed positive attitudes toward the use of materials are more effective in permanent retention of knowledge. Referring to Warschauer (1996), in language learning, technology has been used as key equipment in encouraging and reinforcing students' perceptions. In other words, it inspires students to practice the language, and help them increase language skills. Therefore, the lack of teaching materials may cause low attention of students.

Another element that is important to be taken into account for a good diagnosis of the problem is the size of the groups: teachers say that they have around 30 students in each class, and that the groups are multi-level. This probably affects the motivation of the student, since the teacher cannot answer to all the necessities of the students, and some of them may feel bored while others may feel that they don't progress. In fact, this is Krashen's Input Hypothesis (1987), that states that the learner can only improve in their second language acquisition process when he/she receives second language input that is one step beyond his/her stage of L2 competence.

Interestingly, both teachers and students had similar ideas on the necessity of improving teachers' knowledge and abilities related to English language teaching. For instance, to improve the ability to explain the lesson more clearly in English, to pay more attention to the class (e.g. making sure that the students are following the explanations), to take into account the diverse student levels, to use the target language as the primary mode of instruction, to learn different teaching approaches, to devote more time to students' needs analysis and lesson planning in order to provide enough teaching aids. Additionally, both the teachers and the students highlighted necessity of increasing the practice in class and decrease the teacher-centered lessons. Regarding this aspect, the policy makers expressed their agreement with the necessity with the need of implementing the new policies toward the improvement of the curriculum of the English language teachers as well as providing more and better materials as well as increasing teachers and student's mobility.

Conclusion

One of the most important things that the policy makers said in their surveys is that the university does not receive enough budget to cover all the needs that it has, let alone to cover for the second language teaching needs. For all who work at higher education institutions, we all know that this fact can be a cul-de-sac road when trying to implement new regulations and strategies. Nevertheless, SKU policy makers are really positive and seem to be aware of the specific necessities in this field, which is a really important point: once the problem is tackled and defined, the solution seems to be nearer.

Since the students have a clearly lower proficiency level than what they believe, by having a language test at the beginning of each year, the teachers could have a better image of the starting point and therefore they would be able to create their own curriculum (with the help of whatever materials they think are needed). It could also be important to have smaller groups of students, and the teachers of each level should work together in the design of the materials, activities and agree with the methodology to be used. Maybe, if a teacher is more comfortable teaching with the Grammar Translation method, this method could be applied to some activities during the different courses (so each course should be taught by at least two teachers), or maybe to the group of students who need a specific focus on grammar. In this way, teachers would share ideas and learn from each other.

One of the most important characteristics is that this university is very young. This is a very good aspect, because usually teachers tend to be very positive, full of energy and with a high level of motivation. But on the other hand, this amount of motivation seems to make them not to see the whole picture; basically it is because teachers lack of teaching experience. Probably, they could seek the help of a senior teacher (maybe this could be one of the policy makers' task) to show them the way for one or two years. We all know that this novelty and lack of experience reaches an end with some time spent in the job.

It is also very positive that all the policy makers answered that the university can definitely implement new policies in order to upgrade students' English proficiency, which

seems to agree with decree on higher education, article four, of the Government policy on higher education, No 177/G, dated June 5th, 2015.

We also believe that one of the first things that should be done, is a revision of the content of the TOT courses. The university seems to be making a big effort by offering these teacher training courses, which is extremely positive, therefore the key issue would be to see if the content of these courses match the teachers' necessities. Also, one of the policy makers stated that teacher should not be given more time to participate in these courses: this is probably due to the amount of administrative tasks that teachers have to perform. Unfortunately, we don't have a solution for this, since this seems to be an epidemic problem that is spread all over the universities in the world. But for a university that is so young, and that still needs to form their teachers, maybe they could do an exception.

Finally, one of the most important topics raised in the answers of the policy makers' surveys is that they feel that there's an urgent necessity to improve the curriculum of the teachers and increase the mobility programmes. Without any doubt, we completely agree in these two points, which are interrelated: internationalisation of the faculty and students, and an increase of international research (through Masters projects, Doctorate thesis and published papers) are the pillar of a first class university. Without any doubt, Savannakhet University (Lao PDR) may have a long way to go (as all young universities have had), but it is in the right path.

References

Brown, H.D (1994). Principles of language Learning and Teaching. Practice. Hall. Cheater 6: Personal Factor, pp 136-138.

Bouangeune, S., Sakigawa, M., & Hirakawa, Y. (2008). Determinants and issues in student achievement in English at the Lao Secondary Education Level. *The Asian EFL Journal*, 10(1), 48-64.

Dislen, G (2013) The Reason of Lack of Motivation From the Students' and Teachers' Voices, *ASOS journal, The Journal of Academic Social Science*.

Intarapanich, C. (2013). Teaching methods, approaches and strategies found in EFL classrooms: A case study in Lao PDR. *Procedia-Social and Behavioral Sciences*, 88, 306-311.

Kounnavongsa, S. (2015). An Overview of the State of Language Policy/Practice in Lao PDR. *English for ASEAN Integration: Policies and Practices in the Region*, 65.

Kramsch, C (2000) Second Language Acquisition, Applied Linguistics, and the Teaching of Foreign Languages, *The Modern Language Journal* 84, 332.

Krashen, Stephen D. (1987). Principles and Practice in Second Language Acquisition. Prentice-Hall International.

Khader, K. T., & Shaat, M. (2011). Reasons behind non-English major university students' achievement gap in English language in Gaza Strip from students' perspectives. Retrieved from www.qou.edu/english/.../pdfFiles/khaderKhader.pdf.

Scrivener, J., (2005). Learning Teaching: A Guidebook for English Language Teachers. Macmillan.

Seameo Rihed (Southeast Asian Ministers of Education Organisation. Regional Centre for Higher Education and Development). (2006). Higher education in South-East Asia. Decree of the Higher Education Curriculum (National Standard) in 2001. UNESCO Bangkok. Asia and Pacific Regional Bureau for Education. <http://unesdoc.unesco.org/images/0022/002272/227242e.pdf> . Retrieved on the 14/10/2017.

Souriyavongsa, T., Rany, S., Abidin, M. J. Z., & Mei, L. L. (2013). Factors causes students low English language learning: A case study in the National University of Laos. *International Journal of English Language Education*, 1(1), 179-192.

Souriyavongsa, T., Abidin, M. J. Z., Sam, R., Mei, L. L., & Aloysius, I. B. (2013). Investigating Learning English Strategies and English Needs of Undergraduate Students at the National University of Laos. *English Language Teaching*, 6(10), 57.

Seven, M. A., & Engin, A. O. (2007). The Importance and Effect of Using Aid Materials in Foreign Language Teaching. Online Submission.

- Stuart-Fox, M. (1997). *A history of Laos*. Cambridge University Press.
- Titcomb, A.L. (2000), *ICYF Evaluation Concept Sheet*, University of Arizona. <https://www.scribd.com/document/65262252/Needs-Analysis> . Retrieved on the 14/10/2017.
- Tokoz-Goktepe, F. (2014). Speaking problems of 9th grade high school Turkish learners of L2 English and possible reasons for those problems: Exploring the teachers and students' perspectives. *Procedia-Social and Behavioral Sciences*, 116, 1875-1879.
- Warschauer M. (1996). Computer assisted language learning: An introduction. In S. Fotos (Ed.), *Multimedia language Teaching* (pp.3-20). Tokyo: Logos International.
- Yin, C. (2008). *Language learning strategies in relation to attitudes, motivations, and learner beliefs: investigating learner variables in the context of English as a foreign language in China* (Doctoral dissertation).

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Determining buffer zones for conservation planning of plant diversity, Dong Na Tard Provincial Protected Area, Lao People' Democratic Republic (Lao PDR)

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Abstract

Buffer zone plays an important role for conservation planning and sustainable utilization of plant diversity at Dong Na Tard Provincial Protected Area (Dong Na Tard PPA). Although the park has been established since 1961, the buffer zone has not yet been designed due to lack of available information. The objective of this study was to ultimately conserve plant diversity through establishment of appropriate zoning. Specifically, it aimed to determine buffer zone widths in each section for conservation planning. Influential factors were designed by experts' adjustments using Likert Scale. Preference weights of criteria with respect to the width of buffer zone in sections were decided independently by group of Key Informant Interviews (KIIs). Analytic Hierarchy Process (AHP) method was employed to design and analyze the buffer zone widths. There were four sections (I to IV) of buffer zone widths with 155 m, 160 m, 174 m and 189 m, respectively. The buffer zones should be institutionalized through a policy to ensure conservation of plant diversity and sustain ecosystem services for the local people and societies.

Key words: Dong Na Tard PPA; core area; influential factor; buffer zone width

Introduction

Interaction of the local people with plant diversity is a major concern in Dong Na Tard Provincial Protected Area. If unplanned, overexploitation of plant resources can be very damaging to species diversity and the environment. Therefore, it is urgent to protect the habitat (Larsen et al., 2012) by establishing buffer zones around the core areas (e.g., areas of high value of species diversity).

Setting buffer zones is a widely-used approach to achieve desired conservation outcomes in protected areas. The biosphere reserve concept launched by UNESCO's Man and the Biosphere Program in 1979, provides a useful model and starting point for bioregional management. In this model, a protected core area is surrounded by a buffer zone and then a transition area (Li et al., 1999). They are important zones for conservation planning (Regan et al., 2007) benefitting human well-being through the services the ecosystems provide (Turner et al., 2012; Larsen et al., 2012). The core areas and their buffers should each have a definite boundary, and the transition zone as a whole is usually not strictly delineated (Li et al., 1999; MAF 2011). Additionally, the buffer zone is usually a key aspect for the park's management because it is a link between the park's managers and the local people (Li et al., 1999). Hence, a well-justified buffer zone is the key and basis for a park to exist and develop.

However, the establishments of buffer zone widths require available information on constraints of buffer zone widths from experts' judgments and weighting of influential factors for the perceived criteria from key informant interviews (KIIs). To date, this information is not available at Dong Na Tard PPA. This study aimed to identify the buffer zone widths in four sections of the park. The results of the study can be used to develop conservation plans, policies, and strategies for sustainable utilization of plant diversity at local levels. On the other hand, the procedure and methods adopted in the study could be adapted to use in other similar protected areas.

Methodology

Study sites

Dong Na Tard PPA is located in Savannakhet Province, Lao PDR covering a total area of 6,385 ha (Fig. 1). It lies between 16° 35' 20" and 16° 40' 40" N latitude and between 104° 50' 00" and 104° 57' 10" E longitude. It is influenced by the North-East and South-West monsoons causing highly uneven rainfall. The annual average temperature is 27.2 °C, while the relative humidity is 74%, and rainfall is 1,445 mm year⁻¹ (Somphong and Inocencio, 2017).

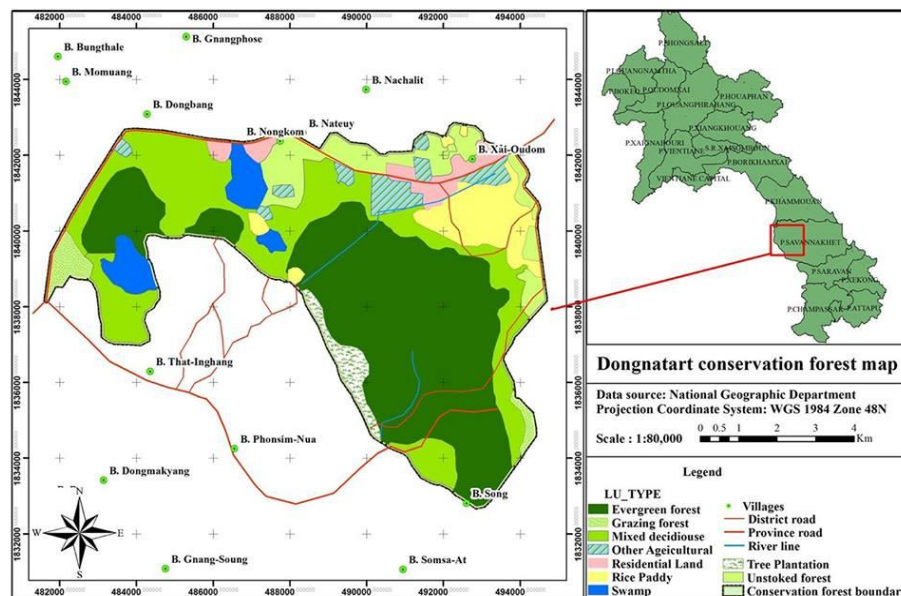


Figure 1: Map of Dong Na Tard Provincial Protected Area. Villages located in and around the park are marked with green dots

Data collection

Procedures of data collection were adapted and modified from Wong and Li (2006). The first aimed to collect general views from experts and practitioners using Likert's scale (where 1 represented "not important at all", and 5 represented "extremely important". Only those criteria with mean ratings above or equal "4" (high important) were included for consideration. The second, analytical hierarchy process (AHP) method was initiated with groups of key informant interviews (KIIs) to prioritize and assign the important weightings for the perceived criteria in general views.

Data analysis

The AHP method was used to evaluate each criterion serving as powerful tool to consider complicated criteria that it decomposes into hierarchical structure (Saaty, 1980). The first step was to decompose the objective into a hierarchical structure. The second step was to create pairwise comparison metrics for weighting the importance of criteria and relative priority of decision alternatives. The comparison and consistency for random judgments can be made using a nine ratio scale and consistency random index (RI) (Tables 1 and 2). For the third step, the consistency ratio (CR) was computed to indicate that the weights decided by expert teams were acceptable or not ($CR \leq 10\%$).

Table 1: Scale of comparison (Saaty, 1980)

Scale	Degree of preference	Explanation
1	Equal importance indifference;	Equal importance or
3	Moderate importance of one factor over another	Experience and judgment slightly favor one activity over another;
5	Strong or essential importance	Experience and judgment strongly favor one activity over another;
7	Very strong importance	An activity is favored very strongly over another; its dominance is demonstrated in practice;
9	Extreme importance	The evidence favoring one activity over another is of the highest possible order of affirmation.
2,4,6,8	Values for inverse comparison	

Table 2: Consistency random index (RI) values (Saaty, 1980)

Order of matrix	1	2	3	4	5	6	7	8	9	10	11	12
Average RI	0.00	0.00	0.58	0.90	1.12	1.24	1.32	1.41	1.45	1.49	1.51	1.48

The relative weights of the influential factors were computed based on the matrix of pairwise comparisons using the eigenvalue method, i.e. $A\omega = \lambda_{\max}\omega$. The eigenvector ω corresponding to the largest eigenvalue λ_{\max} was used in the estimation of relative weights.

A consistence index, CI , measuring the inconsistencies of pairwise comparisons (Saaty, 1980), can be computed as follows:

$$CI = (\lambda_{\max} - n) / (n - 1)$$

A consistence ratio, CR , also measured the coherence of the pairwise comparisons (Saaty, 1980), as follows:

$$CR = CI / RI$$

Where, RI called random index, is the consistency index of a randomly generated reciprocal matrix from 1 to 9. As a rule of thumb, a CR value of 0.1 or less is considered acceptable (Saaty, 1980).

However, the weights of pairwise comparison of each group of KIIs would not be the same judgments. Teknomo (2006) suggested the computation of the priority matrix for each survey response first before making a geometric average to aggregate the results. The geometric average is defined as the n^{th} root of the product of n numbers used when comparing different criteria using advantage of Excel's matrix multiplication function GEOMEAN.

The relative priorities of decision alternatives with respect to the width of buffer zone were estimated using a simple linear function (Li et al., 1999) as follows:

$$WD_i = \sum_{j=1}^n W_j P_{ij}$$

Where WD_i is the relative priority of decision alternative i with respect to the width of buffer zone; W_j is the weight of the factor j ; n is the number of factors considered; P_{ij} is the relative priority of alternative i with respect to factor j .

Lastly, the width of buffer zone (Li et al., 1999) was calculated as follows:

$$\bar{B} = \sum_{i=1}^n WD_i \times B_i$$

Where \bar{B} is the designated width of buffer zone; B_i is the width of buffer zone of the decision alternative i . The results of identifying the core, transition, and buffer zones were then employed using GIS spatial analyses (Bantayan et al., 2015).

Results

Influential factors designed by experts' adjustments

There were 30 experts who were presented with the proposed selection criteria. The results showed that there were four criteria for considering the buffer zone widths: (1) socio-economic

characteristics of local people (*SO*); (2) environmental quality (*EN*); (3) human disturbances (*HU*); and (4) distance from road and residential areas (*DI*) (Table 3).

Table 3: Criteria selected by expert judgments. Scales 4 and 5 were considered for criteria in establishing buffer zone widths

Proposed criteria	Likert Scale				
	1	2	3	4	5
Socio-economic criteria	8	5	4	9	4
Environmental criteria	2	9	5	10	4
Human disturbances	5	1	4	10	10
Distance criteria	3	2	4	15	6
Park management	10	12	8		
Policy	1	12	17		
sum	29	41	42	44	24
Percent	16.1	22.8	23.3	24.4	13.3
Mean	4.8	6.8	7.0	11.0	6.0
Standard deviation	3.5	4.9	5.1	2.7	2.8
ANOVA, p-value = 0.04					

Remarks:

- Likert scale: 1 represented not important at all, and 5 represented extremely important.
- 1 to 17: number of respondents answered the questionnaire.
- Bold numerical numbers are acceptable levels for considering criteria.

Formulation of hierarchies

Before designing the paired comparison matrices, the decision hierarchies were formed (Fig. 2). The hierarchies reaffirmed the results of the general survey and depicted the attributes in considering the buffer zones. There were four levels of hierarchies such as the level 1 defined the objective of the decision problem, *i.e.* width of buffer zone. In level 2, the objective was decomposed into two major criteria, namely direct and indirect criteria. At level 3, each major criterion was divided into sub-criteria which are meaningful to key informant interviews (KIIs) to weight and make decision regarding buffer zone widths. Level 4 or the lowest level of the hierarchy represented the four decision alternatives for establishment of the buffer zone widths.

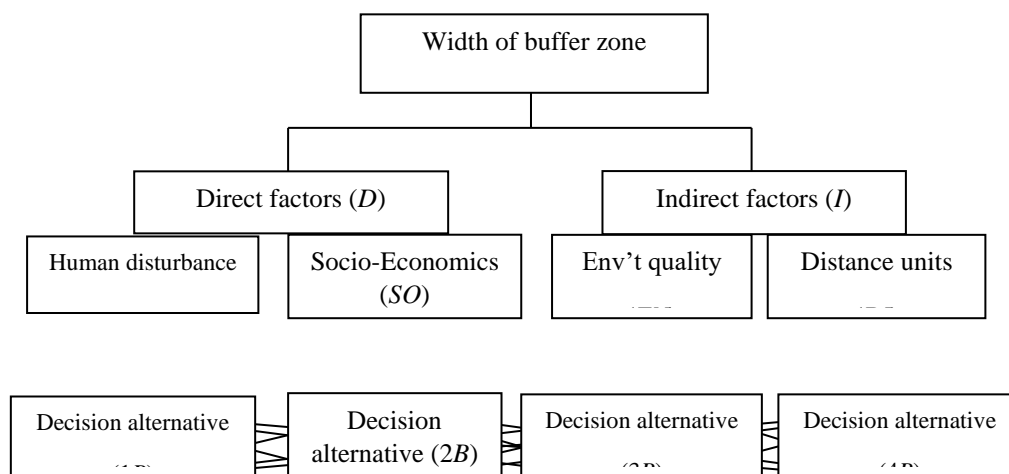


Figure 2: The decision hierarchy of designing buffer zone widths in Dong Na Tard Provincial Protected Area

Preference weights of criteria

Each group of KIIs weighted preference independently to establish the relationship among the criteria with respect to buffer zone widths in each section (Table 4). The results were then used to weigh importance of criteria with respect to buffer zone widths (W_j) (Table 5).

Table 4: Geometric average of ten (10) groups of key informant interviews

Criteria	Groups										Geometric average
	1	2	3	4	5	6	7	8	9	10	
Section I											
<i>HU</i> VS. <i>SO</i>	1.00	1.00	0.20	0.33	1.00	0.33	3.00	3.00	3.00	1.00	1.00
<i>HU</i> VS. <i>EN</i>	0.33	0.20	0.33	0.33	0.20	0.14	1.00	0.33	0.33	1.00	0.33
<i>HU</i> VS. <i>DI</i>	1.00	1.00	1.00	3.00	0.33	1.00	1.00	1.00	1.00	1.00	1.00
<i>SO</i> VS. <i>EN</i>	0.20	0.33	0.14	0.33	0.33	0.20	0.33	0.20	0.33	0.14	0.20
<i>SO</i> VS. <i>DI</i>	3.00	0.33	3.00	3.00	0.20	3.00	3.00	3.00	5.00	5.00	2.00
<i>EN</i> VS. <i>DI</i>	3.00	3.00	3.00	3.00	3.00	5.00	3.00	3.00	5.00	1.00	3.00
Section II											

<i>HU VS. SO</i>	1.00	3.00	0.33	1.00	1.00	0.33	3.00	1.00	1.00	1.00	1.00
<i>HU VS. EN</i>	0.33	0.33	1.00	0.20	0.33	0.20	0.33	0.33	0.33	0.33	0.33
<i>HU VS. DI</i>	1.00	3.00	0.33	1.00	1.00	1.00	0.33	3.00	1.00	1.00	1.00
<i>SO VS. EN</i>	0.33	1.00	0.20	0.33	0.33	0.20	1.00	0.20	0.20	0.33	0.33
<i>SO VS. DI</i>	5.00	1.00	3.00	5.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
<i>EN VS. DI</i>	3.00	5.00	1.00	1.00	3.00	1.00	3.00	1.00	3.00	3.00	2.00

Section III

<i>HU VS. SO</i>	3.00	5.00	1.00	3.00	5.00	3.00	3.00	1.00	5.00	5.00	3.00
<i>HU VS. EN</i>	7.00	5.00	3.00	7.00	5.00	5.00	5.00	5.00	3.00	7.00	5.00
<i>HU VS. DI</i>	3.00	1.00	1.00	1.00	0.33	1.00	1.00	1.00	1.00	1.00	1.00
<i>SO VS. EN</i>	3.00	5.00	5.00	3.00	3.00	3.00	1.00	3.00	3.00	3.00	3.00
<i>SO VS. DI</i>	3.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	1.00	1.00	1.00
<i>EN VS. DI</i>	0.33	0.11	0.11	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14

Section IV

<i>HU VS. SO</i>	9.00	5.00	5.00	3.00	9.00	3.00	3.00	7.00	5.00	5.00	5.00
<i>HU VS. EN</i>	9.00	7.00	5.00	5.00	7.00	9.00	7.00	9.00	5.00	9.00	7.00
<i>HU VS. DI</i>	1.00	3.00	1.00	1.00	1.00	1.00	1.00	0.33	1.00	1.00	1.00
<i>SO VS. EN</i>	5.00	1.00	5.00	5.00	1.00	5.00	3.00	3.00	3.00	3.00	3.00
<i>SO VS. DI</i>	0.33	0.33	0.33	1.00	0.20	0.33	0.33	0.20	0.33	0.33	0.33
<i>EN VS. DI</i>	0.14	0.20	0.20	0.14	0.11	0.11	0.14	0.14	0.14	0.14	0.14

Legends: *HU*-human disturbance; *SO*- socio-economic; *EN*-environmental quality; *DI*-distance from road.

The highest weights (W_j) of buffer zone in section I and II belonged to environmental quality (*EN*) at 0.53 and 0.45, while the lowest (W_j) was human disturbance which indicated 0.16 and 0.15 respectively. A consistency ratio (CR) less than 10 percent meant that the weights decided by KIIs' preference were acceptable. In sections II and IV, human disturbance (*HU*) was the highest W_j with 0.4 or 44% and CR less than 10% was acceptable (Table 5)

Table 5: Pairwise comparison matrices of criteria with respect to buffer zone widths in Section I; II; III; and IV

Section I						Section II					
Criteria	<i>HU</i>	<i>SO</i>	<i>EN</i>	<i>DI</i>	W_j	Criteria	<i>HU</i>	<i>SO</i>	<i>EN</i>	<i>DI</i>	W_j

<i>HU</i>	1	1	0.33	1	0.16	<i>HU</i>	1	1	0.33	1	0.16
<i>SO</i>	1	1	0.2	2	0.17	<i>SO</i>	1	1	0.33	3	0.23
<i>EN</i>	3	5	1	3	0.53	<i>EN</i>	3	3	1	2	0.45
<i>DI</i>	1	0.5	0.33	1	0.39	<i>DI</i>	1	0.33	0.5	1	0.15
Total	6	7.5	1.87	7	1	Total	6	5.33	2.17	7	1
CI=0.05 RI=0.90 CR=0.05						CI=0.08 RI=0.90 CR=0.09					
Section III						Section IV					
Criteria	<i>HU</i>	<i>SO</i>	<i>EN</i>	<i>DI</i>	<i>W_j</i>	Criteria	<i>HU</i>	<i>SO</i>	<i>EN</i>	<i>DI</i>	<i>W_j</i>
<i>HU</i>	1	3	5	1	0.4	<i>HU</i>	1	5	7	1	0.44
<i>SO</i>	0.33	1	3	1	0.21	<i>SO</i>	0.2	1	3	0.33	0.12
<i>EN</i>	0.2	0.33	1	0.14	0.06	<i>EN</i>	0.14	0.33	1	0.14	0.05
<i>DI</i>	1	1	7	1	0.33	<i>DI</i>	1	3	7	1	0.39
Total	2.53	5.33	16	3.14	1	Total	2.34	9.33	18	2.48	1
CI=0.049 RI=0.90 CR=0.054						CI=0.022 RI=0.9 CR=0.024					

Relative priority of alternatives with respect to criteria

The relative priority of alternatives with respect to criteria were human disturbance (*HU*), socio-economic (*SO*), *EN*-environmental quality, and *DI*-distance from road. The group-KIIs' preferences indicated that each section of buffer zones was affected by differently influential factors (Table 6).

Table 6: Geometric average of ten (10) groups' priority of decision alternatives with respect to four criteria.

Criteria	Groups										Geometric
	1	2	3	4	5	6	7	8	9	10	average
<i>HU</i>											
PB_1 VS. PB_2	0.33	0.20	0.20	1.00	0.33	0.33	0.33	0.33	0.33	0.33	0.33
PB_1 VS. PB_3	0.20	0.33	0.14	0.14	0.11	0.14	0.20	0.20	0.20	0.14	0.20
PB_1 VS. PB_4	0.33	0.20	0.14	0.11	0.13	0.11	0.11	0.14	0.14	0.14	0.14
PB_2 VS. PB_3	0.20	0.14	0.33	1.00	0.33	0.33	0.20	0.33	0.33	0.33	0.33
PB_2 VS. PB_4	0.20	0.20	0.33	0.33	0.14	0.14	0.14	0.11	0.20	0.20	0.20
PB_3 VS. PB_4	0.20	0.33	1.00	0.20	0.33	0.33	0.20	0.33	0.33	0.33	0.33
<i>SO</i>											
PB_1 VS. PB_2	0.20	0.33	0.33	0.20	0.33	0.33	0.20	0.33	0.33	0.33	0.33
PB_1 VS. PB_3	0.14	0.11	0.14	0.33	0.33	0.11	0.11	0.11	0.11	0.11	0.14

PB_1 VS. PB_4	0.11	0.11	0.11	0.33	0.33	0.11	0.20	0.11	0.11	0.11	0.14
PB_2 VS. PB_3	0.33	0.33	0.20	0.20	0.20	1.00	0.33	0.33	0.33	0.33	0.33
PB_2 VS. PB_4	0.14	0.11	0.20	0.11	0.14	0.14	0.14	0.14	0.20	0.14	0.14
PB_3 VS. PB_4	0.33	0.33	0.20	0.20	0.20	1.00	0.33	0.33	0.33	0.33	0.33
EN											
PB_1 VS. PB_2	1.00	3.00	0.33	0.33	3.00	0.33	3.00	1.00	1.00	1.00	1.00
PB_1 VS. PB_3	3.00	1.00	3.00	5.00	5.00	3.00	3.00	1.00	5.00	5.00	3.00
PB_1 VS. PB_4	5.00	5.00	7.00	7.00	3.00	3.00	5.00	7.00	5.00	5.00	5.00
PB_2 VS. PB_3	3.00	3.00	3.00	1.00	3.00	5.00	5.00	3.00	3.00	3.00	3.00
PB_2 VS. PB_4	7.00	7.00	3.00	3.00	5.00	5.00	7.00	5.00	5.00	5.00	5.00
PB_3 VS. PB_4	3.00	1.00	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DI											
PB_1 VS. PB_2	3.00	1.00	1.00	1.00	0.33	1.00	1.00	1.00	1.00	1.00	1.00
PB_1 VS. PB_3	0.14	0.11	0.11	0.33	0.11	0.11	0.11	0.14	0.14	0.11	0.14
PB_1 VS. PB_4	0.14	0.11	0.11	0.11	0.14	0.14	0.11	0.14	0.14	0.11	0.14
PB_2 VS. PB_3	0.20	0.14	0.33	0.20	0.20	0.20	0.33	0.14	0.20	0.20	0.20
PB_2 VS. PB_4	0.14	0.14	0.14	0.14	0.20	0.11	0.14	0.14	0.14	0.14	0.14
PB_3 VS. PB_4	3.00	1.00	1.00	1.00	1.00	0.33	1.00	1.00	1.00	1.00	1.00

Legends: PB_1 - priority in section I; PB_2 - priority in section II; PB_3 - priority in section III; PB_4 - priority in section IV.

The results of geometric average were then used to calculate relative priority (P_{ij}) of decision alternatives with respect to influential criteria (HU , SO , EN , and DI). The highest (P_{ij}) with respect to HU and SO found in buffer zones Section IV with 0.558 and 0.574, while the lowest of such criteria resulted in buffer zones Section I with 0.057 and 0.051 respectively. The CR was less than 10 percent; the decision alternatives of the KII groups were acceptable. The highest P_{ij} of EN with 0.395 was in Sections I and II, whereas the lowest P_{ij} with 0.092 found in Section IV. And the highest P_{ij} of DI with 0.450 resulted in Section IV, the lowest 0.064 found in Section I (Table 7).

Table 7: Pairwise comparison matrices of relative priority of decision alternatives with respect to four influential criteria

HU						SO					
Section	PB_1	PB_2	PB_3	PB_4	P_{ij}	Section	PB_1	PB_2	PB_3	PB_4	P_{ij}
PB_1	1	0.33	0.2	0.14	0.05	PB_1	1	0.33	0.14	0.14	0.05
PB_2	3	1	0.33	0.2	0.12	PB_2	3	1	0.33	0.14	0.10
PB_3	5	3	1	0.33	0.26	PB_3	7	3	1	0.33	0.27
PB_4	7	5	3	1	0.56	PB_4	7	7	3	1	0.57

Total	16	9.33	4.53	1.68	1	Total	18	11.33	4.48	1.62	1
CI=0.059 RI=0.9 CR=0.065						CI=0.057 RI=0.9 CR=0.063					
<i>EN</i>						<i>DI</i>					
Section	<i>PB1</i>	<i>PB2</i>	<i>PB3</i>	<i>PB4</i>	P_{ij}	Section	<i>PB1</i>	<i>PB2</i>	<i>PB3</i>	<i>PB4</i>	P_{ij}
<i>PB1</i>	1	1	3	5	0.39	<i>PB1</i>	1	1	0.14	0.14	0.06
<i>PB2</i>	1	1	3	5	0.39	<i>PB2</i>	1	1	0.2	0.14	0.07
<i>PB3</i>	0.33	0.33	1	1	0.12	<i>PB3</i>	7	5	1	1	0.42
<i>PB4</i>	0.2	0.2	1	1	0.09	<i>PB4</i>	7	7	1	1	0.45
Total	2.53	2.53	8	12	1	Total	16	14	2.34	2.29	1
CI=0.015 RI=0.9 CR=0.016						CI=0.006 RI=0.9 CR=0.0065					

Design of buffer zone widths

There were four sections of designated width of the buffer zone. The widest buffer zone of 189 meters was designed in section IV located in the Northern part closest to National Road No. 9 and residential areas, while the narrowest with 155 meters was designed in section I located in the East-Southern part of the park (Table 8; Fig. 3).

Table 8: Designed widths of buffer zones in four sections of Dong Na Tard Provincial Protected Area.

Section I					
Criteria	W_j	P_{ij}	WD_i	B	B^-
<i>HU</i>	0.160	0.057	0.038	250	10
<i>SO</i>	0.173	0.051	0.037	200	7
<i>EN</i>	0.533	0.395	0.888	150	134
<i>DI</i>	0.139	0.064	0.038	100	4
Width of buffer zone					155 m
Section II					
Criteria	W_j	P_{ij}	WD_i	B	B^-
<i>HU</i>	0.163	0.122	0.085	250	21
<i>SO</i>	0.234	0.104	0.104	200	21
<i>EN</i>	0.452	0.394	0.764	150	114
<i>DI</i>	0.151	0.07	0.045	100	5
Width of buffer zone					160 m
Section III					
Criteria	W_j	P_{ij}	WD_i	B	B^-
<i>HU</i>	0.397	0.263	0.341	250	87

<i>SO</i>	0.206	0.271	0.182	200	37
<i>EN</i>	0.062	0.118	0.024	150	4
<i>DI</i>	0.334	0.415	0.453	100	46
Width of buffer zone					174 m
Section IV					
CRITERIA	W_j	P_{ij}	WD_i	B	B^-
<i>HU</i>	0.439	0.558	0.496	250	123
<i>SO</i>	0.123	0.574	0.143	200	28
<i>EN</i>	0.052	0.092	0.010	150	2
<i>DI</i>	0.385	0.45	0.351	100	35
Width of buffer zone					189 m

Legends: *HU*- human disturbance; *SO*-socio-economic; *EN*-environmental quality; *DI*- distance from road; W_j -weight of factors, P_{ij} -decision alternatives, WD_i -relative priority of decision alternative, B - experts' designed widths of buffer zones, B^- - designed width of buffer zone.

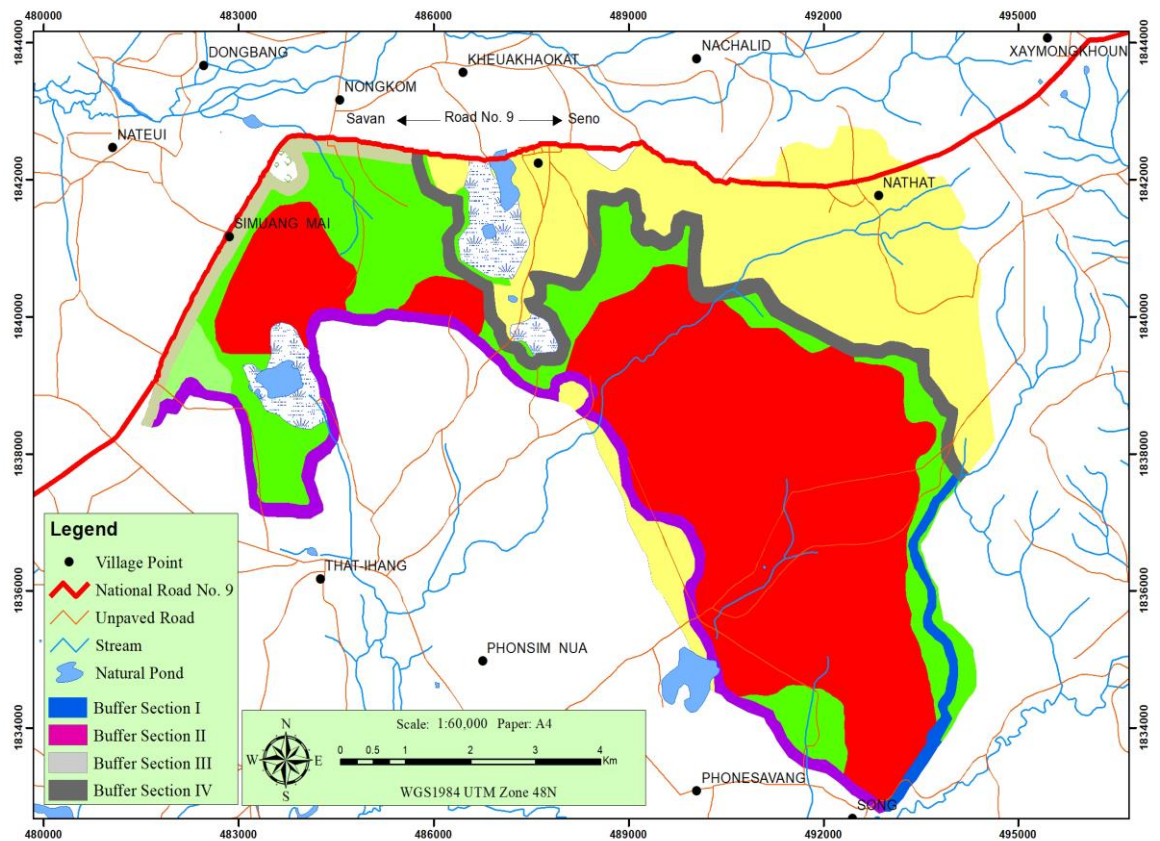


Figure 3: Buffer zone widths of four sections in Dong Na Tard Provincial Protected Area.

Discussion

Several criteria in determining the boundaries of buffer zones were identified by many researchers (Somphong and Inocencio, 2019). The reviews of literature indicated distance from roads, city, and settlements as the criteria influenced buffer zones. The socio-economic characteristic of the people was the other influencing factor affecting buffer zones. Alternatively, human disturbance and environmental factors should be also considered as criteria for AHP analysis. In the Lake Beysehir catchment area in Konya, Turkey, determining the location of landfill sites was a difficult and complex process. The most important criteria included distance from settlements and road, slope and height, and aspect which must be considered for Landfill site selection (Sener et al., 2010). In Nyungwe National Park, Rwanda, buffer zones associated with protected areas must accommodate both conservation and development objectives. The main criteria considered included land use decisions and socio-economic factors which can be challenging in buffer zone management planning in the area (Margles et al., 2010). In Falavarjan, Esfahan Iran, the main criteria to decide buffer zones included distance from the city, distance from major road, distance from minor road, land use, slope, soil texture, and vegetation (Mansouri et al., 2013).

In this study, the designed buffer zone widths with four sections (155 m; 160 m; 174 m; and 189 m) (Table 8) were the most optimal as these depended on the weights of the criteria (*HU*, *SO*, *EN*, and *DI*) affecting the distribution of plant diversity (Table 5) and relative priorities of decision alternatives (*1B*, *2B*, *3B*, and *4B*) with respect to each influential factor (Table 7). Since the environmental factors need to support the services of other parts of the park, the buffer zone width should be narrow (Fig. 3). The designed buffer zones widths is an approach to prevent (or at least reduce) the impacts on plant diversity, to guarantee protection of the core areas of the park (Widagdo, 2008; Zeng et al., 2014; Somphong and Inocencio, 2019) and to improve well-being of local people living in and around the Dong Na Tard PPA. This approach was recognized within the framework of UNESCO's Program on Man and the Biosphere (MAB) established to promote a balanced relationship between humans and the biosphere. Ogogo et al. (2010) who studied the Cross River National Park in south-eastern Nigeria experienced including the participation of the surrounding communities in all the necessary steps of buffer zone management to reduce park encroachment. In the Malaysian FRIM Heritage Site, Abdullah et al. (2013) had to make stakeholders understand the concept of buffer zones and the need to have one for people to agree on its establishment. In both cases, community participation in the various integrated conservation and community development programs proved to be a good strategy after the provision of buffer zone system in protected areas which was also observed by Bhusal, (2012) in Nepal.

In north Queensland Australia, the distribution of costs and benefits of riparian vegetation created conflicts in the objectives of various stakeholder groups. The preference weights towards social, environmental, and economic objectives have been obtained for the various stakeholder groups (Qureshi and Harrison, 2003). In Yancheng Biosphere Reserve China, the problems existing in design of buffer zones were analyzed. The main criteria to be considered included the influential factors caused by human entering into the reserve (Li et al., 1999). On Mount Makiling, Luzon Island, Philippines, the environmental factors: altitude, slope and distance from agricultural farms had been linearly correlated with species stem density in various land use types (Buot and Osumi, 2011).

Similarly, the most important criteria were selected from UNESCO – Man and Biosphere (MAB) Program especially, conservation of landscape and ecosystems; socio-economic

characteristics; diversity of natural habitats and distance from residential areas to and magnitude of human activities impacted plant diversity on specific sites.

Conclusions

To ensure prevention of encroachment on the core areas, the buffer zone widths were designed into four sections depending on the importance of influential factors affected in each section. Although the result of this study had the widths of buffer zone into four sections, it is only a theoretical design. There are still some places that need to be improved in practice. However, the park management can make use of the result of this study, especially the designs of buffer zone widths by involving relevant stakeholders to participate in the process. This approach will help complete the goals of conservation planning in reducing the negative impacts on plant diversity and in increasing the well-being of local people living inside and adjacent to Dong Na Tard PPA.

For effective establishment of the buffer zone widths, the judgments and personal preferences of relevant stakeholders should be taken into account through explicit weights. On the other hand, designed width of the buffer zone should be focused on magnitude of influential factors affected in specific sites. Especially in section IV which is located near the villages, the designed width of buffer zone should be wider than other sections because of human disturbances.

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References

- Abdullah, J., Ahmad, C.B., Jaafar, J., & Sa'ad, S.R.M. (2013). Stakeholders' perspectives of criteria for delineation of buffer zone at conservation reserve: FRIM heritage site. *Procedia, Social and Behavioral Sciences* 105, 610-618.
- Bantayan, C.N., Combalicer, E.A., Tiburan, C.L.Jr., Barua, L.D., & Diva, J.J.V. (2015). *GIS in the Philippines. Principles and applications in forestry and natural resources*. Second edition: UPLB 168p.
- Bhusal, N.P. (2012). Buffer zone management system in protected areas of Nepal. *Journal of Geography Education* 11, 34-44.
- Buot, I.E.Jr., & Osumi, K. (2011). Land use type pattern and woody species composition near human disturbed landscapes on Mount Makiling, Luzon Island. *American Journal of Environmental Sciences* 7, 306-315.
- Larsen, W.F., Bladt, J., Balmford, A. & Rahbek, C. (2012). Bird as biodiversity surrogates: Will supplementing birds with other taxa improve effectiveness?. *Journal of Applied Ecology* 49, 349-356.

- Li, W., Wang, Z., & Tang, H. (1999). Designing the buffer zone of a nature reserve: A case study in Yancheng Biosphere Reserve. *Biological Conservation* 90, 159-165.
- Mansouri, Z., Mofezi, N.H., & Dahrazma, B. (2013). Wastewater treatment plant site selection using AHP and GIS: A case study in Falavarjan, Esfahan. *JGeope* 3, 63-72.
- Margles, W.S., Masozera, M., Rugyerinyange, L., & Kaplin, B.A. (2010). Participatory planning: using SWOT-AHP Analysis in buffer zone management planning. *Journal of Sustainable Forestry* 29, 613-637.
- MAF (Ministry of Agriculture and Forestry). (2011). *Gibbon conservation action plan for Lao PDR*. Vientiane, Lao PDR.
- Ogogo, A.U., Nchor, A.A., & Jacob, D.E. (2010). Challenges of buffer zone management in cross river national park, South-Eastern Nigeria. *Journal of Research in Forestry, Wildlife and Environment* 2, 156-163.
- Qureshi, M.E., & Harrison, S.R. (2003). Application of the analytic hierarchy process to riparian revegetation policy options. *Small-scale Forest Economics, Management and Policy* 2, 441-458.
- Regan, M.H., Davis, F.W., Andelman, S.J., Widyanata, A., & Freese, M. (2007). Comprehensive criteria for biodiversity evaluation in conservation planning. *Biodivers Conserv* 16- 2715-2728.
- Saaty, T.L. (1980). *The analytic hierarchy process. Planning, priority setting, resource allocation*. McGraw-Hill, New York.
- Sener, S., Sener, E., Nas, B.R., & Karaguzel, R. (2010). Combining AHP with GIS for landfill site selection: A case study in the Lake Beysehir Catchment Area (Konya, Turkey). *Waste Management* 30- 2037-2046.
- Somphong, CH., & Inocencio, B.E. Jr. (2017). Plant diversity in Dong Na Tard Provincial Protected Area, Lao People's Democratic Republic (Lao PDR): Species structure and forest zonation. *Journal of Environment Asia* 10, 52-62.
- Somphong, CH., & Inocencio, B.E. Jr. (2019). Priority Areas for Conservation Planning in Dong Na Tard Provincial Protected Area, Lao People's Democratic Republic (Lao PDR). *Journal of Environment Asia* 12, 116-125.
- Somphong, CH., Somphong, CH., & Inocencio, B.E. Jr. (2019). Conservation Status of Plant Diversity at Dong Na Tard Provincial Protected Area, Lao People's Democratic Republic. *International Journal of Conservation Sciences* 10, 393-402.
- Teknomo, K. (2006). *Analytical hierarchy process (AHP)*. tutorial. [http: people.revoledu.com/kardi/tutorial/AHP/](http://people.revoledu.com/kardi/tutorial/AHP/).
- Tuner, R.W., Brandon, K., Brooks, T.M., Gascon, C., Gibbs, H.K., Lawrence, K.S., Mittermeier, R.A., & Selig, E.R. (2012). Global biodiversity conservation and the alleviation of poverty. *BioScience* 62- 85-92.
- Widagdo, I. (2008). Lore Lindu as one of world's biosphere reserve, report. Balai Taman National Lore Lindu, Palu, Sulawesi, Indonesia.

- Wong, K.W.J., & Li, H. (2006). *Application of the analytic hierarchy process (AHP) in multi-criteria analysis of the selection of intelligent building systems*, Building and Environment. doi: 10.1016/j.builenv. 2006.11.019.
- Zeng, Q., Bridgewater, P., Lu, C., Yun, J., & Lei, G. (2014). Perspectives on zonation in ramsar sites, and other protected areas: Making sense of the tower of Babel. *Open Journal of Ecology* 4- 788-796.

Students' perception of native insects in rice field in Laos and attitudes towards species management

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Abstract

Insect pests in Lao rice fields can be controlled by predatory insect species. However, farmers believe that insects cause low production and have to be controlled with insecticides. Hence, farmers still apply pesticides in their rice fields in order to control any insects. To implement a knowledge-based management of insects in rice fields in future time, the knowledge of and attitudes towards insects of students' as stakeholders of tomorrow is relevant. Hence, the present study focused on Lao students' knowledge and attitudes towards insects in rice fields. For carrying out the study, an online questionnaire on species knowledge and attitudes towards management options was developed and distributed to Lao students at Savannakhet University via Lime Survey. The results show that the insect species knowledge of Lao students varies from species to species. Concerning the attitude towards management options there is a heterogeneous result. Approximately half of the students agree with management interventions whereas the other half opposes interventions. Hence, further research should focus on students' attitudes to management options on distinct insect species with distinct ecological behaviors such as predators or pests on rice.

Keywords: Students' perception, native insects, and attitudes towards species management

Introduction

Science education in Lao PDR is taught from the 1st grade to 5th grade, known as "World Round Us" subject that composes of Biology, Geography and History, Environment and Health (Abe, 2007; Khanthavy et al., 2014). The topics and contents of textbook for this subject for primary school are mainly involved to some basic knowledge that children need to live locally or inside Lao PDR. From secondary school to high school, the "World Round Us" subject has separated to a mono subject, known as "Biology". The contents of the subjects are introduced general information on the knowledge on living things, non-living things, and Lao PDR; the relationship between living things and nature; plants and their uses; and animals and their behaviors and so on (Ministry of Education and Sports, 2008; Arakawa, 2010; Inui, 2011 & Research Institute for Education Science, 2013). While, when the Lao textbook compared to science textbooks used in Japan or developed countries, are based on the scientific theoretical

knowledge that usually taken together with practical work, for instance, mammal, birds, amphibians and insects identification or classification, is usually taught from the separating them into the right group and then into their subgroups (Taira, 201; Inui, 2011 & Kozai 2014). Building a young generation with global scientific knowledge, is crucial to improve Lao educational system and also enhances in developing community by applying the theories into an actual life.

The presence of insects in Lao rice fields is widespread. Some insect species are pests on rice, and some other insect species are predators on pests on rice and might thus function as regulator of those pests. Lao students at SKU are potential stakeholders of tomorrow. That means, their knowledge of and attitudes towards insects might influence their management in rice fields and probably also syllabus development for education in Lao schools.

Education, either in formal or informal setting, it could be one of the good ways to spread the information for both biology students and laypersons about how is advantages and disadvantages of insects to biological diversity, ecosystem functioning, socio-economic values, and human health. Furthermore, it could also be a way to promote a differentiated understanding of insect managements. As currently, the Lao government plans to intensify rice production and rice self-sufficiency, is expected to rise moderately in the foreseeable future (Heong et al., 2002). It is thus vital that the lessons regarding insect education's students need to be taken into an account as important part of the national tactics plan for sustainable agricultural development to avoid the pesticide misuse in their family own fields. Research shows, that knowledge of species and attitudes towards them impact also persons' attitudes towards management options on species such as regulation or no regulation (Lindemann-Matthies, 2016). Hence, the present study aims to investigate students' perception and species knowledge of Lao students towards insects in rice fields.

This study is the first to investigate the perception of 4 insects' species in rice field in Laos by 140 interview students in Savannakhet University, and their attitudes towards species management, either with or without information about the respective species. Major aims were to investigate students' (1) characterization of 4 insect species shown on pictures, (2) ability to identify them, (3) general attitudes towards the management of them. Also, it was determined whether students' perception of insect species and attitudes towards certain types of management were related to age, sex, place of living, and study subject.

Methodology

Data collection

Data were collected at the Savannakhet University, Lao PDR. The 138 students from different fields were randomly asked by the Lime survey questionnaires with 4 insects in the Lao rice field. If they agreed and almost all of them did so. They received two versions of questionnaires, which consist of three parts: 1). Characterization on 4 common insects in the Lao rice field. 2). Correct identification of the genus or species level of 4 insects. 3). Determination of student's attitudes towards their management. The students were required in survey approximately 10 minutes, and anonymity was guaranteed to the participants.

Questionnaire approach

The questionnaires composed of two parts, which were separated into two different links. The first part was investigated students' perception of 4 insects and ability to identify them (objectives 1 and 2). The two predators included Seven spotted lady beetle (*Coccinella septempunctata*) and Plant bug (*Cyrtorhinus lividipennis*). The two insect pests included Glasshopper (*Oxya chinensis*) and Brown Planthopper (*Nilaparvata lugens*) were presented in the survey (brief information on each species in the (supplement2). Those 4 insects were commonly found in Lao rice fields. In order to minimize the number of species, we divided the questionnaires by lime survey into two versions for a participant to characterize and identify. In each version provided with 4 links and 2 species. There were 74 students approached to the first version and 66 students for the second version and anonymous their information.

The 4 common insects were presented as photographs and each species had to be characterized by five opposing attributes (ugly-beautiful, extraordinary-ordinary, exotic-indigenous, unfamiliar-familiar, unwanted-wanted) on 7- step scales (e.g. very ugly, ugly, rather ugly, neither/nor, rather beautiful, beautiful, very beautiful) adapting a measurement instrument of Lindemann-Matthies (2016). After the characterization section, participants required to write down their common names as many species as they know. A specie was regarded as correctly identified if its common name was provided at the species level or, in few cases, at the genus level (i.e., Plant bug, Paederus beetle, and Brown Planthopper). A specie would have been considered as wrong answer if the response'' beetle'' for ''plant bug''.

The second part investigated students' general attitudes towards different types of management (Objective 3). A short introduction about the insects were provided and a question of ''Do you know those insects and from where have you seen those insects'' were asked''. Then, participants had to select only one item of the five different types of management (no intervention! Insect pest should be seen as an enhancement of nature, no intervention! Nature will find a solution itself, intervention to conserve Lao origin nature and to conserve endangered species, only management of those insect pest specis which cause serious problems and costs, and no management of beautiful insects, but management of ugly insects) to find the fit best based on their opinion.

In the final part, participants were asked about the general information such as age, gender, and place of living (urban or rural area). Furthermore, they were asked for their major (Biology or other subjects) and year of study. Cultural factors such as age, sex, and specialist of a person (here: training in biology) are important determinants of human-nature interactions (e.g., Bourassa, 1991). A person's information of place of living might influence his or her attitude towards insect management in the Lao rice field (Inthavong, 1999).

Data analysis

To determine the characterization of the insects means and standard errors were calculated. To find relations between the categories of students' ratings, binominal correlation analyses were carried out. For the analysis of the identification task the percentage of correct identifications and the number of absolute identifications were calculated. Binominal logistic regression analyses were calculated to evaluate students' attitude towards insect management. Therefore, responds on both ''no intervention'' items were coded with 1 and responds on the three ''management'' items were coded were coded with 2. In the regression model age, gender, place of living and major were included. For all analysis SPSS for Windows 24.0 was used.

Results

None of the insects was considered as really familiar, native and beautiful. With exception of the Seven spotted lady beetle all of the insects were characterized as ordinary. The Seven spotted lady beetle was described as most wanted, whereas the Plant bug and the Brown planthopper were considered as unwanted (Table 1).

For all insect species there was a strong positive correlation between perceived indigenusness and desirability (correlation coefficients between 0.363 and 0.617, all P between 0.002 and < 0.001). There was also for every insect a positive correlation between the perceived aesthetic appeal and feeling of desirability or respective non-desirability (correlation coefficients between 0.272 and 0.306, all P between 0.021 and < 0.014).

Most students were able to identify Grasshopper and Lady beetle, whereas only few students succeeded in naming the Brown planthopper and the Plant bug (Table 2).

The binominal logistic regression analyses revealed that approximately the half of the students (55.8 %) agreed with management interventions whereas the other half (44.2 %) disagreed. None of the factors included in the binominal logistic regression model had an explanatory effect on the distribution of students' attitudes (all $P > 0.067$).

Table 1: Students' characterization of 4 insects that, commonly found in Lao rice field on seven-step scales (e.g., 1: very ugly, 2: ugly; 3: rather ugly; 4: neither ugly nor beautiful, 5: rather beautiful, 6: beautiful, 7: very beautiful). Species are sorted by perceived beauty. (N = 140)

Name of Insects	Mean rating scores \pm 1 SE				
	ugly – beautiful	ordinary – extraordinary	exotic – native	unfamiliar – familiar	unwanted – wanted
Grasshopper (<i>Oxya chinensis</i>)	4.14 \pm 0.17	4.00 \pm 0.21	4.46 \pm 0.23	4.47 \pm 0.19	4.36 \pm 0.18
Seven spotted lady beetle (<i>Coccinella septempunctata</i>)	3.97 \pm 0.20	4.82 \pm 0.17	4.60 \pm 0.21	4.14 \pm 0.20	4.76 \pm 0.19
Brown planthopper (<i>Nilaparvata lugens</i>)	3.50 \pm 0.23	2.85 \pm 0.20	3.08 \pm 0.21	3.34 \pm 0.20	3.84 \pm 0.23
Plant bug (<i>Cyrtorhinus lividipennis</i>)	3.19 \pm 0.24	3.86 \pm 0.23	3.37 \pm 0.20	3.31 \pm 0.20	2.86 \pm 0.19

Table 2: Correctly identified insects in the Lao rice field on the genus or species level by students (n = 140). In square brackets: number of respondents

Name of Insects	Correct identifications (%)
Grasshopper (<i>Oxya chinensis</i>)	78 [72]
Seven spotted lady beetle (<i>Coccinella septempunctata</i>)	75 [72]
Brown Planthopper (<i>Nilaparvata lugens</i>)	35 [66]
Plant bug (<i>Cyrtorhinus lividipennis</i>)	27 [66]

Discussion (This should explore the significance of the results of the work, not repeat them. A combined Results and Discussion section is often appropriate.)

Interestingly, none of the insects was perceived as really aesthetic appealing. This is not surprising since humans are found to dislike invertebrates in comparison to vertebrates (Morris & Morris, 1965; Shepard, 1997; Lindemann-Matthies, 2005; Stokes, 2007). For the case of protection of biodiversity this is a big gap to bridge: Insects play an important role in ecosystem and are also able to provide valuable ecosystem services. However, as disliked species group it might be hard to protect insects in an adequate way.

It is relevant to note that Lao students describe themselves as not really familiar with insects. This circumstance might make it difficult to judge the impact of an insect species on its environment. For instance, in the present study two pests on rice and two predators were included. The results of the identification task show that only two species – one predator and one pest on rice - could be identified by more than the half of the participating students. Going out from this situation, are they able to judge for instance the brown planthopper as a pest on rice or to judge the plant bug as predator and hence as a potential protector of rice and crop? This comes especially evident since the evaluation of the students' attitudes towards management interventions shows that half of them agrees to management and half of them opposes management. Under the point of view that desirability was found to correlate with perceived indigenusness it is a strong argument to increase education on insect species in Lao classrooms. If students know insect species – maybe due to education in classroom – they judge them as desired. However, it is not sure, whether the students were aware that two species were pests on rice and two species were predators.

Results of the binominal regression analysis show that the students' attitude towards insect management is independent from factors such as gender, age, place of living or study subject. However, most of the participants were students of a science subject such as food processing technology or environmental science. Maybe students of such scientific study subjects have got a similar view on questions that tackle with ecological topics. Focusing on the place of living, the explanation of the non-impact might be rather simple: Given that the chosen insects are distributed over Laos in an equal density, even students that grew up in non-farmer families might get in contact with such animals.

Conclusions

It comes clear that Lao students attribute no high importance to insects and that there are some species that are well known and those that are only rarely known. Further research should focus not only on the identification abilities but on the students' knowledge of the insects' ecological role in rice fields. It is relevant to know, if students can describe distinct species as pest on rice or maybe as a predator who might protect rice. Coming from this point of view, the question for the support of management interventions should be asked again. That means it should be evaluated what impact ecological knowledge concerning each distinct insect species on students' attitudes to management options related exactly to a distinct insect species. Given that predators in rice fields would be more accepted compared to pests on rice, this could be the starting point for a knowledge-based management of insects in rice fields with maybe a reduction of the application of chemicals.

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References

- Abe, H. (2007). Teacher Training in Lao People's Democratic Republic, Bulletin of Faculty of Education, Yamaguchi University, 57, 45-58
- Arakawa, A. (2010) Educational Circumstances in Lao People's Democratic Republic, Ryugaku Koryu (Studying Abroad Interaction), 22 (3),22-25.
- Bourassa, S.C. (1991). The aesthetics of landscape. London, UK: Belhaven Press.
- Brown, P.R., Tuan, N.P., Singleton, G.R., Ha, P.T.T., Hoa, P.T., Hue, D.T., Tan, T.Q., Tuat, N.V., Jacob, J., Muller, W.J., 2006. Ecologically-based management of rodents in the real world: application to a mixed agro-ecosystem in Vietnam. Ecol. Appl. 16, 2000–2010.
- Heong, K.L, Escalada, M.M., Sengsoulivong, V. & Schiller, J. (2002). Insect management beliefs and practices of rice farmers in Laos. Agriculture, Ecosystems and Environment, 92,137–145
- Inthavong, S. (1999). Ecological studies and yield loss assessment of rice gall midge, *Orseolia oryzae* (Wood-Mason) in rainfed lowland rice ecosystems of Laos. M.S. Thesis. University of the Philippines, Los Banos, Philippines, 118 pp.
- Inui, M. 2011. Educational Circumstances in Lao People's Democratic Republic: Focusing on development of higher education, Ryugaku Koryu (Studying Abroad Interaction), 23 (3),18-21.
- Khanthavy, H., Tamur, K., Terashima, Y., & Kozar, T. (2014). Comparative Study of Elementary Science Curriculum and Textbook Production of Laos and Japan. NUE Journal of International Educational Cooperation, 8, 47-62.
- Kozai, T. (2014). Local Education Administration. Lecture on Education and culture in Japan, May 19,2014, Naruto University of education.
- Lindemann-Matthies, P. (2005). Lovable mammals and lifeless plants: how children's interest in common local organisms can be enhanced through observation of nature. *International Journal of Science Education*, 27, 655-677. <https://doi.org/10.1080/09500690500038116>.
- Lindemann-Matthies, P. (2016). Beasts or beauties? Laypersons' perception of invasive alien plant species in Switzerland and attitudes towards their management. *NeoBiota*, 29, 15-33. <https://doi.org/10.3897/neobiota.29.5786>.
- Mai, V., Huan, N.H., Heong, K.L., Escalada, M.M., Lazaro, A.A. (1997). Pest management perceptions and practices of rice farmers in Long An Province, Vietnam. In: Heong, K.L., Escalada, M.M. (Eds.), Pest Management of Rice Farmers in Asia. IRRI, Los Baños, Philippines, pp. 215–226.
- Matteson, P.C., 2000. Insect pest management in tropical Asian irrigated rice. Ann. Rev. Entomol. 45, 549–574.
- Ministry of Education and Sports (MOES). (2008). National education reform system strategy 2006-2015. Vientiane capital city, Sisavanh printing house

- Ministry of Science and Technology (MOST). (2014). Science and technology strategy in Lao PDR during 2013-2020 and vision until to 2030. Last visited on July 7,2014: <http://www.most.gov.la>
- Morris, D., & Morris, R. (1965). *Men and snakes*. London, UK: Hutchinson & Co.
- Peter, RB & Khamouane, K. (2010). Changes in farmers' knowledge, attitudes and practices after implementation of ecologically-based rodent management in the uplands of Lao PDR, *Crop Protection*, 29, 577–582
- Rapusas, H.R., Schiller, J.M., Sengsoulivong, V., 1997. Pest management practices of rice farmers in the rainfed lowland environment in Laos PDR. In: Heong, K.L., Escalada, M.M. (Eds.), *Pest Management of Rice Farmers in Asia*. IRRI, Los Baños, Philippines, 99–114.
- Research Institute for Education Science (RIES). (2013). Curriculum of Pre-school, primary and secondary education Last visited in July 2014:<http://www.moe.govJa/rieslindex.php/en/curriculum-tb-and-tg>.
- Shepard, P. (1997). *The others*. Washington, DC: Island Press.
- Singleton, G.R., 1997. Integrated management of rodents: a Southeast Asian and Australian perspective. *Belg. J. Zool.* 127, 157–169.
- Singleton, G.R., Hinds, L.A., Leirs, H., Zhang, Z., 1999. Ecologically-based Management of Rodent Pests. ACIAR Monograph No. 59. Australian Centre for International Agricultural Research, Canberra, 494 pp.
- Singleton, G.R., Sudarmaji, Jacob, J., Krebs, C.J., 2005. Integrated management to reduce rodent damage to lowland rice crops in Indonesia. *Agr. Ecosyst. Environ.* 107, 75–82.
- Stokes, D. L. (2007). Things we like: human preferences among similar organisms and implications for conservation. *Human Ecology*, 35, 361-369. <https://doi.org/10.1007/s10745-006-9056-7>
- Taira, T. (2011). Lao People's Democratic Republic “Revised Law on Education” (in Japanese) (created and promulgated in 2007), *Research Bulletin of Human Development and Education*,5,49-61

Contribution to amphibian conservation in Laos.

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Abstract

The extinction of animals and plants are estimated to be 100 times higher than the background rate in fossil record around the world (Samuel, 2005; Wilson, 1999; Bailli et al, 2004). Global biodiversity was threatened by climate change, habitat fragmentation, and the introduction of exotic species (Vitousek et al., 1996; Millennium Ecosystem Assessment, 2003). Amphibians are crucial animals of biodiversity (Manuel et al., 2010) and amphibian extinction would impact ecosystem directly (Juliana et al., 2015), for example, amphibian larvae feed on algae may thus contribute to eutrophication reduction (Ranvestel et al. 2004); adult amphibian prey on invertebrate, include mosquito, which are possible for the spread of malaria (Greenlee et al. 2006). They are the most threatened group of vertebrate (Martin et al, 2012). Knowledge of local species is elementary for humans' attitudes to conserve them. As students are the stakeholders of tomorrow, this study focused on Lao student's perception and knowledge of amphibians. Therefore, a questionnaire in accordance with Lindemann-Matthies (2016) was developed and distributed to students of Savannakhet University. The results indicate that Lao students judge as amphibians as common and are broadly able to identify them with their species name, independent from factors such as age, sex, rurality or study major. Most of them underline their value as food. However, if students know amphibians value as predator on pests remain unclear and is a desiderate for further research.

Keywords: contribution, amphibian, Laos, conservation

Introduction

The extinction of animals and plants is estimated to be 100 times higher than the background rate in fossil record around the world (Samuel, 2005; Wilson, 1999; Baillie et al, 2004). Global biodiversity is threatened by climate change, habitat fragmentation, and the introduction of exotic species (Vitousek et al., 1996; Millennium Ecosystem Assessment, 2003). Amphibians are an important component of biodiversity that has appeared as a global conservation concern because of recent worldwide weakened (Manuel et al., 2010; Stuart et al., 2004; Wake and

Vredenburg, 2008; D'men and Bombi, 2009). Furthermore, amphibians provide an important protein for some rural communities in Asia (Neang, 2010). There is also demand for amphibians as pets (Andreone et al. 2005), for use in laboratories (Welson et al. 2007) and as baits for fishing industry (Picco and Collin 2008). Nevertheless, amphibian extermination would directly impact on ecosystem (Juliana et al., 2015), for example, amphibian larvae feed on algae and may thus underwrite to eutrophication reduction (Ranvestel et al. 2004). Adult amphibian prey on invertebrate, include mosquito, which are possible for the spread of malaria (Greenlee et al. 2006). Amphibians are the most threatened group of vertebrate (Martin et al, 2012). Almost one-fifth of Southeast Asian amphibians are listed as threatened (IUCN 2009) because of many factors such as losing of habitat, deprivation, and fragmentation, especially in tropical regions nearly 4,000 species were threatened in universal (Nates and Lindemann-Matthies, 2011; Sturt et al., 2008). Moreover, factors driving population declines include overharvesting, competition with invasive species, habitat alteration, environmental contaminants, climate change, and infectious disease (Gilbert et al. 2012; Collins. 2010). The fungus *Batrachochytrium dendrobatidis* has been prominent as a cause of amphibian declines and extinction (Cheng, Rovito, Wake & Vredenburg, 2011); Ranavirus (family Iridoviridae) is another disease of amphibians and also effects reptiles and fish (Johnson et al. 2008; Janchovich. 2010).

Southeast Asian amphibians are facing conservation crisis and impending extinction. The major threat to the amphibians of Southeast Asia is the over-harvesting of amphibians from the wild to supply the consumption, traditional medicine and pet trades (Rowley et al. 2009). In Laos frogs are the common dishes, people eat frog all of their life cycle for example: between May and June is the reproductive season of frog people hunt them by lighting in the night, when become tadpole, tadpole with 2 legs and tadpole with 4 legs are hunted by fishing net; when become young adults and adults, they are hunted by lighting and fishing trap at night. Furthermore, in the dry season while they are living in the hole, people hunt them by hole digging that make populations of amphibians vulnerable to extirpation. The harvesting of salamandrids for traditional medicine in Southeast Asia occurs in Laos, Myanmar, Thailand and Vietnam, where most species are sold for relatively low prices (less than US\$1 per animal) (Rowley et al. 2009).

Conservation of local biodiversity not only requires measures such as development of species action plans; establishment of nature reserves; ecosystem restoration; and control of over-harvesting or poaching but it also requires public information and education about local organisms and their ecological important (Nates and Lindemann-Matthies. 2015; Trombulak et al., 2004).

Research Question

1. How familiar are students in Savannakhet university with frogs and toads, and what do they know about them?
2. What are their attitudes toward frogs and toads?
3. Is students' familiarity with frogs and toads influenced by age, sex, rurality and major of study?

Methodology

Data Collection

In 2019, 229 participants were asked with questionnaire and before classes start. One interview required approximately 20 minutes. The interview were carry out in Lao, and afterward translated into English.

Questionnaire

As students' attitudes toward certain species may influence their willingness to protect and conserve them (e.g., Kellert, 1993a, 1993b; Prokop & Fančovičová, 2010; Nates et al., 2010; Prokop & Fančovičová, 2013), study participants were then asked how useful, tasty, harmful, beautiful, important to conserve, and important for medicine they considered frogs and toads to be. They had to state their opinions on five step Likert scales, ranging from 1 (e.g., extremely harmful) to 5 (e.g., absolutely harmless). Participants were also shown potential uses of frogs and toads (i.e., as bioindicators; for pest control, nature conservation, and consumption; and as companion animals), and asked to tick those uses they thought most fitting. To investigate the influence of socio-demographic variables on students' familiarity with frogs, participants were asked about their ages, sexes, place of living and major of studying.

Picture Test

To investigate the participants' ability to identify frogs, they were given a picture test. Photographs of 6 amphibians that are common in the study regions were presented to the participants in questionnaire and power point. Participants were asked to identify the species by their common name and to indicate whether they were present in the area. In an open-end question, they were asked to write down what they know about the species.

The photographs were good of quality and taken under similar light conditions that optimally characteristic clearly visible. The following frogs common to the region were selected:

1. *Occidozyga sumatrana* is a species of frog in the Dicroglossidae family. It might be endemic to Indonesia.
2. *Polypedates leucomystax* is a species in the shrub frog family Rhacophoridae. It is known under numerous common names, including common tree frog, four-lined tree frog, golden tree frog or striped tree frog
3. *Duttaphrynus melanostictus* is commonly called Asian common toad, Asian black-spined toad, Asian toad, black-spectacled toad, common Sunda toad, and Javanese toad. It is probably a complex of more than one true toad species that is widely distributed in South and Southeast Asia.
4. *Glyphoglossus molossus* a species of frog in the family Microhylidae. It is monotypic within the genus *Glyphoglossus*. Its common names are Blunt-headed Burrowing Frog and Balloon Frog, among others
5. *Hoplobatrachus rugulosus* is a species of frog in the Dicroglossidae family. It is found in Cambodia, China, Hong Kong, Laos, Macau, Malaysia, Myanmar, the Philippines, Taiwan, Thailand, and Vietnam.
6. *Microhyla pulchra* is a species of narrow-mouthed frog found in northeastern India, southern China, and Southeast Asia south to at least Thailand but possibly as far south as Malaysia and Singapore.

Data Analysis

To analyze open questions, answers were sorted into categories. To evaluate students' species knowledge in the picture test both common Lao names and scientific names at the level of species and genus were counted as correct answers. In the analysis, common names were converted to the respective scientific names. Multiple regression analyses with backward elimination of non-significant ($p > 0.05$) variables were used to search for impacts such as age, sex, rurality, and study major on study students' knowledge of amphibians. For all statistic analyses IBM SPSS 24.0 was used.

Results

Students judge all the six included amphibians as present in their region (Table 1). With exception of *Microhyla pulchra* about 90 % of the students succeeded in naming those amphibians correctly. Especially *Occidozyga sumatrana*, *Hoplobatrachus rugulosus* and *Microhyla pulchra* were described as present in Lao rice fields.

Amphibians were described by Lao students as useful and tasty (Table 2). However, only few of them characterized amphibians as useful or harmful. For Lao students the highest value of amphibians is the application as food (Table 3). Other uses of amphibians were rarely seen by the participants of the present study.

The multiple regression analyses with backward elimination revealed that neither age, sex, rurality nor major of study had a significant impact on students' species knowledge in the picture

identification task (all $P > 0.05$).

Name of amphibian	Correct identification	Belief that amphibian is present	Information about amphibians(responses > 10.0)
<i>Occidozyga sumatrana</i>	82.5	94.7	living in rice field (51.3), living in river (11.4), living in pond (10.4)
<i>Polypedates leucomystax</i>	91.7	91.6	living on tree (34.6), living in pond (13.4), living in forest (11.3)
<i>Duttaphrynus melanostictus</i>	94.3	93.4	poisonous (18.1), living in wetland (15.4), blistered body (11.7)
<i>Glyphoglossus molossus</i>	94.3	90.7	present in rainy season (13.6), living in rice field (13.0), living in pond (13.0), living in clay (12.0)
<i>Hoplobatrachus rugulosus</i>	96.5	94.7	living in rice field (29.2), living in ponds (16.4), living in holes (15.9)
<i>Microhyla pulchra</i>	9.2	91.6	living in rice field (31.5), small body (10.5)

Table 2: Attitudes towards frogs and toads (N = 224)

Attributs	Mean \pm SE
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Useful	3.52 \pm 0.06
Tasty	3.51 \pm 0.06
Important for medicine	3.47 \pm 0.06
Important to conserve	3.38 \pm 0.07
Harmful	2.73 \pm 0.07
Beautiful	2.66 \pm 0.06

Table 3: Importance of frogs and toads (N = 224)

Uses	Responses (%)
Food	87.5
Bio-indicator	33.5
Pest-control	31.3
Nature conservation	31.3
Medical value	28.6
Regulation of water systems	20.1
Pets	4.5

Discussion

Interestingly, all amphibians in the study were described by Lao students as present in the region. More than 90 % agreed with this statement. This value appears quite high and underlines that amphibians appear very common to Lao people. The result of the identification test shows that amphibians appear not only as common, Lao students know those animals very well by their species names. 5 of 6 amphibians could be named correctly by more than 90 % of the participants. That shows that amphibians have also a high value in Lao everyday life. However, the apparent good species knowledge of amphibians has also got some obstacles. In the case of *Microhyla pulchra* nearly every participant characterized this animal as resident, however not even 10 % know its name.

Lao students show also knowledge of the amphibians' live what might be explained due to a strong connection to nature and agriculture. For instance, many responses relate to places where students have seen those animals, e.g. rice field, pond, river forest. Interestingly, with their knowledge students differentiate exactly from species to species. For instance, *Occidozyga sumatrana*, *Hoplobatrachus rugulosus* and *Microhyla pulchra* are described as inhabitants of rice fields. In contrast, *Polypedates leucomystax* was described as tree-living, *Duttaphrynus melanostictus* as poisonous, and *Glyphoglossus molossus* as seasonal appearing. With the lenses of an ecologist it would be relevant to know if the students relate the appearance of amphibians

in rice fields to their role as predator on pests on rice. Focusing on attributes that students relate to frogs and toads, the most important quality is usefulness. However, the term ‘useful’ can be interpreted in two ways. On the one hand, it can be seen as usefulness in an ecological point of view. On the other hand, it can be seen as usefulness for human consumption. Since the attributes ‘tasty’ and ‘important to conserve’ are also mentioned close behind, both interpretations make sense. In contrast, it should be noted that less than the half of the participants find amphibians beautiful. Looking at the preferred uses of amphibians, with nearly 90 % mentions it comes obvious what crucial role amphibians got for human nutrition in Laos. Only around every third participants agrees with ecological or agricultural benefits of amphibians. Given that amphibians are predators on pest on rice this number of mentions appears quite small. On the first view, it might be surprising that none of the factors age, sex, rurality or study major had an impact on the students’ success in identifying amphibians. On the second, this circumstance appears less surprising. Note, 5 of 6 amphibians were known by approximately 9 from 10 participants and six’ one was none by almost nobody. However, this shows once more how wide spread amphibian knowledge in Laos is.

Conclusion

Amphibians are very well known in Laos in everyday live independent from sex, age and place of living, e.g. from observing them in rice fields or just from eating them. They are described as useful, but not as beautiful. What do Lao students think about the ecological and agricultural value of amphibians? It comes apparent, that about 70 % do not connect those factors with amphibians. However, having amphibians in rice fields could have two advantages: First, to have an important instrument to regulate pests on rice, and second, to enrich human nutrition. Further research should focus on how people get aware of this.

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References

- Andreone, F., M. Vences, D. R. Vieites, F. Glaw, and A. Meyer. 2005. Recurrent ecological adaptations revealed through a molecular analysis of the secretive cophyline frogs of Madagascar. *Molecular Phylogenetics and Evolution* **34**: 315–322.
- Baillie, J.E.M., Hilton-Taylor, C., Stuart, S.N., 2004. IUCN Red List of Threatened Species. A global Species Assessment. IUCN Gland, Switzerland and Cambrige, UK.
- Cheng, T. L., Rovito, S. M., Wake, D. B., & Vredenburg, V. T. (2011). Coincident mass extirpation of neotropical amphibians with the emergence of the infectious fungal pathogen *Batrachochytrium dendrobatidis*. *PNAS*, 108, 9502-9507. doi: 10.1073/pnas.1105538108.
- D’Amen, M., Bombi, P., 2009. Global warming and biodiversity: evidence for climate-linked amphibian declines in Italy. *Biological Conservation* 142, 3060–3067.
- Greenlees, M. J., Brown, G. P., Webb, J. K., Philips, B.L. and Shine, R. 2006. Effects of an invasive anuran [the cane toad (*Bufo marinus*)] on invertebrate fauna of tropical Austran floodplain. *Animal conservation* 9: 431-438.

- IUCN 2009 IUCN Red List of Threatened Species, version 2009.1. See www.iucnredlist.org (date last accessed 1 May 2009).
- Jancovich JK, Bremont M, Touchman JW, Jacobs BL (2010) Evidence for Multiple Recent Host Species Shifts among the Ranaviruses (Family Iridoviridae). *Journal of Virology* 84:2636-2647
- Jodi Rowley, Rafe Brown, Raoul Bain, Mirza Kusriani, Robert Inger, Bryan Stuart, Guin Wogan, Neang Thy, Tanya Chan-ard, Cao Tien Trung, Arvin Diesmos, Djoko T. Iskandar, Michael Lau, Leong Tzi Ming, Sunchai Makchai, Nguyen Quang Truong and Somphouthone Phimmachak. 2009. Amphibians Impending conservation crisis for Southeast Asian
- Johnson AJ, Pessier AP, Wellehan JFX, Childress A, Norton TM, Stedman NL, Bloom DC, Belzer W, Titus VR, Wagner R, Brooks JW, Spratt J, Jacobson ER (2008) Ranavirus infection of free-ranging and captive box turtles and tortoises in the United States. *Journal of Wildlife Diseases* 44:851-863
- Millennium Ecosystem Assessment. (2003). *Ecosystem and human well-being: A framework for the assessment*. Washington, DC: Island Press.
- Neang T (2010) An Investigation into Frog Consumption and Trade in Cambodia. Flora and Fauna International, Cambodia Programme, Phnom Penh, Cambodia
- Picco AM, Collins JP (2008) Amphibian commerce as a likely source of pathogen pollution. *Conservation Biology* 22:1582-1589
- Ranvestel, A.W., Lips, K. R., Pringle, C.M., Whiles, MR. and Bixby, R. J. 2004. Neotropical tadpoles influence stream benthos: Evidence for the ecological consequences of decline in amphibian populations. *Freshwater Biology* 49: 274-285.
- Rowley J, Brown R, Bain R, Kusriani M, Inger R, Stuart B, Wogan G, Thy N, Chan-ard T, Trung CT, Diesmos A, Iskandar DT, Lau M, Ming LT, Makchai S, Truong NQ, Phimmachak S (2010) Impending conservation crisis for Southeast Asian amphibians. *Biology Letters* 6:336-338
- Samuel A. Cushman., 2005. Effects of habitat loss and fragmentation on Amphibian: A review and prospectus. USDA Forest Service.
- Stuart, S.N., Chanson, J.S., Cox, N.A., Young, B.E., Rodrigues, A.S.L., Fischman, D.L., Waller, R.W., 2004. Status and trends of amphibian declines and extinctions worldwide. *Science* 306, 1783–1786.
- Stuart, S.N., Hoffman, M., Chanson, J.S., Cox, N.A., Berridge, R.J., Ramani, P. & Young, B.E. (2008) Threatened amphibians of the world. Lynx Editions, IUCN and conservation International, Barcelona, Spain.
- Vitousek, P. M., D'Antonio, C. M., Loope, L. L., & Westbrooks, R. (1996). Biological invasions as global environmental change. *American Scientist*, 84, 468–478.
- Wake, D.B., Vredenburg, V.T., 2008. Are we in the midst of the sixth mass extinction? A view from the world of amphibians. *Proceeding of the National Academy of Science* 105, 11466–11473.
- Wilson, E.O., 1999. *The Diversity of Life*. Longitude, New York, USA.

Estimation of Methane Emission from Solid waste Landfill Site, Savannakhet Province, Lao PDR

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Abstract

Methane (CH₄) released from solid waste landfill has been identified as a significant contributor to greenhouse gas emission in waste sector, which contributes to global warming. This study aimed to characterize new and age-defined solid waste disposed in Savannakhet landfill site. The obtained laboratory data of solid waste characteristics were used to estimate site specific emission factors, including methane generation potential (L_0) and methane generation rate constant (k). The results showed that organic carbon fraction and methane generation potential (L_0) of the waste decreased as elapsed time of landfill increased. The methane generation rate constant (k) of bulk waste was 0.155 yr⁻¹, while the k values of different components were varied depending on waste composition. The k values for paper, textile, wood, garden, and food were 0.069, 0.098, 0.088, 0.229, and 0.204 yr⁻¹, respectively. Methane emissions from landfill were calculated based on FOD method, using default and site specific values, by three models including 2000 GPG, 2006 IPCC, and LandGEM models. The results using default values showed that methane emission in the year 2016 estimated by 2000 GPG and LandGEM provided similar trends of CH₄ emission which were higher than those estimated by 2006 IPCC. Methane emissions from Savannakhet landfill site in 2016 using default values by 2000 GPG, 2006 IPCC, and LandGEM were 0.92, 0.53, and 1.00 Gg CH₄, respectively. Methane emissions using site specific values were less than those using default values, which were 0.65, 0.41, and 0.82 Gg CH₄, when estimated by 2000 GPG, 2006 IPCC, and LandGEM, respectively.

Keyword: greenhouse gas, methane generation potential, methane generation rate constant, solid waste landfill

Introduction

Presently, global warming has become problem of public concern. This phenomenon can mostly be attributed to the trapping of enormously quantities of greenhouse gases (GHG) in the earth's atmosphere, resulting in an increase of temperatures. Solid waste landfill is one of the most important anthropogenic sources of methane emission. Methane (CH₄) is the main component of landfill gas (LFG) produced from anaerobic degradation of organic carbon in municipal solid waste (MSW) during disposal.

In Savannakhet Province, Lao PDR, most of the solid wastes are disposed of by landfilling in local area. The solid wastes are disposed, through aerobic or anaerobic biodegradation. The main degradation products of aerobic process are carbon dioxide (CO₂), water, and heat, while those of anaerobic process are methane (CH₄) and carbon dioxide (CO₂). Methane (CH₄) released from solid waste landfill has been identified as a significant contributor

to greenhouse gas emissions, which contributes to global warming potential 25 times of carbon dioxide (CO₂) over a 100 years' time horizon (IPCC Fourth Assessment Report, 2007). Over the years a large number of numerical and mathematical models have been developed to estimate CH₄ emission from solid waste disposal based on first order decay (FOD) model. This approach is generally recognized and widely used, as it is recommended by the Intergovernmental Panel on Climate Change (IPCC) in the IPCC waste model (IPCC, 2006).

The FOD method recommended by IPCC considered that degradable organic carbon (DOC) containing in solid waste decays slowly by microbiological and biochemical processes throughout a few decades, during which LFG (mostly consisting of CH₄ and CO₂) are formed. As a result, emissions of CH₄ from waste deposited in a disposal site are highest in the first few years after deposition, and then gradually decline as degradable carbon in the waste is consumed by the microorganisms responsible for the decay. To estimate methane emission based on the FOD model, activity data and emission factors are required. Depending on availability of data, the FOD method can be used according to Tier I (with default activity data), Tier II (country specific activity data), and Tier III (country specific values of key parameters with half-life, methane generation potential and fraction of degradable organic carbon) (IPCC, 2006).

In Lao PDR, the FOD model with Tier I approach has been used as a standard tool for methane emission inventory from waste sector (WREA, 2000). Due to a limitation of data, the IPCC default values are being used to estimate CH₄ emission. This reflects that the estimated results may not correspond to reality with a high uncertainty in calculation. To up level of calculation, it is essential to investigate the site specific activity data and to develop country specific emission factor. However, there is no such a study in Lao PDR. This study aims to investigate site specific data of a landfill in Savannakhet Province, including waste composition, fraction of degradable organic carbon, methane generation potential (L_0), and methane generation rate constant (k). Those parameters were further used in estimation of CH₄ emission from the landfill. The result of estimation using default value and specific values obtained from the study were compared both in terms of CH₄ emission and uncertainty value. The outcome of this study can be used as a guideline to contribute hierarchy in development of country specific emission factors and calculation of CH₄ emission from solid waste landfill sites throughout Lao PDR.

Methodology

1. Location of study site

Savannakhet province was selected in this study as a representative of special economic zone province in country. Savannakhet province is located in East-West Economic corridor of Greater Mekong Sub region (GMS), linking Vietnam, Lao PDR, Thailand, and Myanmar. Savan-Seno Special Economic Zone (SSEZ) has started developing since 2003, and the categories of business activities planned to be developed in the SSEZ include export-processing zone, free trade zone, free service and logistic center. This situation leads to a presumably increase of MSW in the near future. Savannakhet sanitary landfill is located in the east of the Savannakhet city at a distance of about 11 km from the city center, exactly lies between 16°32'25.36"N and 104°49'28.45"E. Approximately 70% of MSW generated in Kaisone Phomvihan District which was major city of Savannakhet Province was transported to landfill site. The landfill has been receiving waste for more than 17 years as it was established and started operation in 2000. The landfill has a total site area of 13.5 ha and disposal area of 4 ha, including four cells for solid waste disposal.

2. Characterization of age-defined waste

2.1 Solid waste sampling and sorting

Solid waste samples at varying ages were taken from Savannakhet landfill site at different parts of landfill site. The study site is divided into 4 sections depending on time of landfilling. As shown in Figure 5, the solid waste samples obtained from section 1 reflected the waste at the age of 5 years. Section 2 provided the waste sample at the ages of 3-4 years. The sample at the age of 1 year was collected from section 3, while new waste was directly obtained from garbage truck, prior to dumping in section 4. The aged samples were taken by bulldozer with backhoe at the depth of 3 meters, approximately, while the new samples were taken directly from the garbage truck delivered to the landfill site. The sampling was conducted in July (rainy season) of 2016. The average temperature at the site was 28.2 °C and average monthly precipitation was 245.3 mm.

The amount of 50 kg of each sample was gathered and then conducted a quartering until the amount of 5 kg was achieved. Then 5 kg of waste sample was manually sorted into 11 types of wastes according to IPCC (2006), including:

- | | |
|---|----------------------------------|
| (1) food waste | (6) nappies (disposable diapers) |
| (2) garden (yard) and park waste | (7) rubber and leather |
| (3) paper and cardboard | (8) plastics |
| (4) wood | (9) metal |
| (5) textiles | (10) glass |
| (11) others (e.g., ash, dirt, dust, soil, electronic waste) | |

Each composition was weighted to calculate the percentage of waste compositions by equation (1) according to ASTM D5231-5292. The composition containing organic matters of age-defined wastes, including food, garden, paper, wood, textile, and nappies, were kept into containers and delivered to laboratory for further analyses.

$$C = (w_1 * 100) / w_2 \quad (1)$$

where: C = percentage composition of waste
w₁ = weight of waste in each composition (kg)
w₂ = total weight of waste (kg)

2.2 Proximate Analysis

Different compositions of solid waste as mentioned earlier were analyzed in laboratory. The main purpose was to determine moisture content, volatile matter, ash content, and organic carbon of the age-defined municipal solid wastes. The following procedures are the approaches for characterization of solid waste samples.

2.2.1. Moisture

Moisture content was determined according to ASTM E1756-01 standard. Three grams of municipal solid waste was placed into an oven at 105°C for two hours. The sample was then stabilized in desiccator and reweighed. The difference in weight represents the moisture content of the sample indicating in percentage. The moisture content of solid waste can be calculated according to equation (2).

$$M = \left(\frac{w-d}{w} \right) \times 100 \quad (2)$$

where M = moisture content, wet basis (%)

w = initial (wet) weight of sample (g)

d = final (dry) weight of sample (g)

2.2.2. Volatile matter, ash content, and organic carbon

Volatile matter is the portion of wastes which is converted into gas before and during combustion at high temperature. The samples after determination of moisture content also used to determine the volatile matter content. The dried waste samples were then heated at 550°C for 1 hour to determine the volatile matter. After combustion the samples were weighed to determine dry weight of ash. At this stage the volatile matters and ash content were calculated according to equations (3) and (4), respectively.

$$\%V = \frac{(\text{weight of dry sample} - \text{ash weight})}{(\text{dry sample weight})} * 100 \quad (3)$$

$$\% \text{ ash} = \frac{\text{ash weight}}{(\text{dry sample weight})} * 100 \quad (4)$$

Percentage of organic carbon in age-defined composition was calculated by using equation (5).

$$\text{Organic carbon (\%)} = (100 - \text{ash})/1.8 \quad (5)$$

3. Simplified approaches to estimate site specific emission factors

Emission factors including methane generation potential (L_0) and methane generation rate constant (k) were determined by using simplified methods described by Ishii & Furuichi (2013) and Machado *et al.* (2009). According to these approaches, organic carbon in different waste components of age-defined waste samples were analyzed. Then methane generation potential (L_0) was calculated by considering biodegradable fraction and methane generation potential of each component, as shown in equations (6)-(8).

$$L_0 = \frac{BF_w * C_m}{1 + w} \quad (6)$$

$$BF_w(t) = \sum_{i=1}^n BF_i * FR_i * \left[\frac{VS(t)}{VS_0} \right] \quad (7)$$

$$C_m = \frac{\sum_{i=1}^n BF_i * FR_i * C_{mi}}{BF_w} \quad (8)$$

where	L_0	=	methane generation potential ($\text{m}^3 \text{CH}_4/\text{Mg}$)
	BF_w	=	biodegradable fraction
	C_m	=	MSW organic matter methane generation potential ($\text{m}^3 \text{CH}_4/\text{dry-Mg}$)
	w	=	water content (wet basis)
	VS	=	volatile solids (fraction)
	FR	=	fraction in the waste composition
	t	=	elapsed time (year)
	i	=	fraction of waste composition

The results of methane generation potential (L_0) of age-defined waste can be used to calculate methane generation rate constant (k) as expressed in equation (9).

$$\frac{L_0(t)}{L_0} = e^{-k t} \quad (9)$$

4. Estimation of methane emission

Methods for estimation of CH_4 emission are based on first order decay (FOD) principles. Three methods were approached in this study to estimate CH_4 emission from solid waste landfill sites including 2000 IPCC good practice guidance (2000 GPG) and 2006 IPCC guidelines (2006 IPCC) given by IPCC, as well as LandGEM by US.EPA. The detailed methods of each approach for estimation of CH_4 emission were described as follows:

4.1. 2000 Good Practices Guidance (2000 GPG)

The 2000 GPG presents equations based on the derivative of the general FOD equation in revised 1996 IPCC guideline. Methane generation during solid waste disposal and CH₄ emission from landfill site can be calculated by equations (10) and (11), respectively.

$$\text{CH}_4\text{generation in year } t \text{ (Gg/yr)} = \sum_x \left[\frac{A * k * \text{MSW}_T(x) * \text{MSW}_F(x)}{L_0(x) * e^{-k(t-x)}} \right] \quad (10)$$

where:

t = year of inventory

x = year for which input data should be added

A = (1-e^{-k})/k; normalisation factor which corrects the summation

k = methane generation rate constant (1/yr)

MSW_T(x) = total municipal solid waste (MSW) generated in year x (Gg/yr)

MSW_F(x) = fraction of MSW disposed at SWDS in year x

L₀(x) = methane generation potential (Gg CH₄/Gg waste)

MCF(x) = methane correction factor in year x (fraction)

DOC(x) = degradable organic carbon in year x (fraction) (Gg C/Gg waste)

DOC_F = fraction of DOC dissimilated

F = fraction by volume of CH₄ in landfill gas

16/12 = conversion from C to CH₄

$$\text{CH}_4\text{emission in year } t \text{ (Gg/yr)} = [\text{CH}_4\text{generated in year } t - R(t)] * (1 - OX) \quad (11)$$

where: R(t) = recovered CH₄ in inventory year t (Gg/yr)

OX = oxidation factor (fraction)

According to 2000 GPG, methane generation potential (L₀) can be calculated by using equation (12).

$$L_0 = \text{MCF} * \text{DOC} * \text{DOC}_F * F * 16/12 \quad (12)$$

where: L₀ = methane generation potential (Gg CH₄/Gg waste)

MCF = CH₄ correction factor (defaults value for manage landfill 0.8)

DOC = degradable organic carbon (Gg C/Gg waste)

DOC_F = fraction of DOC that can be decomposed (default 0.77)

F = fraction of CH₄ in generated landfill gas (default 0.50)

16/12 = molecular weight ratio CH₄/C (ratio)

4.2. 2006 IPCC Guidelines (2006 IPCC)

The FOD model was introduced in 2006 IPCC guidelines (IPCC, 2006). The advantage of this model is that it incorporates time parameters to reflect the decay process of carbon in waste. To estimate CH₄ emission based on 2006 IPCC, the following steps are applied:

1) Decomposable DOC from waste disposal data

$$\text{DDOC}_m = W * \text{DOC} * \text{DOC}_f * \text{MCF} \quad (13)$$

where: DDOC_m = mass of decomposable DOC deposited, (Gg)

W = mass of waste deposited, (Gg)
 DOC = degradable organic carbon in the year of deposition, fraction, (Gg C/Gg waste)
 DOC_F = fraction of DOC that can be decomposed (default value 0.50)
 MCF = CH_4 correction factor for aerobic decomposition in the year of deposition (default value for manage landfill 0.8)

2) Mass of DOC accumulated at the of year T

$$DDOCma_T = DDOCmd_T + (DDOCma_{T-1} * e^{-k}) \quad (14)$$

3) Mass of DOC decomposed in year T

$$DDOCm\ decomp_T = DDOCma_{T-1} * (1 - e^{-k}) \quad (15)$$

where: $DDOCma_T$ = $DDOCm$ accumulated in the SWDS at the end of year T
 $DDOCmd_T$ = mass of $DDOC$ disposed in the SWDS in year T
 $DDOCma_{T-1}$ = $DDOCm$ accumulated in the SWDS at the end of year $(T - 1)$
 $DDOCm\ decomp_T$ = $DDOCm$ decomposed in year T
 k = reaction constant, $k = \ln(2)/t_{1/2}$ (yr^{-1})
 $t_{1/2}$ = half-life time (y)

4) Methane generation from $DDOCm$ decomposed

$$CH_4\ generated_T = DDOCm\ decomp_T * F * 16/12 \quad (16)$$

where: $CH_4\ generated_T$ = amount of CH_4 from decomposable material
 $DDOCm\ decomp_T$ = $DDOCm$ decomposed in year T , Gg
 F = fraction of CH_4 , by volume, in generated landfill gas
 $16/12$ = molecular weight CH_4/C (ratio)

5) Methane emission from SWDS

$$CH_4\ emission\ (Gg) = [\sum_x CH_4\ generated_{x,T} - R_T] * (1 - OX_T) \quad (17)$$

where: $CH_4\ emission$ = CH_4 emitted in year T , Gg
 T = inventory year
 x = waste category or type / material
 R_T = recovered CH_4 in year T , Gg
 OX_T = oxidation factor in year T , (fraction)

4.3. LandGEM

LandGEM is based on a first-order decomposition rate equation for quantifying emissions from the decomposition of landfilled waste in MSW landfills. The software provides a relatively simple approach to estimating landfill gas emissions. The model parameters including k and L_0 were applied in this decomposition equation. Model defaults are based on empirical data from U.S. landfills as shown in equation (18). Field test data can also be used in place of model defaults when available.

$$Q_{CH_4} = \sum_{t=1}^n \sum_{j=0.1}^1 k L_0 \left(\frac{M_t}{10} \right) e^{-kt_{ij}} \quad (18)$$

where: Q_{CH_4} = annual methane generation in the year of the calculation ($m^3/year$)
 i = 1 year time increment
 n = (year of the calculation) - (initial year of waste acceptance)

$j = 0.1$ year time increment
 k = methane generation rate (year^{-1})
 L_0 = potential methane generation capacity ($\text{m}^3 \text{CH}_4/\text{Mg}$)
 M_i = mass of waste accepted in the i^{th} year (Mg)
 t_{ij} = age of the j^{th} section of waste mass M_i accepted in the i^{th} year (decimal years, e.g., 3.2 years)

Results and Discussion

1. Municipal solid waste in Savannakhet Province

Savannakhet landfill site disposal mostly received MSW from Kaisone Phomvihian District which is a major city of Savannakhet Province. Approximately 70% of MSW generated has been delivered to the landfill site since 2000. The landfill has a total area of 4 ha with a depth in a range of 5-8 m. Previous study revealed that MSW generation rates was 0.75 kg/person/day and total amount of solid waste was 51 tonnes/day (IGES, 2012). The annual amount of solid waste disposal related to the growth of population. Figure 1 exhibited the trends of population growth and solid waste disposed in the landfill site from 2000 to 2016. The amount of solid waste delivered to landfill site rapidly increased after 2005 because of higher efficiency on solid waste collection and governmental policy on solid waste management.

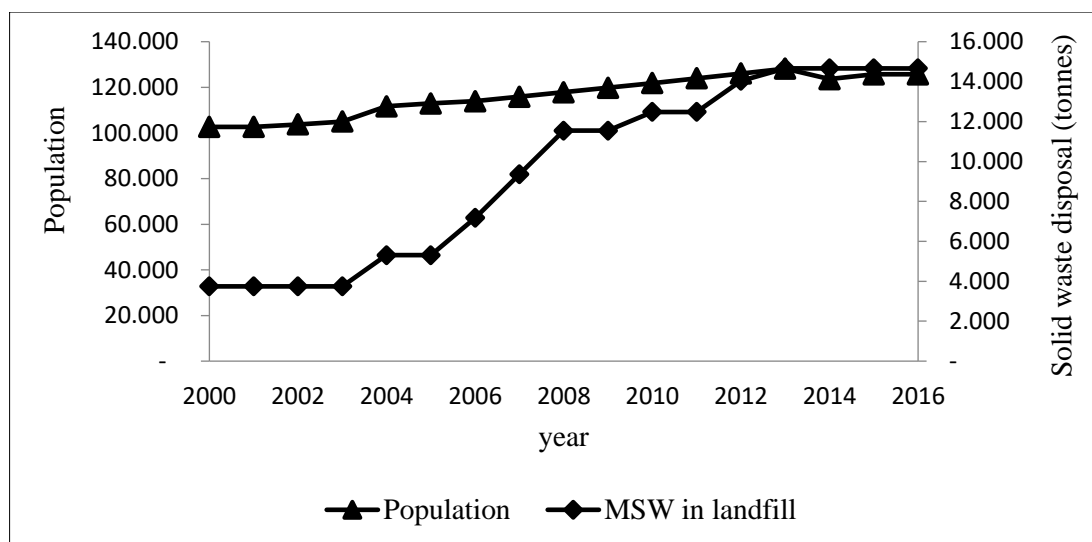


Figure 1 Population number of Savannakhet Province and solid waste disposal at Savannakhet landfill site

2. Solid waste composition and characterization

Composition of MSW at Savannakhet landfill site was investigated, as shown in Table 1. The study indicated that main composition of MSW at landfill site were biodegradable organic carbon fraction, including paper, food waste, garden waste, wood, textile, and leather, while the remaining consisted of non-biodegradable organic compounds, i.e. plastic and rubber, and inorganic compounds, e.g. glass, metal, and others. It was found that biodegradable fractions of MSW accounted for 45.3%, which was lower than that reported by IGES (2012). The great discrepancies were found in the components of food, rubber, metal, and glass. It can be explained that the new waste samples in this study were collected directly from garbage trucks, not from landfill site, therefore some recyclable components, eg. plastic, metal, and glass, were possibly separated prior to dumping to landfill site.

Table 1 MSW composition at Savannakhet landfill

Types	% Composition	
	This study	IGES (2012)
Paper	9	9
Textile	2	1
Wood	7	8
Garden	14	6
Food	13	54
Nappies	2	1
Rubber&Leather	8	1
Plastic	19	15
Metal	10	1
Glass	14	2
Others	2	2
Total	100	100

3. Estimation of site specific emission factor

3.1 Methane generation potential (L_0)

Fractions of organic carbon in different age-defined waste were used to estimate methane generation potential (L_0). Table 2 listed the parameters involved in estimation of the L_0 value. The results showed that L_0 of new waste (year 2016) were 66.54 m³CH₄/Mg which was highest compared to the older-aged wastes. As the waste was deposited longer in the landfill, the L_0 was found to decrease due to organic fraction in the waste was gradually degraded by microorganisms. The L_0 values of the wastes in years of 2015, 2013, 2012, and 2011 were found to be 58.86, 46.95, 40.75, and 28.44 m³ CH₄/Mg, respectively. The decrease of L_0 values was corresponded to the reduction of organic carbon fraction.

Table 1 Parameters involving in calculation of methane generation potential (L_0)

Parameter	New waste (2016)	2015	2013	2012	2011
MSW organic matter methane generation potential (C_m) (m ³ CH ₄ /dry-Mg)	489.34	569.98	702.18	823.58	1,021.54
biodegradable fraction of the waste as a whole (BF_w)	0.20	0.15	0.10	0.07	0.04
methane generation potential (L_0) (m ³ CH ₄ /Mg)	66.54	58.86	46.95	40.75	28.44

3.2 Methane generation rate constant (k)

3.2.1 k value based on bulk waste (2000 GPG)

The value of k was estimated by the change of L_0 values at different elapsed time of landfill. Figure 2 shows the trends of L_0 values as the age of waste became older in landfill site. The curve was fit with exponential equation, by which the k value was obtained.

The results showed that the k value was 0.155 yr^{-1} . This value was comparable to that suggested by IPCC (2006), which was 0.17 yr^{-1} for bulk waste in tropical wet climate zone. The result was compared with that studied by Wangyao *et al.* (2010), obtained from field and laboratory experimental results. The obtained value of k in the study of Wangyao *et al.* (2010) was about 0.2 year^{-1} , which was equal to the upper range of the suggested value for bulk waste in the tropical climate zone in 2006 IPCC guidelines. Moreover, Ishigaki *et al.* (2008) measured the methane emissions from different-aged landfills in Hanoi, Vietnam. The fitting of the measured methane emissions of landfills to the FOD model suggested a first-order reaction rate of 0.51 year^{-1} . Ishigaki *et al.* (2008) claimed that the high k values possibly caused by high content of rapidly degradable organic carbon in waste combined with high temperature and moisture content, stimulating anaerobic degradation and high biogas production rate.

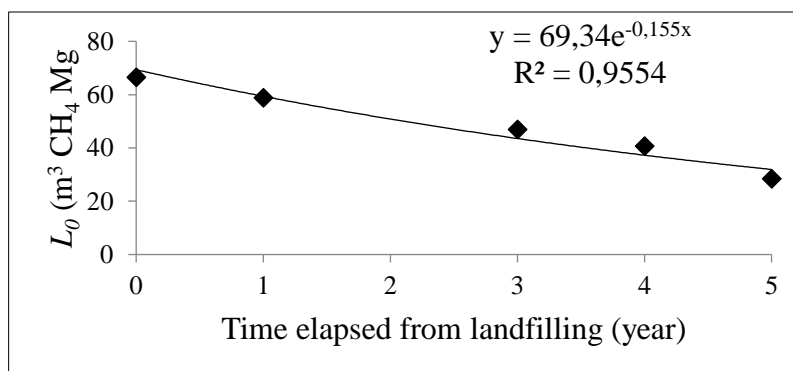


Figure 2 Methane generation potential (L_0) at different elapsed time of landfill and curve fitting for k value.

3.2.2 k value based on biodegradable components (2006 IPCC)

The k values of each waste composition were obtained from results of the ratio of degradable organic carbon (DOC) in waste samples of varying ages. Figure 3 exhibited the declining trends of DOC contents in different compositions of solid waste. The exponential curve was fitted with the obtained data. Then the k values of individual biodegradable components were identified and compared with the default values suggested in 2006 IPCC guidelines, as listed in Table 3. The k values for paper, textile, wood, garden, food, and nappies were 0.069, 0.098, 0.088, 0.229, 0.204, and 0.021, respectively. The k value for paper was comparable to the default value recommended by IPCC 2006 and Wangyao *et al.* (2010). Whereas, the k value for food was less than that of IPCC 2006 and Wangyao *et al.* (2010), possibly due to low percentage of food composition in solid waste during studied time. However, the k value for food was similar to De la Cruz and Barlaz (2010), Eleazer *et al.* (1997), Levis and Barlaz (2011).

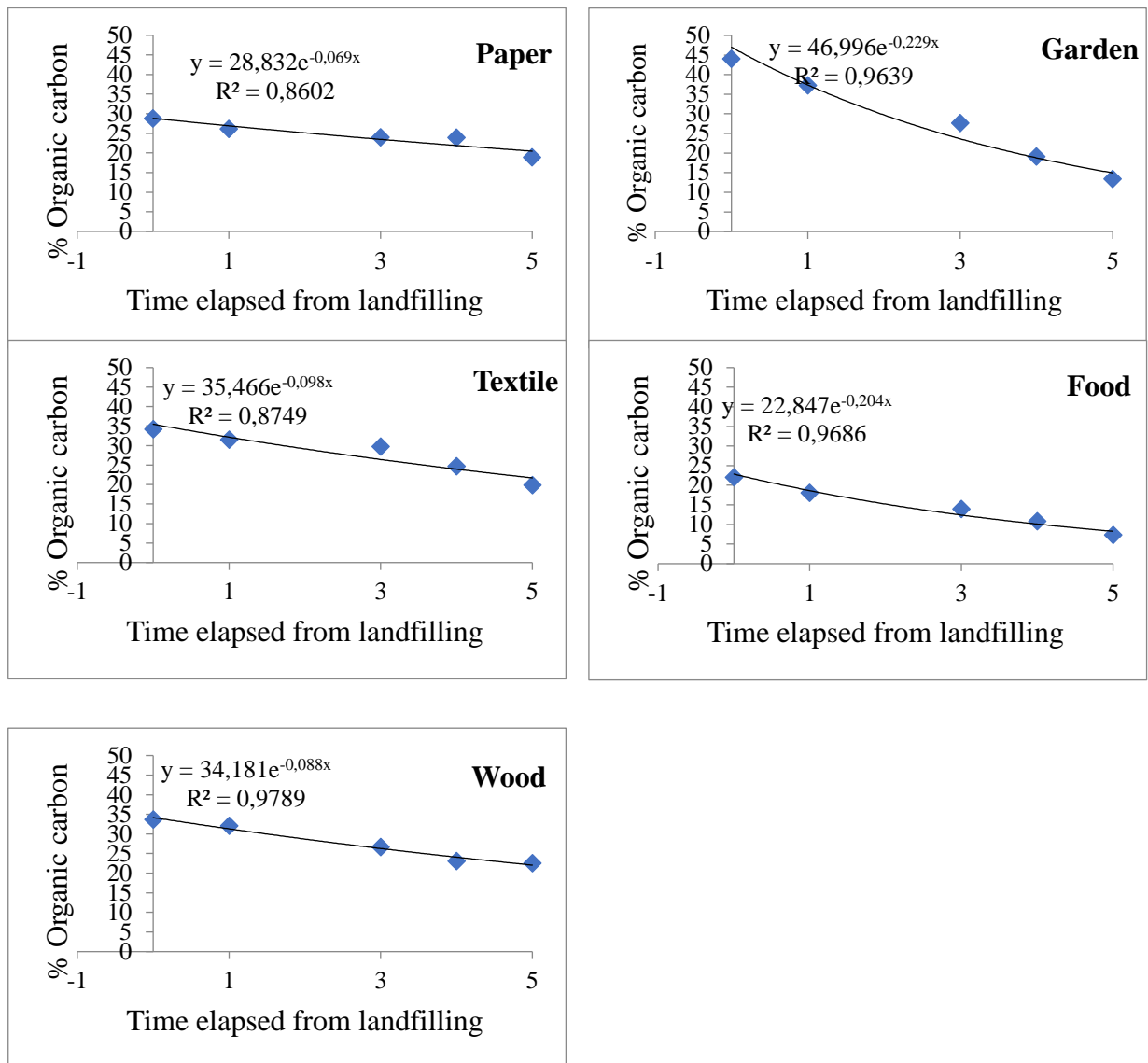


Figure 3 The k values for each component of waste (a) Paper, (b) Garden, (c) Textile, (d) Food, and (e) Wood

Table 3 Values of methane generation rate constant (k) of different MSW fraction

Source	Paper	Garden	Textile	Food	Wood
In this study	0.069	0.229	0.098	0.204	0.088
IPCC	0.070	0.170	0.070	0.400	0.035

Source: IPCC (2006)

4. Estimation of methane emission from solid waste landfill site

4.1 FOD method: 2000 GPG

The calculation of CH₄ emission according to 2000 GPG used methane generation potential (L_0) and methane generation rate constant (k) of bulk waste as input parameters. The default and site specific values were used to compare the results of CH₄ emission. Figure 4 shows that the estimates of methane emission from landfill sites in the 2016 was 0.92 and 0.65 Gg CH₄ when the default and site specific values were used, respectively (see more details in Appendix Table B1). It was found that the CH₄ emission estimated using site specific emission factors was lower than that using default values because L_0 and k of site specific values were less than the default values.

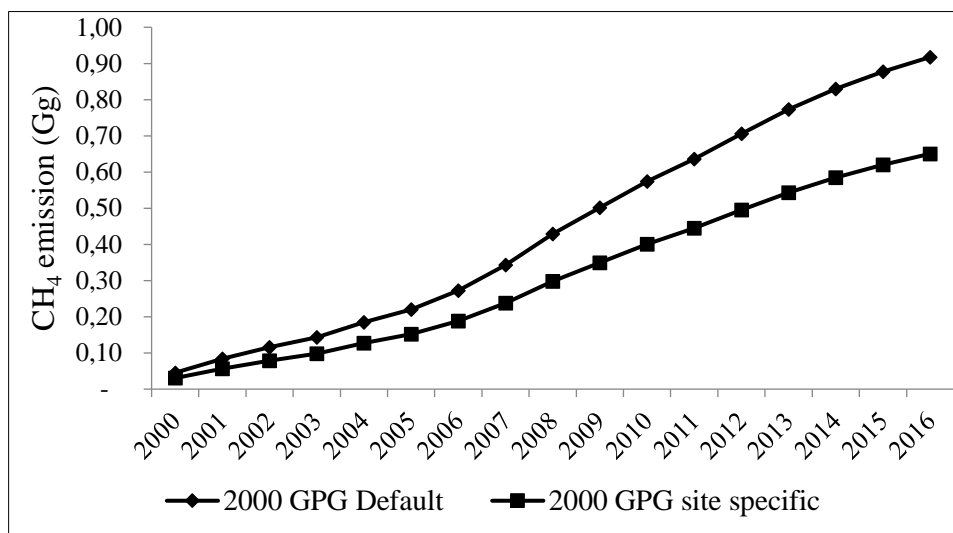


Figure 4 Methane emission estimated by 2000 GPG approach comparing between default and site specific emission factors

4.2 FOD method: 2006 IPCC

The estimation of CH₄ emission from landfill site calculated by 2006 IPCC approach was illustrated in Figure 5. The results of methane emission from landfill sites in 2016 were 0.41 and 0.53 Gg CH₄ using default and site specific values, respectively. The result estimated with site specific values was found to be higher than that obtained using the default values. It can be explained that the obtained methane generation rate constant (k) of individual components of waste were higher than the default values, especially textile, wood, and garden waste.

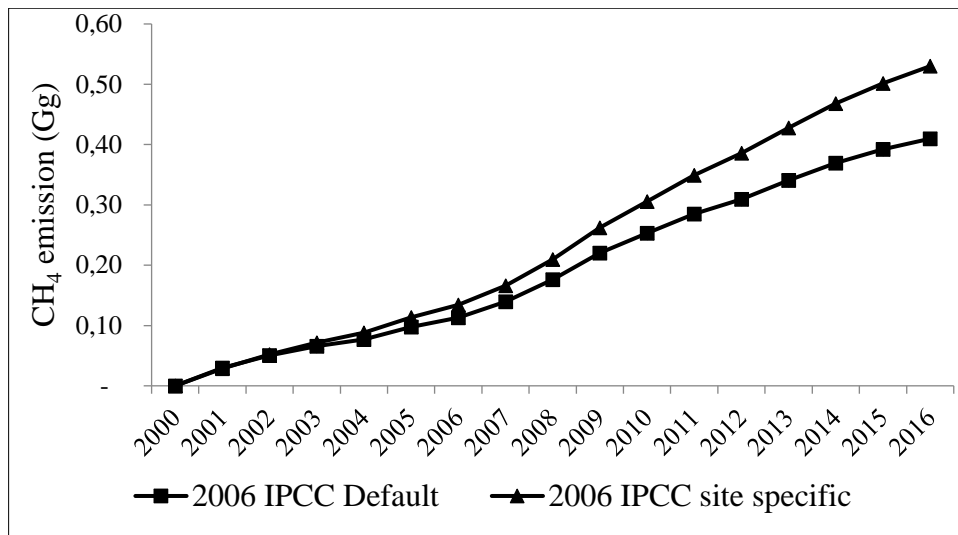


Figure 5 Methane emission estimated by 2006 IPCC comparing between default and site specific emission factors

4.3 LandGEM

The results of methane emission in the 2016 calculated by LandGEM were 1.00 and 0.82 Gg CH₄ when using default and site specific values, respectively. It was found that the CH₄ emission results using site specific emission factors were lower than the results using default value because L_0 and k of site specific obtained less than default values, as shown in Figure 6.

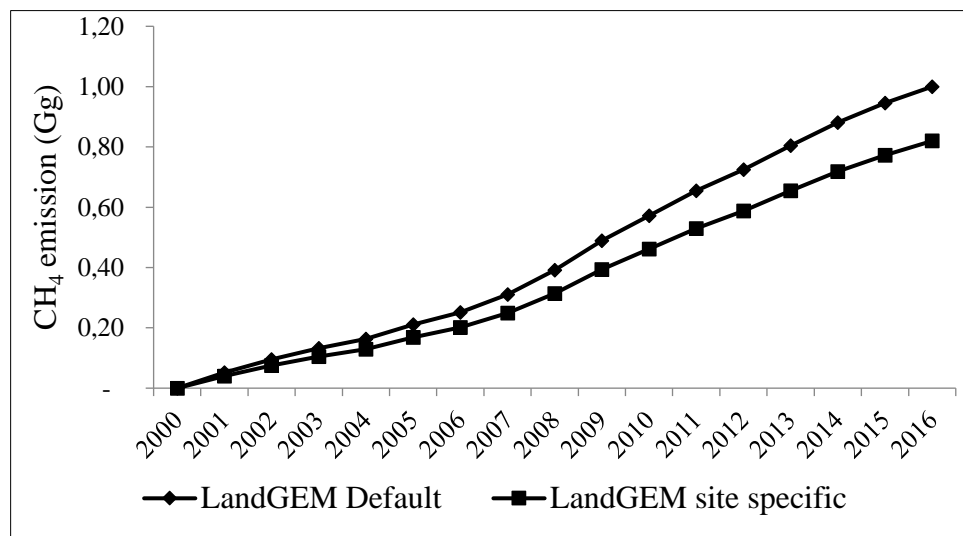


Figure 6 Methane emission estimated by LandGEM model comparing between default and site specific values

4.4 Comparison of methane emission among three models

Methane emission calculated by three different models using default and site specific values are shown in Figure 7 and 8, respectively. The results showed that the values calculated based on LandGEM and 2000 GPG provided similar trends of CH₄ emission because L_0 and k values were equal, whereas less trends were obtained from 2006 IPCC method because

the value of fraction of DOC that can be decomposed (DOC_F) used in 2006 IPCC was less than the DOC_F applied in 2000 GPG.

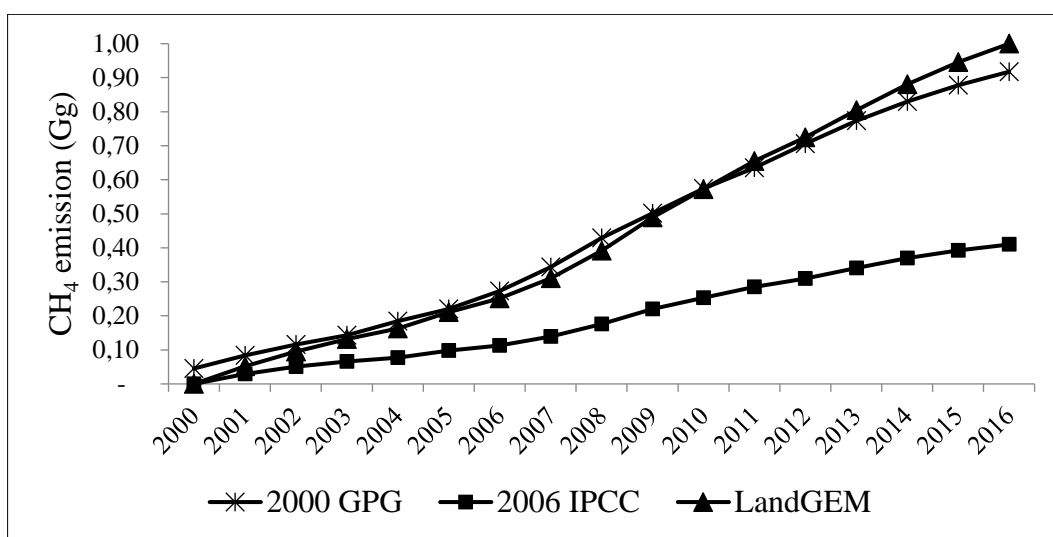


Figure 7 Comparison of estimated methane emission by different approaches using default values

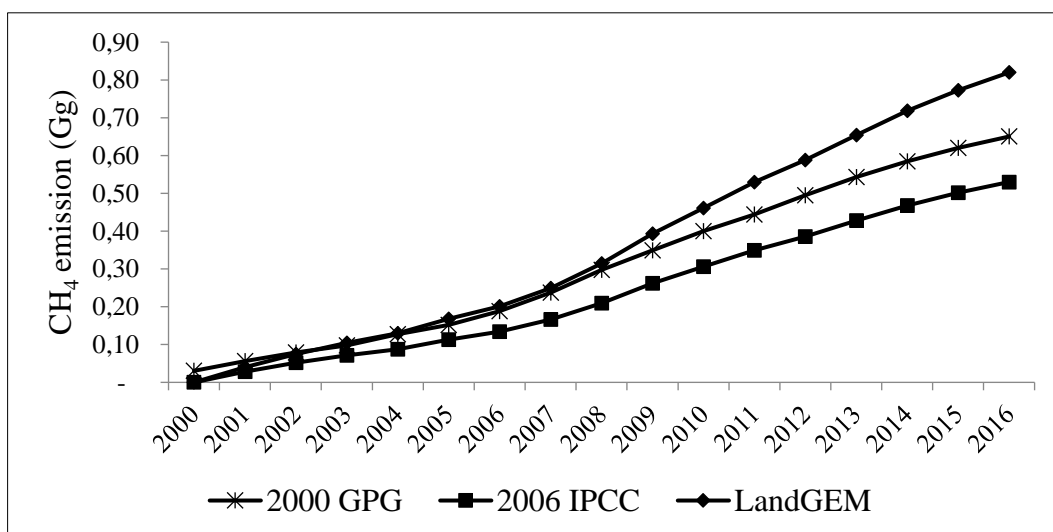


Figure 8 Comparison of estimated methane emission by different approaches using site specific emission factors

Additionally, the k values used in 2006 IPCC were identified based on waste composition, while 2000 GPG and LandGEM use the k value of bulk waste.

Conclusions

The characterization of age-defined solid waste disposed in Savannakhet landfill site found that volatile matter and organic carbon became decreased as the elapsed time of landfilling increased, reflecting decomposition of organic carbon by microorganisms during landfilling.

Methane emissions from solid waste landfill in Savannakhet Province, Lao PDR were estimated based FOD method, comparing between default and obtained site specific values.

Different approaches were used to estimate including 2000 GPG, 2006 IPCC, and LandGEM. The results using default values showed that methane emission during the year 2000-2016 estimated by 2000 GPG and LandGEM provided similar trends of CH₄ emission which were higher than those estimated by 2006 IPCC. Methane emissions in the year 2016 estimated by 2000 GPG, 2006 IPCC, and LandGEM using default values were 0.92, 0.53, and 1.00 Gg, respectively. While using site specific values, methane emissions were 0.65, 0.41, and 0.82 Gg, when estimated by 2000 GPG, 2006 IPCC, and LandGEM, respectively, which were less than those using default values.

References

- Blaha, D., K. Bartlett, P. Czepiel, R. Harris, and P. Crill. 1999. Natural and anthropogenic methane sources in New England. **Atmospheric Environment** 33 (2): 243-255.
- Bo-Feng, C., L. Jian-Guo, G. Qing-Xian, N. Xiao-Qin, C. Dong, L. Lan-Cui, Z. Ying and Z. Zhan-Sheng. 2014. Estimation of methane emissions from municipal solid waste landfills in China based on point emission sources. **Advances in Climate Change Research** 5: 81-91.
- Campuzano, R and S. González-Martínez. 2016. Characteristics of the organic fraction of municipal solid waste and methane production: A review. **Waste Management**. 54:3-12.
- Chakraborty, M., C. Sharma, J. Pandey, N. Singh and P. K. Gupta. 2011. Methane emission estimation from landfills in Delhi: A comparative assessment of different methodologies. **Atmospheric Environment** 45 (39): 7135-7142.
- Cheremisnoff, N. P. 2003. **Handbook of solid waste management and waste minimization technologies**, Butterworth-Heinemann.
- De Gioannis, G., A. Muntoni, G. Cappai and S. Milia. 2009. Landfill gas generation after mechanical biological treatment of municipal solid waste. Estimation of gas generation rate constants. **Waste Management** 29: 1026-1034.
- De la Cruz, F. B and M. A. Barlaz. 2010. Estimation of waste component-specific landfill decay rates using laboratory-scale decomposition data. **Environmental Science and Technology** 44: 4722-4728.
- Eleazer, W. E., W. S. Odle, Y.S. Wang and M. A. Barlaz. 1997. Biodegradability of municipal solid waste components in laboratory scale landfills. **Environmental Science and Technology** 31: 911-917.
- Institute for Global Environmental Strategies (IGES). 2012. **A guide for improving municipal solid waste management and promoting urban organic waste utilization in Lao PDR**.
- Intergovernmental Panel on Climate Change (IPCC). 2006. **Climate change. The supplementary to the IPCC**. Scientific Assessment Cambridge University Press, UK.
- Ishii, K and T. Furuichi. 2013. Estimation of methane emission rate changes using age-defined waste in a landfill site. **Journal of Waste Management** 33 (9): 1861-1869.
- Ishigaki, T., V. C. Chu, N. N. Sang, M. Ike, K. Otsuka, M. Yamada and Y. Inoue. 2008. Estimation and field measurement of methane emission from waste landfills in Hanoi, Vietnam. **Journal of Material Cycles and Waste Management** 10: 165-172.
- Levis, J. W and M.A. Barlaz. 2011. Is biodegradability a desirable attribute for discarded solid waste? Perspectives from a national landfill greenhouse gas inventory model. **Environmental Science Technology** 45: 5470-5476.
- Kim, H. and T. G. Townsend. 2012. Wet landfill decomposition rate determination using methane yield results for excavated waste samples. **Waste Management** 32 (7): 1427-1433.
- Kumar, A. and M. P. Sharma. 2014. Estimation of GHG emission and energy recovery potential from MSW landfill sites. **Sustainable Energy Technologies and Assessments** 5: 50-61.

- Machado, S. L., M. F. Carvalho, J.-P. Gourc, O. M. Vilar and J. C. F. do Nascimento. 2009. Methane generation in tropical landfills: Simplified methods and field results. **Waste Management** 29 (1): 153-161.
- Mou, Z., C. Scheutz and P. Kjeldsen. 2015. Evaluating the methane generation rate constant (k value) of low-organic waste at Danish landfills. **Waste Management** 35: 170-176.
- Tchobanoglous, G., H. Theisen and S. Vigil. 1993. **Integrated solid waste management: engineering principles and management issues**. McGraw-Hill, Inc., New York.
- Thompson, S., J. Sawyer, R. Bonam and J. E. Valdivia. 2009. Building a better methane generation model: validating models with methane recovery rates from 35 Canadian landfills. **Journal of Waste Management** 29: 2085-2091.
- Wangyao K., M. Yamada, K. Endo, T. Ishigaki, T. Naruoka, S. Towprayoon, C. Chiemchaisri and N. Sutthasil. 2010. Methane Generation Rate Constant in Tropical Landfill. **Journal of Sustainable Energy & Environment** 1: 181-184.
- Water Resources and Environment Administration (WREA). 2010. **The Strategy on Climate Change of the Lao PDR**.

The Assessment System Air Pollution PM2.5 and PM10 using Laser Dust Sensor PMS3003

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Abstract

Recently, Air pollution due to smog in almost every city in Vientiane, especially traffic light area Vientiane capital. This study was conducted to Study and Design Assessment System Air Pollution PM2.5 and PM10 using Laser Dust Sensor PMS3003. To study the Air pollution problem should be in Vientiane Capital for continuous monitoring of particulate air pollution (PM2.5 and PM10) using Laser Dust Sensor.

The study focused on 5 nodes, located in Vientiane capital as ThatLuang traffic area, Dongdok (NUOL) traffic area, Nongdoun traffic area, Nongbeuak junction area and 450-year road. We were storing the data through SD card adapter in a minute, the information of haze and air pollution situation more quickly and comprehensively.

To know about the amount of the dust in every second we have saved the data from every station and to evaluation the PM2.5 and PM10 air pollution in Vientiane capital, we have compared between the standard system's value and the new build systems to find the most correct value by using Correlation's low. From finding the fault of two systems: PM2.5 = 0.9992 (99.92%) and PM10 = 0.9995 (99.95%)

Our new build system's equipment's are cheaper than the standard system 35%, this system is automatic save the data in every minute to SD- Card, quality of saving is 2 months. From all invalidation most of the dust's value is much than the standard value, but if compare to the index value AQI, the PM2.5 is on acceptable.

This study can be used to lead guidelines in the best practices of air pollution policy, moreover, to be an environmental impact assessment in Vientiane capital for sustainable sort out the air pollution problem and climate mitigation for the future.

Keywords: Embedded System, Air pollution, Laser Dust Sensor, Monitoring.

Introduction

Nowadays, economic growth effected to an expansion of infrastructure, factories and transportation, especially in land transport which made vehicles increase continuously. According to statistical data of department of Civics and Transportation in 2016, there were 789,262 vehicles that have already registered, comparing with statistical data from 2009, average of increasing was 60,000 vehicles per years. Following this point was traffic jam and air pollution in the City area. All of these were factors which affect to health of people who travelled and lived in the area.

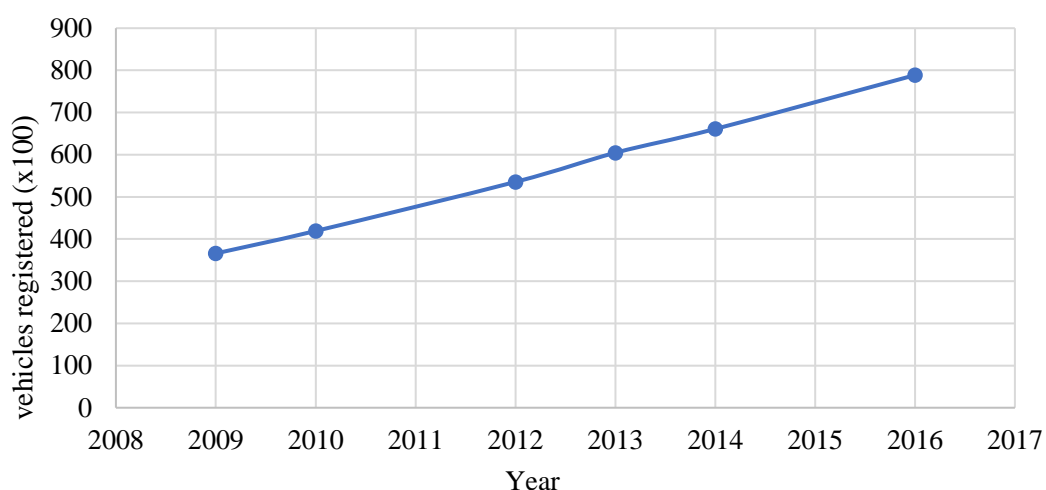


Figure 1: The total number of vehicles registered in Vientiane.

Air pollution is the presence of substances in the atmosphere that are harmful to the health of humans and other living beings, or cause damage to the climate or to materials. Pollution and air condition in the City are ranged to be the biggest problem of the world. According to reported World Health Organization (WHO) in 2014, air pollution has killed around 7 million people around the world. In the South East Asia was affected by air pollution, especially crowded City. Main reason which cause of the problem is increasing vehicles continuously, the vehicles release toxin substance such as: Carbon monoxide (CO), Sulfur dioxide (SO₂), Nitrogen dioxide (NO₂) which have negative affection to human; moreover, particulate matter 2.5 μm (PM_{2.5}) which its size is only half of blood cell therefore the PM_{2.5} is able to infiltrate to every part of human body, it is able to be harmful effect to human body too.

Table: AQI and health implications

AQI	Air Pollution Level	Air Pollution Category	Health Implications	Recommended Precautions
0–50	Level 1	Excellent	No health implications.	Everyone can continue their outdoor activities normally.
51–100	Level 2	Good	Some pollutants may slightly affect very few hypersensitive individuals.	Only very few hypersensitive people should reduce outdoor activities.
101–150	Level 3	Lightly Polluted	Healthy people may experience slight irritations and sensitive individuals will be slightly affected to a larger extent.	Children, seniors and individuals with respiratory or heart diseases should reduce sustained and high-intensity outdoor exercises.
151–200	Level 4	Moderately Polluted	Sensitive individuals will experience more serious conditions. The hearts and respiratory systems of healthy people may be affected.	Children, seniors and individuals with respiratory or heart diseases should avoid sustained and high-intensity outdoor exercises. General population should moderately reduce outdoor activities.
201–300	Level 5	Heavily Polluted	Healthy people will commonly show symptoms. People with respiratory or heart diseases will be	Children, seniors and individuals with heart or lung diseases should stay indoors and avoid outdoor

>300	Level 6		significantly affected and will experience reduced endurance in activities.	activities. General population should reduce outdoor activities.
		Severely Polluted	Healthy people will experience reduced endurance in activities and may also show noticeably strong symptoms. Other illnesses may be triggered in healthy people. Elders and the sick should remain indoors and avoid exercise. Healthy individuals should avoid outdoor activities.	Children, seniors and the sick should stay indoors and avoid physical exertion. General population should avoid outdoor activities.

According to the essential problem above, our country is risk of this problem and tend of both expanding town and increasing vehicles continuously in every year as well as tend is growth up. As shown in picture 1, our country has not system of measurement and collect data continuously about air pollution in big city. Therefore, for following, analysis and being reference information to related work. This article, there is purpose to research for building system of measurement about air pollution PM2.5 and PM10 by Laser Dust Sensor PMS3003 in crowded area or traffic jam, Vientiane Capital by using Embedded System assist recording in every single minute. Values are measured that will choose 2 main changers such as: temperature Value and particulate matter 2.5 μm value or PM2.5 and 10 μm or PM10; The particulate matter is a main part of air pollution.

Methodology

This research was conducted to study and design assessment system air pollution and we have 3 objectives: Study on the sensor to measure the effects of air pollution, study and design air pollution monitoring system with Laser Dust Sensor PMS3003 and to assesses PM2.5 and PM10 resident exposure in Vientiane capital.

The measurement area shall be varied to evaluate the accuracy of the measuring device against the standard equipment and the values obtained from the records are compared with the standard air pollutants analyzed together with the temperature variables at each time.

For expected outcomes in this research will to:

- The obtained continuous PM2.5 and PM10 pollution data at all five study sites for analysis.
- The concentrations of PM2.5 and PM10 in the measurement area were used to guide the prevention and treatment of air pollution.
- The information can be referenced to relevant organizations such as the Department of Air Pollution Control, the Ministry of Nature and the Environment.
- There is a prototype system for recording and monitoring changes in air pollution.
- Such models can be applied to other areas and can be expanded in the future.

Conceptual our Framework follow as:

1. Study the regulations and controls on air pollution in the Lao PDR;
2. Identify the place to measure;
3. Study and test the sensor equipment used by the calibration experiment to be most accurate in comparison with standard measuring equipment;
4. Measure PM2.5 at 5 locations in Vientiane Capital, 7 days, 7 hours, 7 hours/day (7.00 am to 10.00 am and 15.00 pm to 19.00 pm) and charge real-time every 10 minutes;
5. Monitoring of systems and metrics to evaluate the stability of the system designed with the analysis of air pollution in different areas in Vientiane Capital;

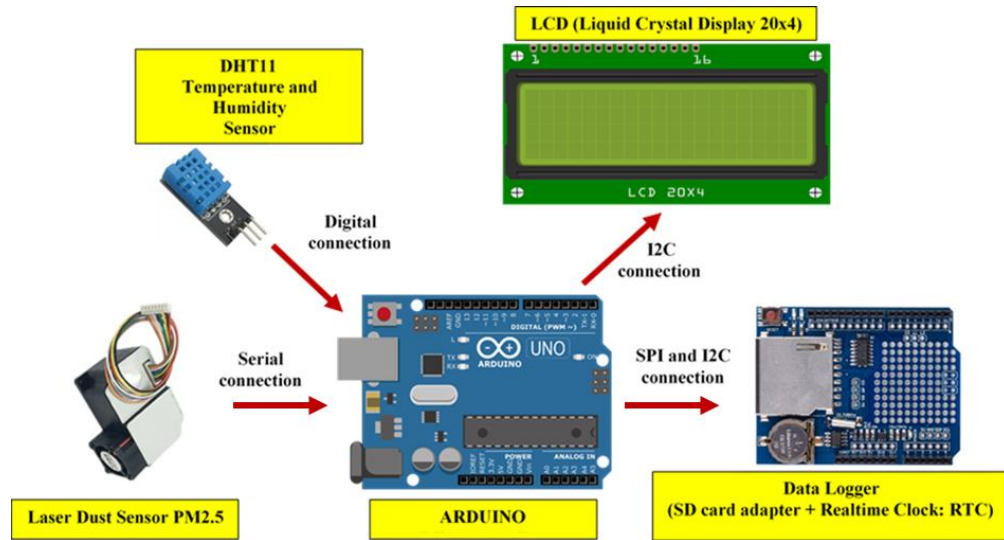


Figure 2: System design and instruments

Results

We used standard instrument model HT-9600 is a high sensitivity PM2.5 detector for compare with our instrument for test the sensor equipment used by the calibration experiment to be most accurate in comparison with standard measuring equipment;

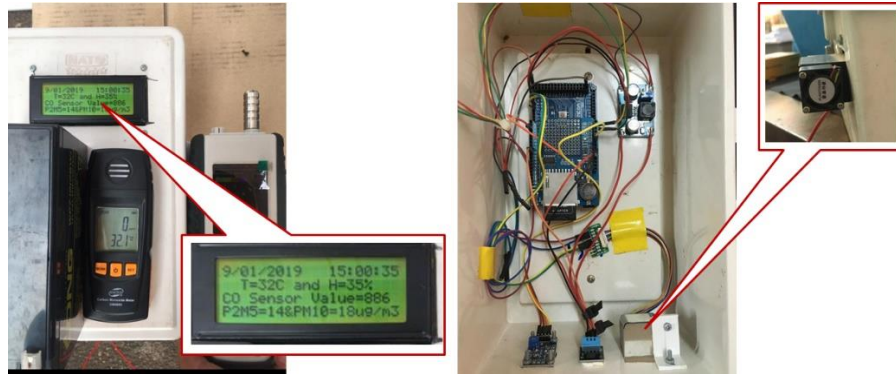


Figure 3: HT-9600 sensitivity PM2.5 detector compare with our instrument

To find the difference between the two metrics (the standard measure and the research statement), the correlation principle is used to find the relation between the two variables.

The formula of Correlation is:

$$\text{Correl}(X,Y) = \frac{\sum(x - \bar{x})(y - \bar{y})}{\sqrt{\sum(x - \bar{x})^2 \sum(y - \bar{y})^2}}$$

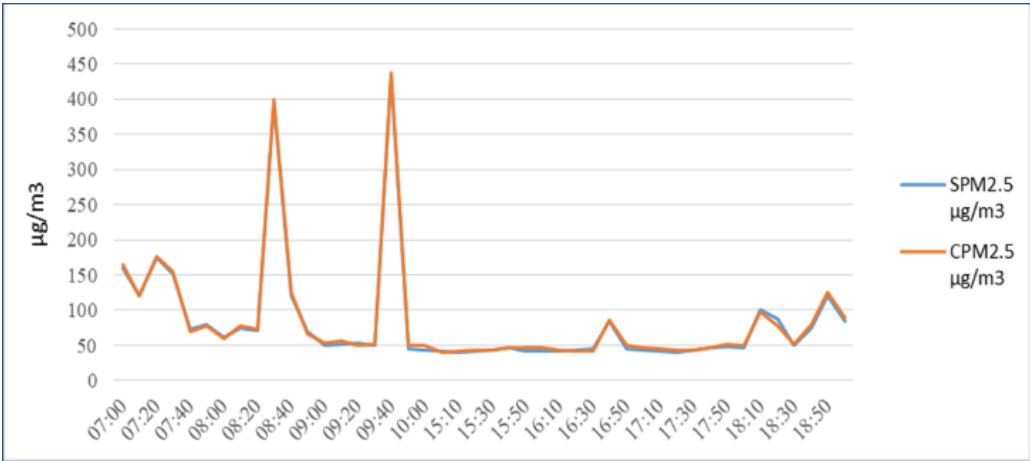
- \bar{x} is the average of the variable x (AVERAGE(array1))
- \bar{y} is the average of the variable y (AVERAGE(array2))

Correlation values generally range from 0 to 1;

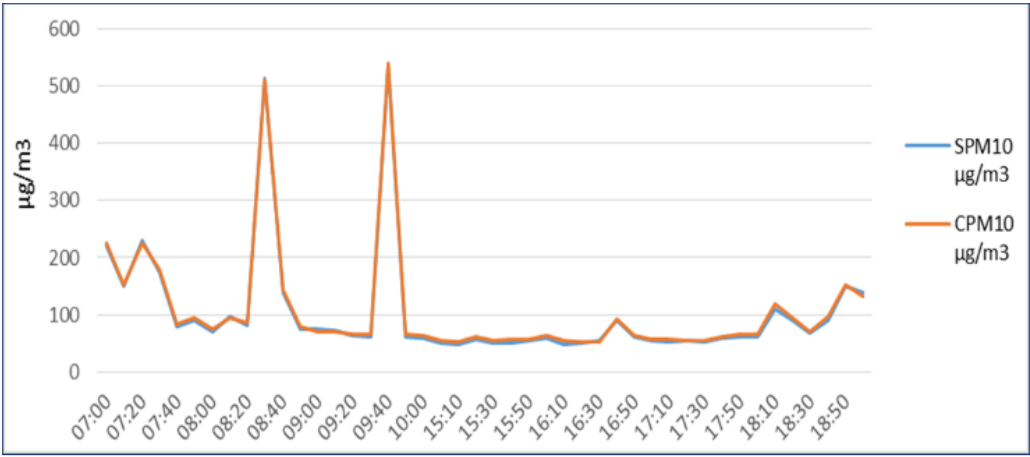
Discussion

To know about the amount of the dust in every second we have saved the data from every station and to evaluation the PM2.5 and PM10 air pollution in Vientiane capital, we have compared between the standard system's value and the new build systems to find the most correct value by using

Correlation's low. From finding the fault of two systems: $PM2.5 = 0.9992$ (99.92%) and $PM10 = 0.9995$ (99.95%)



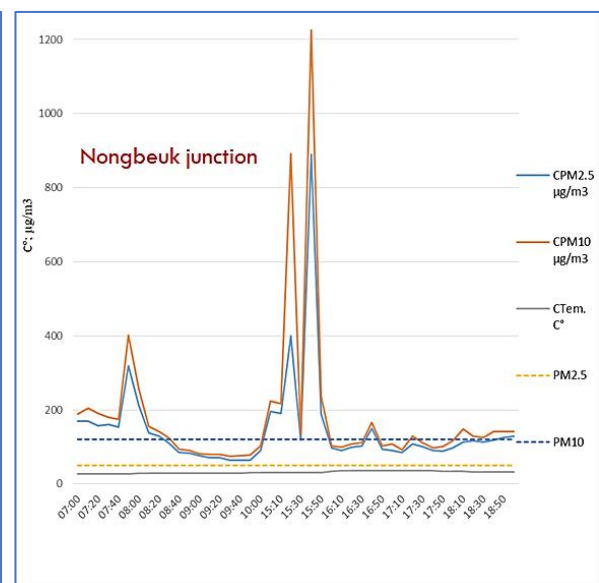
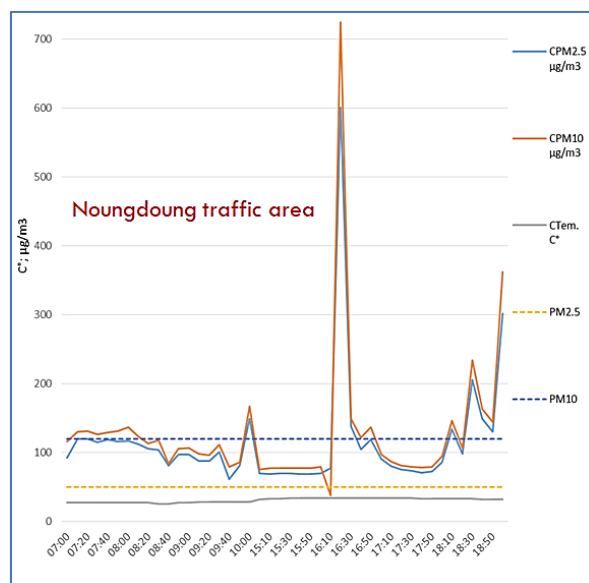
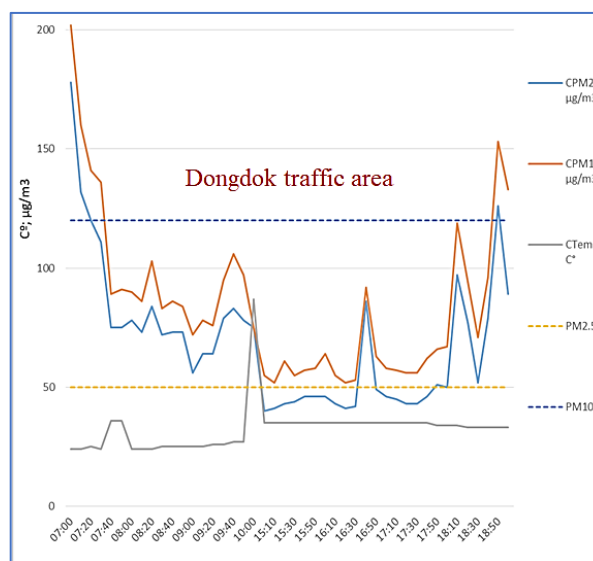
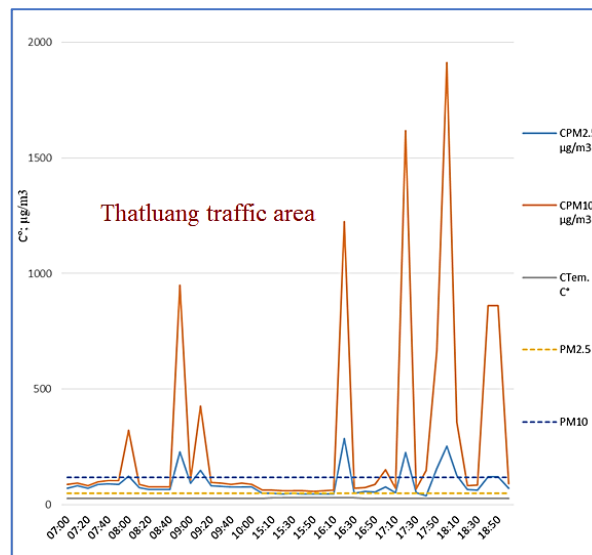
CORREL(PM2.5) = 0.9992 (99.92%)



CORREL(PM10) = 0.9995 (99.95%)

Figure 4: Outcome Evaluation of PM2.5 and PM10

For measure PM2.5 at 5 locations in Vientiane Capital, 7 days, 7 hours, 7 hours/day (7.00 am to 10.00 am and 15.00 pm to 19.00 pm) and charge real-time every 10 minutes.



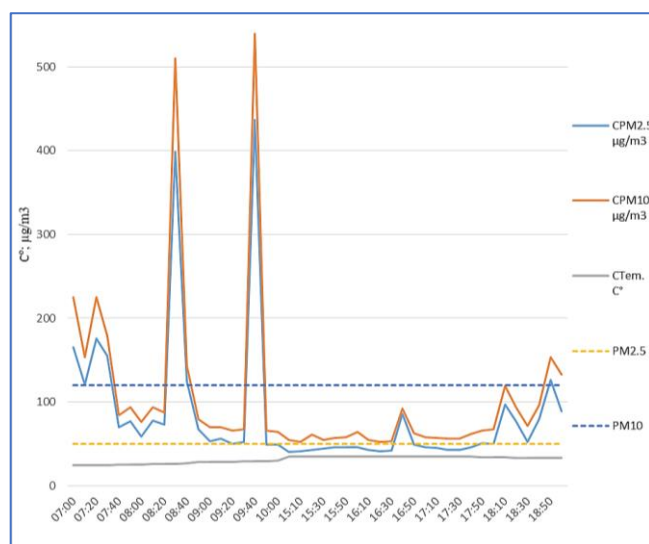


Figure 5: Measure PM2.5 at 5 locations in Vientiane Capital

Conclusions

Our new build system's equipment's are cheaper than the standard system 35%, this system is automatic save the data in every minute to SD- Card, quality of saving is 2 months. From all invalidation most of the dust's value is much than the standard value, but if compare to the index value AQI, the PM2.5 is on acceptable.

- PM2.5 value on both measurements has the highest accuracy value of 0.9998 (99.98%)
- PM10 value on both measurements has the highest accuracy value of 0.9996 (99.96%)
- Therefore, from all the values measured and compared, it is possible to use PM2.5 and PM10 in relevant work.

References

- Technical Regulation on Ambient Air Quality Index (on trial)] (PDF). *Ministry of Environmental Protection of the People's Republic of China* (in Chinese). 2012-03-02. Retrieved 2018-02-02
- Cheng, Y.H., Y.L., Lin. And C.C. .(2012) Levels of PM 10and PM 2.5in Taipei Rapid Transit System. *Atmospheric Environment*) pg. 42: .(7249-7242 Atmospheric Environment.
- L.Y, Chan. .(2002) *Commuter exposure to particulate matter in public transportation modes in Hong Kong*. Hong Kong: the Hong Kong Polytechnic University.
- Pornpimol K., T. Anthayanon., W. Yoosook and C. (2012). Exposure to Particulate Matter, CO₂, CO, VOCs among Bus Drivers in Bangkok. *J Med Assoc Thai 2012*, (๒๖๓. 95: 169-178). Onchoi.

Biochar as amendment to soil growing cassava for foliage

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Abstract

The design of this experiment was a 2*2*5 factorial with 3 replications in a split-plot arrangement. The main plots were biochar levels of 0, 0.5, 1, 1.5 and 2 kg/m² of soil; the split plots were cassava variety (sweet or bitter) and partial peeling (or no peeling) of the cassava stems prior to planting.

The rate of germination was much higher for stems from bitter compared with sweet variety of cassava, and was higher when the stems were partially peeled, but was not affected by soil amendment with biochar. Yields of all components of the above-ground biomass were much higher for the bitter than the sweet cassava variety. There were no effects on foliage yield due to level of biochar. Soil pH, water-holding capacity, content of organic matter and of nitrogen were all enhanced with linear trends as the level of biochar added to the soil was increased.

Key words: *foliage, germination, planting method, variety*

Introduction

Cassava is a staple food crop in Lao PDR. However, it has now become the second most important crop in Lao PDR, as a result of the development of industrial extraction of starch from the cassava roots. It has also recently been shown that the byproduct pulp from cassava starch extraction, as well as the whole cassava root, can be the basis of intensive fattening systems of local cattle (Phanthavong et al 2016a,b; Sengsouly and Preston 2016). The cassava foliage can also be used as the basal diet for intensive feeding of goats (Vor Sina et al 2017).

These developments have encouraged the introduction of improved cassava varieties with higher yield potential. Most of the new varieties are considered to be “bitter” varieties because of the higher concentrations of cyanogenic glucosides. The sweet varieties are those used for human consumption.

However, there appears to be no information on the relative responses of both “bitter” and “sweet” varieties to new agronomic practices such as the use of biochar as soil amender (Lehman and Joseph 2011; Preston 2015).

The objective of the experiment to be reported in this paper was to study the response of bitter and sweet varieties of cassava to application of increasing levels of biochar. Cassava was established by planting short lengths of stems directly in the soil. Possible advantages from limited peeling of the stems to encourage germination were also examined in view of the successful use of this technique for hastening the germination and survival of stem cuttings of the mulberry tree (*Morus alba*) (Moreno et al 2005; Bouaravong et al 2017).

Materials and Methods

Location

The experiment was conducted on Nongpheu campus, Savannakhet University, Lao PDR. The trial covered a period of 150 days from 12 June to 8 November 2016.

Experimental design

The design was a 2*2*5 factorial with 3 replications in a split-plot arrangement. The main plots were biochar levels of 0, 0.5, 1, 1.5 and 2 kg/m²; the split plots were cassava variety (sweet or bitter) and partial peeling (or no peeling) of the cassava stems prior to planting.

The total area was 240 m² (6*40 m). The plots were 1.5*1.5m; the distance between each replication and plots was 0.5 m; the distance between rows in each plot was 0.5 m with 0.5 m between individual stems.

Procedure

The cassava stems were from cassava plants 8-12 months old. They were cut into lengths of 20 cm and inserted vertically 10 cm into the soil. The first harvest of foliage was made at 60 days and the second harvest 90 days later.

Biochar was produced from rice husk combusted in a gasifier stove (Photos 1 and 2). It was mixed into the top 10 cm of soil according to the treatments.

Urea was applied as fertilizer at the rate of 50 kg N/ha. The plots were irrigated every evening. Weeds were removed on days 31 and 91.



Photo 1. Burning rice husk to make biochar



Photo 2. Biochar from rice husk



Photo 3. Arrangement of the plots

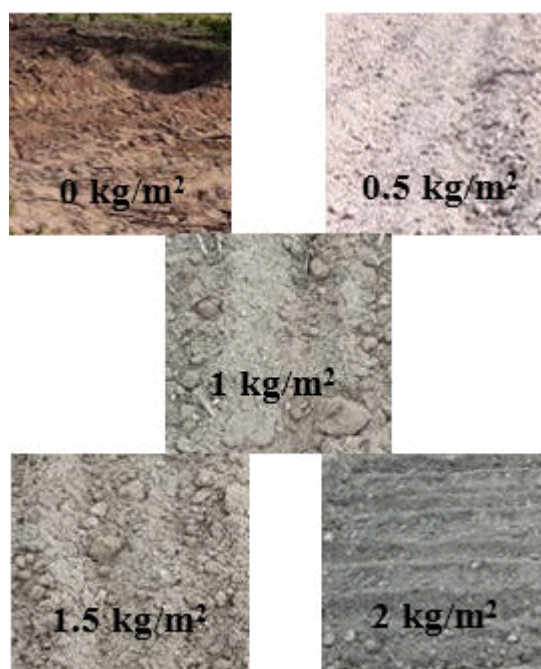


Photo 4. Appearance of the soil with biochar levels from 0 to 2 kg/m²



Photo 5. Bitter cassava with biochar (2 kg/m²) after 60 days of growth



Photo 6. Sweet cassava with biochar (2 kg/m²) after 60 days of growth

Data collection

Samples of soil and biochar were analyzed at the beginning and end of the trial for DM, pH, water holding capacity (WHC), ash and N. Observations were made of germination of the stems and the height of the plants. At harvest the above-ground biomass was separated into stems, leaves and petioles. Samples of each component were analyzed for DM and crude protein by AOAC (1990) methods.

Statistical analysis

The data were analyzed using the GLM option of the Minitab (2013) ANOVA software. Sources of variation were; biochar level, sweet or bitter cassava, peeling or no peeling the stems; interaction biochar level*sweet or bitter cassava, and error.

Results

Chemical composition of the soil and the biochar

The soil was acid and low in organic matter and nitrogen (Table 1).

Table 1. Composition of soil and rice husk biochar.

	DM, %	pH	WHC, %	OM, %	N, %
Soil	86.6	5.40	42.5	0.80	0.05
Biochar	93.5	8.61	80.0		-

Germination

The rate of germination was much higher for stems from the bitter compared with the sweet variety of cassava and was higher when the stems were partially peeled (Table 2; Figures 1 and 2) but was not affected by soil amendment with biochar.

Biomass yield

Yields of all components of the above-ground biomass were much higher for the bitter than the sweet cassava variety. There were no effects on foliage yield due to level of biochar (Tables 2 and 3, Figures 3 and 4) and no interaction ($p = 0.71$) between variety and level of addition of biochar.

Table 2. Mean values for effects of variety and peeling of the cuttings on germination, height and biomass yield of bitter and sweet cassava

	Cassava		<i>p</i>	Peeling		<i>p</i>	SEM
	Bitter	Sweet		No	Yes		
Germination, %	96.3	55.6	0.001	71.9	80.0	0.05	2.8
First harvest							
Height, cm	72.4	60.3	0.001	67.3	65.4	0.62	2.69
Fresh biomass, kg/m ²							
Total	2.65	0.99	0.001	1.94	1.7	0.23	0.054
Stem	0.89	0.31	0.001	0.65	0.55	0.23	0.048
Petiole	0.74	0.31	0.001	0.58	0.47	0.11	0.060
Leaves	1.03	0.37	0.001	0.72	0.68	0.62	0.20
Second harvest							
Height, cm	237	230	0.33	233	234	0.82	4.9
Fresh biomass, kg/m ²							
Total	12.5	9.16	0.001	10.5	11.1	0.50	0.67
Stem	6.27	5.00	0.02	5.43	5.84	0.46	0.38
Petiole	2.29	1.41	0.001	1.66	2.04	0.15	0.19
Leaves	3.62	2.50	0.001	3.11	3.01	0.70	0.19

Table 3. Mean values for effect of biochar on germination, height and biomass yield of cassava grown for forage (average of bitter and sweet varieties)

	Biochar, kg/m ²					<i>p</i>	SEM
	0	0.5	1.0	1.5	2.0		
Germination, %	80.6	80.6	80.6	80.6	80.6	0.77	0.40
First harvest							
Height, cm	63.8	69.8	67.9	62.1	68.1	0.68	4.25
Fresh biomass yield, kg/m ²							
Total	1.92	1.95	1.83	1.67	1.71	0.87	0.23
Stem	0.66	0.63	0.63	0.53	0.55	0.78	0.09
Petiole	0.53	0.52	0.58	0.5	0.5	0.29	0.08

Leaves	0.74	0.81	0.63	0.65	0.67	0.52	0.09
Second harvest							
Height, cm	232	231	237	222	245	0.35	7.7
Fresh biomass yield, kg/m ²							
Total	11.1	10.7	11.2	9.55	11.6	0.71	1.07
Stem	5.8	5.3	5.93	5.03	6.12	0.68	0.60
Petiole	1.75	1.67	1.85	1.72	2.27	0.64	0.30
Leaves	3.30	3.19	2.97	2.38	3.48	0.12	0.31

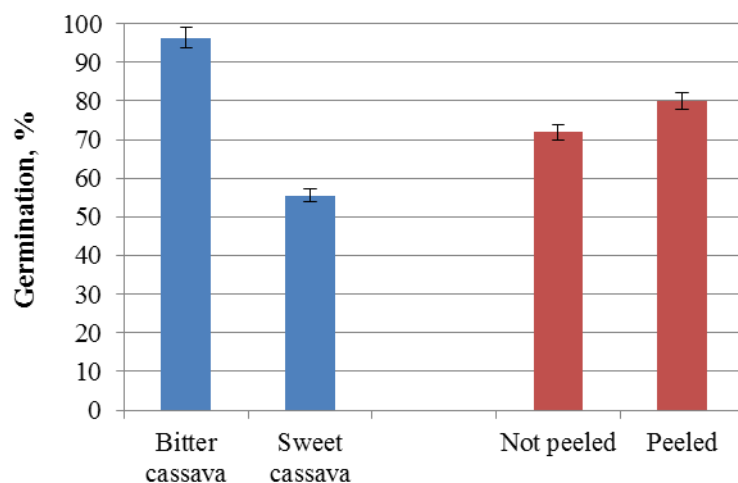


Figure 1. Germination was much higher for the bitter variety of cassava than the sweet one and was higher when the stem was partially peeled

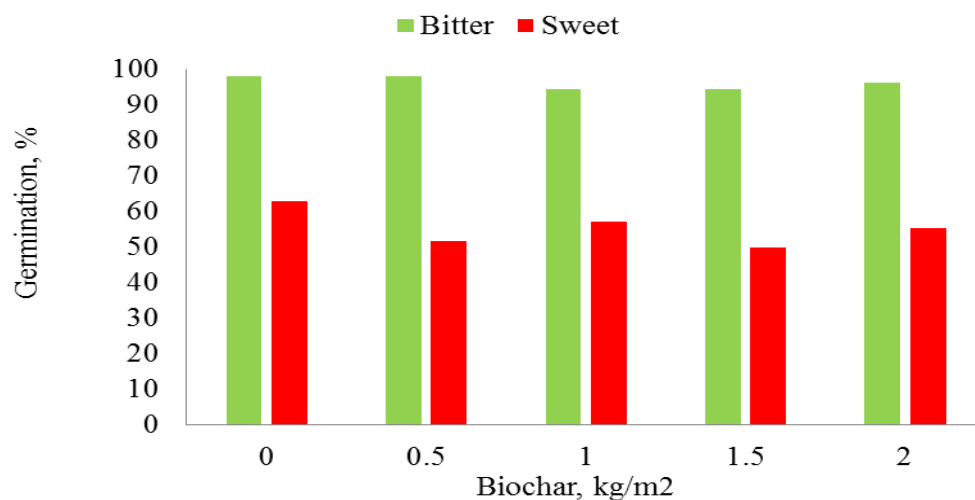


Figure 2. Germination not affected by biochar

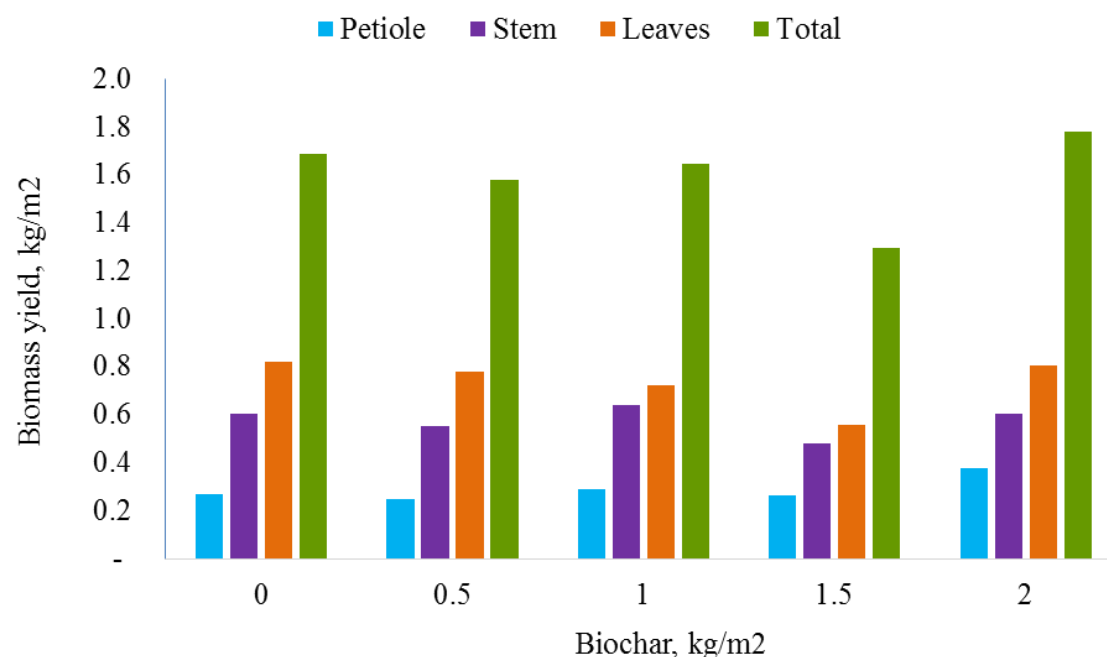


Figure 3. Yield components of cassava were not affected by biochar

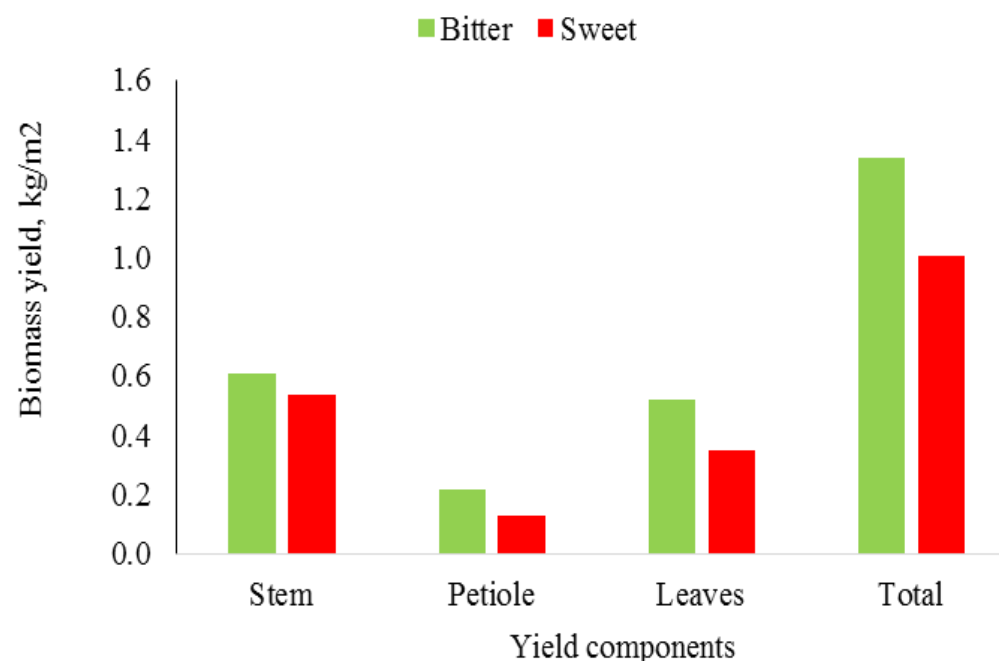


Figure 4. Biomass yield of cassava higher for bitter than sweet variety

Soil fertility

Soil pH, water-holding capacity, content of organic matter and of nitrogen were all enhanced with linear trends as the level of biochar added to the soil was increased (Table 4; Figures 5, 6, 7 and 8).

The soil pH was increased linearly from 5.40 to 6.92 as the level of biochar was increased from 0 to 2.0 kg/m² (Tables 1 and 4, Figure 5). Similar responses have been reported by many researchers (eg: Rodríguez et al 2007; Southavong et al 2012; Dao et al 2013). Water holding capacity was increased by application of biochar from 42.5 to 54.4% (Tables 1 and 4, Figure

3). The result was similar to that reported by Sokchea et al (2011) and Southavong et al (2011). The organic matter in the soil was increased from 0.80 to 1.43% at the biochar level of 2 kg/m² (Tables 1 and 4 and Figure 4). The soil nitrogen was increased ten-fold (from 0.12 to 1.53%) when biochar was added to the soil at 2 kg/m² (Table 4; Figure 8).

Table 4. Mean values for effect of biochar on soil pH, water-holding capacity (WHC), organic matter and nitrogen content

	Level of biochar, kg/m ²					<i>P</i>	SEM
	0	0.5	1.0	1.5	2.0		
pH	5.95	5.98	6.56	6.59	6.92	0.04	0.25
WHC, %	42.3	46.3	47.3	50	54.4	<0.001	1.44
OM, %	0.85	1.1	1.17	1.4	1.43	<0.001	0.05
N, %	0.12	0.57	0.89	1.09	1.53	<0.001	0.11

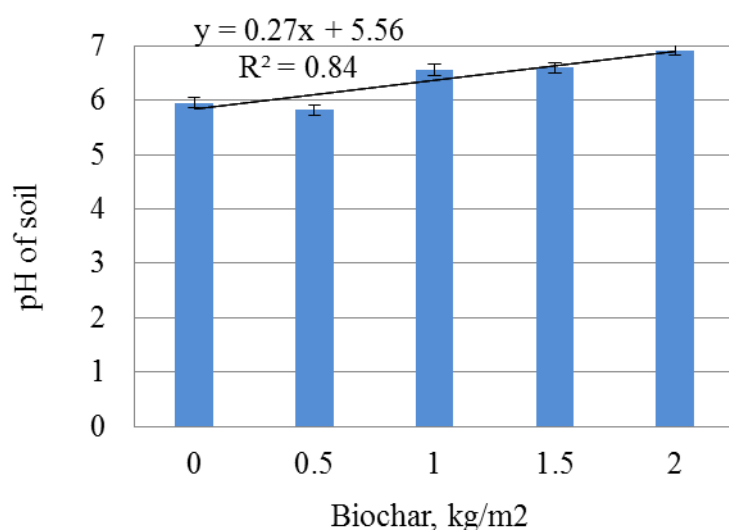


Figure 5. Effect of biochar level on soil pH

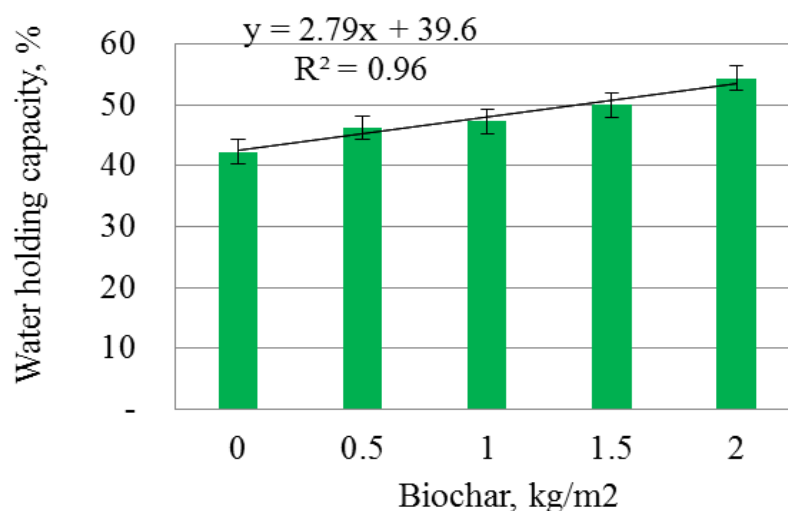


Figure 6. Biochar increased the water holding capacity of the soil

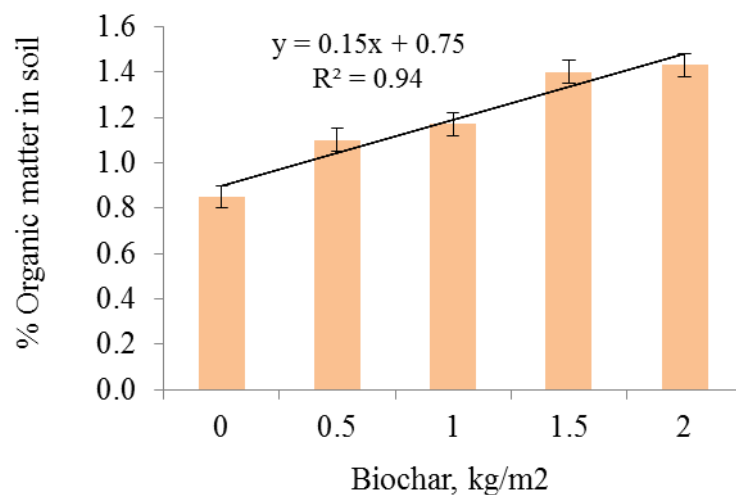


Figure 7. Biochar increased the organic matter content of the soil

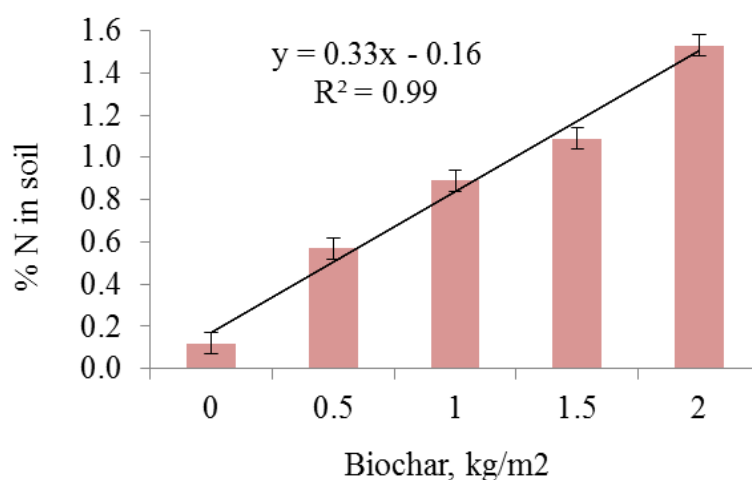


Figure 8. Biochar increased the nitrogen content of the soil

Discussion

The positive effects of adding biochar to the soil on pH, water-holding capacity, organic matter, nitrogen and pH are in line with the report of Chittavong et al (2017) who recorded similar effects of biochar amendment in the same soil type. However, while these soil improvements in the report of Chittavong et al (2017) were associated with increased biomass yields - in their case sugar cane - in our experiment biomass yield of cassava was not affected.

We have no explanation for our results in which soil fertility was improved by addition of biochar but this improvement was not reflected in biomass yield. Clearly this is an area of research that should be studied comprehensively in view of the increasing importance of cassava cultivation in Lao PDR.

Conclusions

- The rate of germination was much higher for stems from bitter compared with sweet variety of cassava and was higher when the stems were partially peeled. Germination rate was not affected by soil amendment with biochar.

- There were linear increases in pH, water-holding capacity, and content of nitrogen and organic matter in the soil as the application rate of biochar was increased from 0 to 2 kg/m².
- Yields of all components of the above-ground biomass were much higher for the bitter than the sweet cassava variety. There were no effects on foliage yield due to addition of biochar.

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References

AOAC 1990 Official Methods of Analysis. Association of Official Analytical Chemists. 15th edition (K Helrick editor). Arlington pp 1230

Bouaravong B, Dung N N X and Preston T R 2017: Effect of biochar and partial peeling of stems on soil fertility and germination of *Erythrina variegata* cuttings. *Livestock Research for Rural Development*. Volume 29, Article #70. <http://www.lrrd.org/lrrd29/4/boun29070.html>

Chittakone I, Xuan Dung N N and Preston T R 2017 Sugar cane had higher yield when established from node cuttings rather than from long stems and had a higher sugar content when the soil was amended with biochar. *Livestock Research for Rural Development*. Volume 29, Article #219. <http://www.lrrd.org/lrrd29/11/lay29219.html>

Dao T T, Canh N T, Trach N X and Preston T R 2013 Effect of different sources of biochar on growth of maize in sandy and feralite soils. *Livestock Research for Rural Development*. Volume 25, Article #59. <http://www.lrrd.org/lrrd25/4/dao25059.htm>

Lehmann J and Joseph S 2011 Biochar for Environmental Management, Science and Technology, Earthscan, UK.

Minitab 2000 Minitab reference Manual release 13. User's guide to statistics. Minitab Inc., USA

Moreno F A, Márquez A y Preston T R 2005 : Cuatro métodos de propagación vegetativa de Morera (*Morus alba*). *Livestock Research for Rural Development*. Volume 17, Art. No. 58. <http://www.lrrd.org/lrrd17/5/more17058.htm>

Phanthavong V, Khamla S and Preston T R 2016a Fattening cattle in Lao PDR with cassava pulp. *Livestock Research for Rural Development*. Volume 28, Article #10. <http://www.lrrd.org/lrrd28/1/phan28010.html>

Phanthavong V, Preston T R, Viengsakoun N and Pattaya N 2016 Brewers' grain and cassava foliage (*Manihot esculenta* Cranz) as protein sources for local "Yellow" cattle fed

cassava pulp-urea as basal diet. *Livestock Research for Rural Development*. Volume 28, Article #196. <http://www.lrrd.org/lrrd28/11/phan28196.html>

Preston T R 2015 The role of biochar in farming systems producing food and energy from biomass. In: *Geotherapy: Innovative Methods of Soil Fertility Restoration, Carbon Sequestration and Reversing CO2 Increase* (Editor: Thomas J Goreau) CRC Press, Tayler and Francis Group, Boca Raton, Florida USA

Rodríguez L, Salazar P and Preston T R 2009 Effect of biochar and biodigester effluent on growth of maize in acid soils. *Livestock Research for Rural Development*. Volume 21, Article #110. <http://www.lrrd.org/lrrd21/7/rodr21110.htm>

Sengsouly P and Preston T R 2016 Effect of rice-wine distillers' byproduct and biochar on growth performance and methane emissions in local "Yellow" cattle fed ensiled cassava root, urea, cassava foliage and rice straw. *Livestock Research for Rural Development*. Volume 28, Article #178. <http://www.lrrd.org/lrrd28/10/seng28178.html>

Sokchea H and Preston T R 2011 Growth of maize in acid soil amended with biochar, derived from gasifier reactor and gasifier stove, with or without organic fertilizer (biodigester effluent). *Livestock Research for Rural Development*. Volume 23, Article #69. <http://www.lrrd.org/lrrd23/4/sokc23069.html>

Southavong S and Preston T R 2011 Growth of rice in acid soils amended with biochar from gasifier or TLUD stove, derived from rice husks, with or without biodigester effluent. *Livestock Research for Rural Development*. Volume 23, Article #32. <http://www.lrrd.org/lrrd23/2/iso23032.html>

Southavong S, Preston T R and Man N V 2012 Effect of biochar and biodigester effluent on growth of water spinach (*Ipomoea aquatic*) and soil fertility. *Livestock Research for Rural Development*. Volume 24, Article #34. Retrieved April 4 2017, from <http://www.lrrd.org/lrrd24/2/iso24034.html>

Vor Sina V, Preston T R and Ho Thanh Tham 2017 Brewers' grains have a synergistic effect on growth rate of goats fed fresh cassava foliage (*Manihot esculenta* Crantz) as basal diet. *Livestock Research for Rural Development*. Volume 29, Article #137. <http://www.lrrd.org/lrrd29/7/sina29137.html>

Land Cover Change in Thapangthong District,

Savannakhet Province, Lao PDR

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Abstract

The study aimed to quantify the change in land cover between the years 2005 and 2016; using remote sensing and Geographic Information System (GIS). according to data collected from the satellite image as Landsat-5Thematic Mapper (TM) 2005 and Landsat-8 Operational Land Imager (OLI) 2016. Also, did on imagination process. There are five classes of land-cover as the following numbers; 1) mixed deciduous forest, 2) dry dipterocarp forest, 3) agriculture land, 4) built-up land and 5) water were discriminated. During this 11- years period, dry dipterocarp forest has decreased by 8.72% of the total area whereas agriculture land increased by 7.13% of total area, followed by built-up land (0.85%), and water (0.62%). In addition, mixed deciduous has slightly increased by 0.85%, especially the agriculture land expanded to a mixed deciduous forest. And the overall classification accuracy of the map was 84.25% and Kapa Coefficient about 0.70%.

The study found out the relative information due to land cover has been changing in Thapangthong district. This information is not currently known. Furthermore, it is needed to study and the possibility sustainable forest management in the district.

Keyword: Land cover change, Remote sensing, and Geographic Information System (GIS)

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INTRODUCTION

Land-cover refers to the physical and biophysical cover over the surface of earth, including distribution of vegetation, water, bare soil and artificial structures (IGBP-IHDP, 1999), point out that, land use and land cover change (LUCC) is commonly grouped into two broad categories: conversion and modification. Conversion refers to a change from one cover or use category to another such as forest to grassland (Meyer and Turner (1994). On the other hand, modification represents a change within one land use or land cover category (for example, from rain fed cultivated area to irrigated cultivated area), which can lead to changes in its physical or functional attributes. These changes in land use and land cover systems have important environmental consequences through their impacts on soil and water, biodiversity, and microclimate (Lambin et al., 2003).

Land-cover change is influenced by both the increase and decrease in given population (Lambin et al., 2003). For instances, in developing countries like Ethiopia, population growth has been a dominant cause of land use and land cover change than other forces (Sage, 1994) Also, Meyer and Turnner, 1994) point that; there is a significant statistical correlation between population growth and land cover conversion in most of African, Asian, and Latin American countries. Lead to the increasing demands of food production, agricultural lands are expanding at the expense of natural vegetation and grassland (Lambin et al., 2003).

Normally, knowing the impact of land use and land cover change on natural resources like depends on an understanding of the past land use and land cover, as affected by population size and distribution, economic development, technology, and other factors. The land use and land cover change assessment is a very important step in planning sustainable land management that can help to minimize agro-biodiversity losses and land degradation, especially in developing countries like Ethiopia (Hadgu, 2008).

Lao People's Democratic Republic (Lao PDR) is a country that used to be a part of Indochina of French colonial. Lao PDR has 236,800 square kilometers of land and with a population of 6,492,400 people (in 2015). Lao PDR is situated in a tropical area and extremely rich in biodiversity and has a large amounts of forest resources in contrast to other ASEAN member countries which in 1940 had forest cover of 70% of the total land area that has been reduced to only 41.5% in 2002. Therefore, Lao government established a sustainable forest management policy with three forest categories: conservation forest covering 4,827,000 ha (56.45%), protection forest covering 517,000 ha (6.04%) and 3,207,000 ha (37.50%) of production forest (natural forest, natural regeneration and plantation forests) (Ministry of Agriculture and Forestry, 2005). During the last decades of the twentieth century, the loss of forest land increased due to land-use practices e.g, shifting cultivation, commercial logging, commercial agriculture and tree plantation (Department of Land Planning and Development, 2006). According to the results of the forest cover survey in 2002, the total land area of Laos covered by natural forest (canopy density of higher than 20 % and height of above 5 meter) was 9,824,700 hectares or about 41.5 % of the total land area, while the dry lands (lowland dry dipterocarp forest) covered roughly 1,317,200 hectares or 13.88 % of the total land area. Almost all of this land area is located in the central and southern Laos.

Lao PDR is a developing country and this is often the reason given as the cause of forest resource changes, especially the change in the forest area. Changes in forest area are often related to environment problems associated with economic development and direct impacts of human livelihood. Therefore, the change of forest area information is an important key used for resource planning and management in quickly emerging developing countries. One way of assessing forest change is through looking at land-use and land-cover changes. However, when investigating this one needs to consider budget, labor and time needed to explore a wide variety of information. Information regarding transformation of the forest status is often outdated and unclear.

Savannakhet is a province rich in forest resources. It was still about 70% forest covered in 2000 and included three national biodiversity conservation areas (NBCA): Phouxanghe (109,900 hectares), Dongphouvieng (197,000 hectares), and Xebangnouan (150,000 hectares). There are two state production forests in the province: Dongkapho (9,600 hectares) and Dongsithounh (212,000 hectares) (Ministry of Agriculture and Forestry, 2001). Savannakhet Province has a total population of 937,907 as of the June 2012 census and 1,013 villages and 147,175 households, the population density 43/km². The ethnic minority groups residing in the province include Lao Loum (Lowland Lao), Phu Tai and Bru (the only ones recognized by the provincial government). The Bru, however, are a diverse people with various dialects and cultures, in the 2000 census. In comparing the land-use classes it is seen that 55.5% of province is forest land, 23.8% is potential forest land (including shifting cultivation fields and fallow forests in early successional stages), 8.8 % is other wooded areas (mainly open woodlands), 9.1% is permanent agricultural land (mainly paddy fields), and 2.8% is other non-forest land such as urban areas, grassland, or wetland (NOFIP, 1992). A total of 80% of households are engaged in paddy cultivation (UNDP, 1998).

Thapangthong is one of the districts in Savannakhet province. There are 211,388.26 (hectare) of total area is which In Thapangthong district, the forest cover fairly dens. Thapangthong district is far to the south the center point of Kaysonephomvihane City of a province by 147 km (Figure 1). Based on the report of district, The total population of the

district is estimated to be 40,708, and 20,199 female, The total households of 6.696, and there are 42 villages of total areas of district, On the other hand there are 3 types of forest in district such as *National Biodiversity Conservation Area (NBCA) (Xebangnouane)*, covered (45,400 hectares), *Production Forest Area (DongSithouane)* covered (94,259.5 hectares) and *National Protection Forest (Xetanoune)* covered (52,775 hectares) Forest Inventory Planning Division (FIPD, 2010).

Whatever, At present, the population and economies are both quickly increasing. This drives an increasing demand for land used in building houses, the infrastructure, and especially for agriculture production such as the paddy fields, commercial timber for saw mills and commercial crops. Overall the production in the whole district has been increasing. Forest cover changes are a key factor affecting the changes of the landscapes. Therefore, the change of forest shall have an important influence on the living of habitat, livelihood or people, the area of agriculture, and the expansion of urbanization.

Remote sensing technologies making use of satellite imagery and aerial photos are used widely, along with GIS, to support the allocation of land use, agriculture and forestry, environmental planning and other planning (Chobtham, 2008).

OBJECTIVE

The main objective of this study is to quantify the change in land cover between the years 2005 and 2016 in the case study area using remote sensing and GIS technologies and techniques.

STUDY AREA

The study sites are located in Thapangthong District, Savannakhet Province, Lao PDR. It lies in the 16° 05' 34.48''N latitude and 105° 51' 03.81''E longitude with elevations 219 meters of mean sea level. The district was established in 1984, shares borders with Pin and Xonboursy districts to the North, Lakhonepheng, district to the South, Toumlan and Vapi districts of Salavan province to the East, Songkhone district to the west.

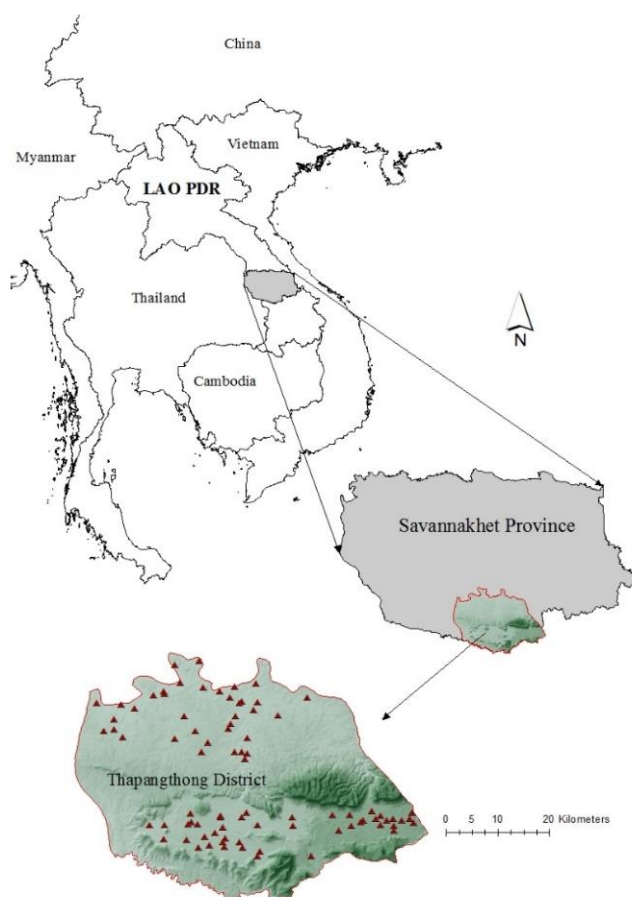


Figure 1. Location map of study area

DATA AND METHODS

Data

The type of the satellite images used are the Landsat 5 and Landsat 8, which the Landsat 5-Thematic Mapper (TM) consist of Path/Row (126/049), Number of band 7(3-4-5), Spatial resolution (30x30) & Acquire date (2005-01-03) and Landsat 8-Operational Land Imager (OLI) comprise of Path/Row (126/049), Number of band 11(5-4-3), Spatial resolution (30x30) & Acquire date (2016-03-22) respectively. Two Landsat images containing the study area were obtained from the U.S. Geological Survey (USGS) (<https://earthexplorer.usgs.gov/>).

Data analysis

Steps in the analysis of Satellite image data is given below:

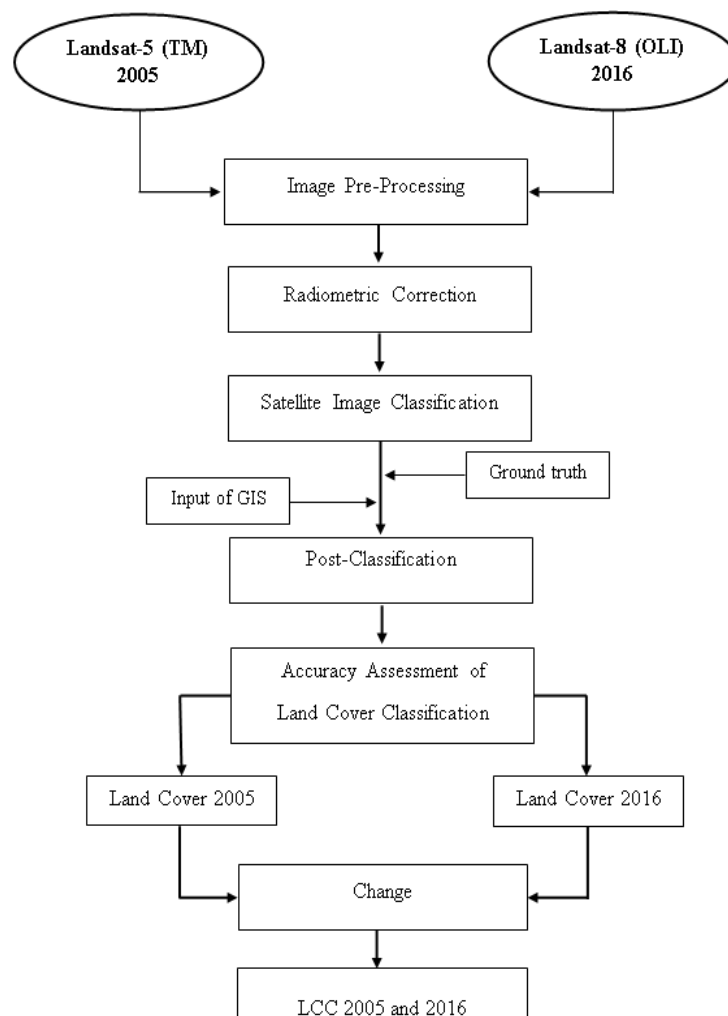


Figure 2. Satellite image of data analyze framework

1) Layer stacking

There are two Landsat images (Landsat5-TM 2005 and Landsat 8-OLI 2016) in this study area, All seven bands of Thematic Mapper (TM) and eleven bands of Observational Land Imager (OLI) were considered for Layers stacking in order to process the satellite imagery. The nature of these different bands had to be considered to make a decision as to which three band combination would be most helpful for classification and visual interpretation. The false color composite of Landsat5_TM was used a red band 3 wavelength (0.63-0.69 μm), band 4 a near infrared wavelength (0.76-0.90 μm) which is absorbed by water (appearing dark) and reflected by vegetation (appearing bright), and band 5 a mid-infrared wavelength (1.55-1.74 μm) which contrast well, revealing differences in types and conditions of vegetation and soil (W. Muttitanon and N. K. Tripathi, 2005). furthermore, The false color composite of Landsat 8_OLI images was used band 5 Near Infrared Wavelength (0.845-0.885 μm). band 4 Red Wavelength (0.630-0.680 μm) and band 3 Green Wavelength (0.525 - 0.600 μm) (Liya Sun and Karsten Schulz, 2015). After layer stacking, all the scenes were re-projected to UTM Zone 48 North using WGS 84 as a datum.

2) *Radiometric Correction*

To improve visible interpretability an image by increasing apparent distinction between the features in the scene, digital enhancement such as level slicing, contrast stretching, spatial filtering, histogram equalization, edge enhancement, resolution merging, was carried out by the help visually the information in the images. These processes were done using image enhancement tools/options of ERDAS 2014.

3) *Satellite image classification*

Landsat5-(2005) and Landsat8-(2016) images were earlier and very recent images available for study areas. Hence, it was possible to undertake field visit and collect GCPs. Supervised and Unsupervised classification were preferred. The two Landsat images were also included to meet the preferred time horizon of the study. Meanwhile, it must be noted that efforts have been made to integrate historical information acquired from surveys to minimize complete reliance on spectral information and to solve the mystery of spectral similarity of different land cover classes in order to improve classification accuracy). Data of the different land cover classes obtained from the field study (GPS location) were used training sample for supervised classification. Land cover was classified into the following five classes.

- Mixed Deciduous Forest (MDF): The tree species more that 50% of stand.
- Dry Dipterocarp Forest (DDF): The tree diameter is comparably small and the height of the stand varies from 8 to 25 m.
- Agriculture Land (AL): The agriculture land means the land aims for into agriculture activities such as grazing of cattle, rice field, cultivating like coffee, coconut and cocoa.
- Built-up Land (BL): The built-up lands are areas with small towns, institutions such as houses, schools, village offices, and others.
- Water: includes all water bodies (pond, stream, river and reservoirs).

4) *Classification Accuracy assessment*

According to (Chust, *et al.*, 2004; Congalton 1991, Gary M.Senseman, *et al.*, 1995), Classification accuracy assessment and Kappa coefficient error matrix were also defined based on classification result of images. Eventually, the classified images were exported to ArcGIS

10.3 for map preparation and to described the situation of the spatial land cover change of the study area. Accuracy of classification is a general term for comparing the classification to geographical data that are presented to be true, in order to defined the accuracy of the classification process. Normally, the assumed-true data are derived from ground truth data or field survey. It is usually not practical to ground truth or otherwise test every pixel of a classified image. Consequently, a set of reference pixels is usually used. Reference pixels are points on the classified image for which actual data are (or will be) known. The reference pixels are randomly selected

5) Change detection

Following the image classification from the individual years, the multi-data post-classification comparison change detection algorithm was used to define the land cover changes (Fei Yuan, *et., al.* 2005). Many methods of change detection have been used the various applications (Ayele, 2011). Example: post-classification comparison, image rationing, image differencing, image regression, principal component analysis. Therefore, this study was used by convert from raster format in to vector (shapefile) format for classified images. The vector files was again converted to the raster grid by using spatial analysis extension of ArcMap ver. 10.3, Conversion of land cover were calculated by using raster calculator. The analysis and interpretation of different aspects of the numeric data of land use dynamics was done on Microsoft Excel. The results were presented in the easily understandable forms such as maps, charts, table and graphs.

Software used

This study was used the software of ArcMap version 10.3 and ERDAS IMAGINE version 2014 to data analysis, especially spatial data between Raster and Vector of vector to raster for land cover classification. Moreover, used to the Microsoft Excel to mixed between vector file and excel. To help the calculation of land cover type.

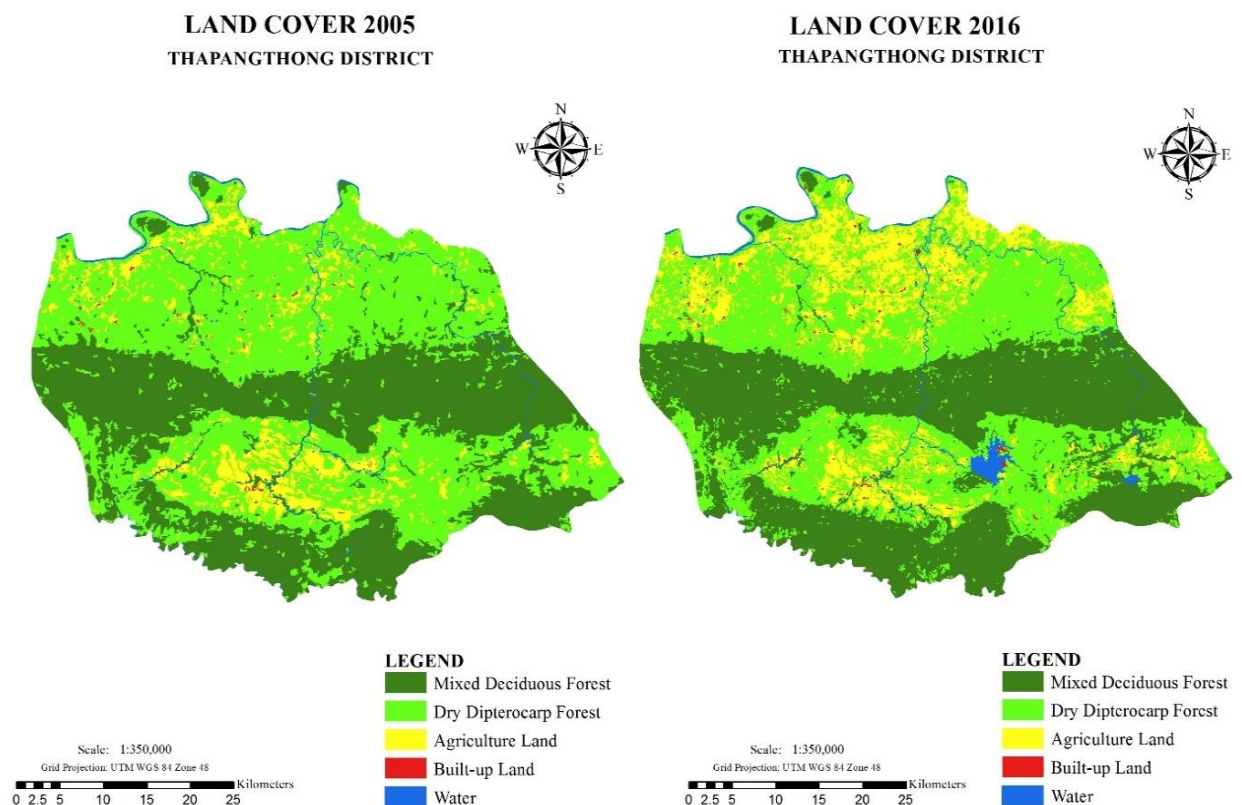


Figure 3. Land cover status in 2005 and 2016, (base on Landsat-5 TM and Landsat-8 OLI)

RESULT

Satellite image classification in (2005-2016)

The objective of the image classification is to determine change in land cover particularly, the attention to five classes distribution namely mixed deciduous forest, dry dipterocarp forest, agriculture land, built-up land and water area, For the land cover classification Landsat TM and Landsat OLI images were used. Supervised classification and change detection analysis method were applied to land cover change between two time periods (2005 and 2016). The result of land cover classification shows that the forest is major, mainly forest is mixed deciduous, which is followed by dry dipterocarp and agriculture land. The other land cover types of different dated images data is given below:

In 2005, Landsat -5 (TM) was used for satellite image classification. According to the results of land cover classification (Figure 4. And 5) showed that in year 2005, dry dipterocarp forest covered 108,920 (ha), mixed deciduous forest 81,400.11 (ha), water 1,280.54 (ha), agriculture land 19,336.80 ha, and built-up land 399.98 (ha) which consist of 51.54%, 38.52%, 9.11%, 0.61% and 0.19% respectively.

In 2016, Landsat-8 (OLI) was used for the satellite image classification, the land cover maps (Figure 4 and 5) shows that the mixed deciduous forest has increased to 83,200 ha (39.36%) Similarly agriculture land 34,415.19 ha (16.38%), water 2,579.64 ha (1.23%) and built-up land 651.68 ha (0.31%) respectively. whereas dry dipterocarp forest decreased approximately 90,523 ha (42.81%).

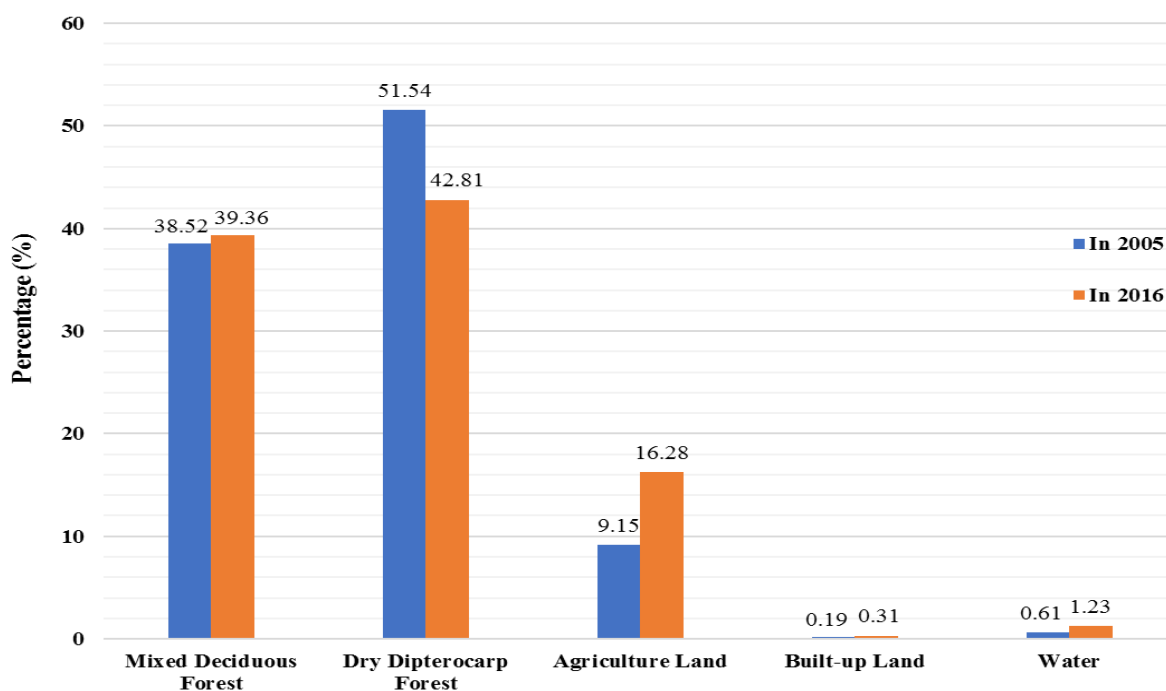


Figure 4. Rate of land cover classification in percentage between 2005 to 2016

Classification Accuracy Assessment

The overall classification accuracy, producers accuracy (PA) and user accuracy (UA) were computed from Kappa Statistics and Confusion Matrix (KHAT) (Chust, *et al.*, 2004; Congalton, 1991; Gary M.Senseman, *et al.*, 1995). Overall classification accuracy was taken probability of correctly mapped location with ground survey and user accuracy comparing the map with the data of ground survey. Producers assessment moreover compares between ground survey data and maps. In addition to this study, the ground survey data was collected by using Global Positioning Systems (GPS). Therefore, the result of classification accuracy assessment reveals that the overall classification accuracy of the map was found to be 81.25% and Kapa Coefficient about 0.70% Table 1.

Table 1. Accuracy assessment of image classification

Land Cover Types	Ground truth					total	PA(%)	UA(%)
	MDF	DDF	AL	BL	W			
MDF	2	0	0	0	0	2	66.67	100.00
DDF	0	29	3	5	2	39	90.63	74.36
AL	1	3	29	1	0	34	90.63	85.29
BL	0	0	0	1	0	1	14.63	100.00
W	0	0	0	0	4	4	66.67	100.00
Total	3	32	32	7	6	80		
Overall Classification Accuracy:						81.25		
Kapa Coefficient:						0.70		

Computation of Kappa Coefficient of Agreement

Where:

$$\hat{K} = \frac{N \sum_{i=1}^r x_{ii} - \sum_{i=1}^r (x_{i+} \times x_{+i})}{N^2 - \sum_{i=1}^r (x_{i+} \times x_{+i})}$$

- r = the number of rows in error matrix
- x_{ii} = the number of observations in row I and column
- x_{i+} = the marginal totals of row i
- x_{+i} = the marginal totals of column i
- N = the total number of observations

Where $N=80$

$$\sum_{i=1}^r x_{ii} = (2 + 29 + 29 + 1 + 4) = 65$$

$$\sum_{i=1}^r (x_{i+} \times x_{+i}) = (3 \times 2) + (32 \times 39) + (32 \times 34) + (7 \times 1) + (6 \times 4) = 2,373$$

$$\text{Therefore } \hat{K} = \frac{80(65) - 2373}{80^2 - 2373} = \frac{5200 - 2373}{6400 - 2373} = \frac{2827}{4027} = 0.70 = 70\%$$

Land Cover change in 2005 to 2016

The comparison of land cover change of 2005 and 2016 showed that, data registered in Figure (5) and Table (1) revealed the positive and negative changes occurred in the land cover pattern of the Thapangthong District during the last two decades.

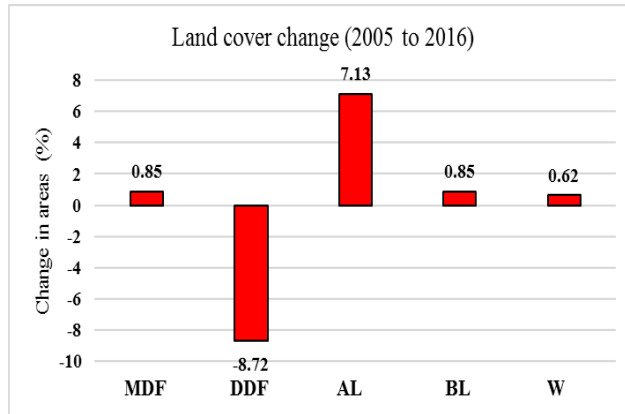


Figure 5. Diagrammatic instance of land cover change in percent during between in 2005 and 2016

in 2016 which account for 7.13%. In addition to this, the built-up land from 399.98(ha) in 2005 to 651.68(ha) in 2016. This increase in built-up land account for 0.85%. The water of study area has been increased from 1,280.54(ha) in 2005 to 2,597.64(ha) in 2016 which covered 0.62%.

Table 2. Area and amount of change different land cover types during 2005 to 2016

Code	Land Cover Types	Area of LCC (ha)			Land cover change (ha)		
		in 2005	%	in 2016	%	2005-2016	%
MDF	Mixed Deciduous Forest	81,400.11	38.52	83,190.78	39.36	1,790.68	0.85
DDF	Dry Dipterocarp Forest	108,920.83	51.54	90,482.96	42.81	-18,437.87	-8.72
AL	Agriculture Land	19,336.80	9.15	34,415.19	16.28	15,078.39	7.13
BL	Built-up Land	399.98	0.19	651.68	0.31	251.64	0.85
W	Water	1,280.54	0.61	2,597.64	1.23	1,317.10	0.62
Total area		211,338.26	100	211,338.26	100	0.00	0.00

Data source from analysis

The dry dipterocarp forest of this study area has decreased from 108,920.83 (ha) in 2005 to 90,482.96 (ha) in 2016 which account for 8.72% of the total study area. The mixed deciduous forest of this area has slightly increased from 81,400.11(ha) in 2005 to 83,190.78(ha) in 2016 which account for 0.85%. The agriculture land has increased from 19,336.80(ha) in 2005 to 34,415.19(ha)

Change in land cover types in 2005 to 2016

During 2005 to 2016, as the result of data analysis found that mostly the dry dipterocarp forest was decreased to convert the agriculture land Table 1 and also slight mixed deciduous forest was converted into agriculture land, On the other hand, there are some types of forest cover and land use were converted to water body. However, some agricultural land turned to mixed deciduous forest as well.

There are some reasons for the conversion of land use cover in the past two decades. actually, the rate of land converted from forest cover to agriculture land due to the population was increased faster and economic expectation of the farmers change their future views from subsistence to economy perspective. The agriculture lands was expanded by villager for paddy rice etc (Natural Resource and Environment Office, 2014). Otherwise, according to Savannakhet Irrigation Section (SIS-PAFO, 2014). There is a China's project (China Gezhouba Group Corporation (CGGC), Xesalalong Irrigation Project or CGGC was established in year 2011. The total area is 2000 hectares of reservoir, On the other hand compress water intake structure, dam, water reservoir, flood spillway, canal and buildings along canal system (SIS-PAFO, 2014). The project could be supported water to agriculture especially plantation and livestock in during dry season and rainy season. However, the land use and forest cover was effected by the project especially built-up land, paddy rice, garden, etc. a village was flooded by water thus they must be moved the building to a new place and there are six villages was effected by reservoir Figure 7 (Natural Resource and Environment Office, 2014).



Figure 6. Characteristic of Xesalalong Irrigation Reservoir in Thapangthong District



Figure 7. Clear the dry dipterocarp forest for agriculture land such as paddy field.

DISCUSSION

Land cover change in Thapangthong District, Savannakhet Province, Lao PDR between 2005 to 2016 by Landsat satellite imagery (Landsat-5 TM acquired on 2005-01-03 and Landsat-8 OLI acquired on 2016-03-22 date). The method of image classification was used maximum likelihood classification (MLC) for the supervised classification, There are five classes of land cover. Land cover types were classified by using Landsat satellite image data such as mixed deciduous forest, dipterocarp forest, agriculture land, built -up land and water body.

Between year 2005 to 2016, The result of this study shows that type of dry dipterocarp forest was decreased dominate (18,437.87 ha) which that 8.72 %, whereas agriculture land increased at (15,078.39 ha) 7.13%; followed by built-up land (25.64 ha) 0.85%; water body at (1,317.10 ha) 0.62% and mixed deciduous forest was slight increase about 1,790.68(ha) and 0.85% of the total study areas respectively, see the Table 1.

As the result received from remote sensing and GIS, there are some reason for land cover change in Thapangthong district, especially the forest cover was converted to agriculture land due to the population has increased faster. Otherwise, the agriculture land was expanded by villager for paddy rice, garden etc. In addition to some forest cover and land use were converted to water body, because in the year 2014 the LC was flooded by reservoir of the Xesalalong Irrigation Project (Savannakhet Irrigation Section, 2014). Which that there are 2000 hectare of total reservoir area, length 22 km of canal and water can be supported to plantation and livestock during the rainy season and dry season.

Many researchers were used the remote sensing (RS), geographic information system (GIS) technique for assess the forest cover and land-use/land-cover changes (Amna Butt, *et al.*, 2015, Prabhat Kumar Rai, 2013, O.S. Olokeogun *et al.*, 2014, R.Manonmani, *et.*, al 2010,

Selçuk Reis, 2008). Similarly, to using Landsat satellite imagery to assessing the land use and land cover change of Phoukhaokhouay National Protected area, Lao PDR, to examine the rate of change of land use and land cover change between 1999 to 2014, the image classification was conducted by maximum likelihood classification (MLC) of supervised classification, the result found that forest cover has decreased by 1.11%, from evergreen forest, mixed deciduous forest to agriculture. Depending on the data of ground truth in field survey, thus the overall accuracy of remote sensing (RS) and geographical information system (GIS) estimated the value was 82% (Chanthakard, 2014). Impact of land use and land cover change on local livelihood in Pha-Oudom District, Borkoe Province, Lao PDR (Thongphanh, *et. al* 2007) to examine the land cover change though selected villages between the years 1988 to 2007, For the image interpretation was used the supervised of the maximum likelihood classification (MLC) thus the result reveal changes between 1988 to 2007 the landscape were foreseen largely for subsistence upland rice, whereas the data analysis of image interpretation shown a slow change of mature forest to secondary forest and agriculture.

CONCLUSION

The study on the changes in land cover was between the year 2005 and 2016. Landsat-5 Thematic Mapper (TM) and Landsat-8 Operational Land Imager (OLI) were used for satellite image classification. Therefore, information on the land-cover change was obtained by using remote sensing and GIS. According to result showed that mostly dry dipterocarp forest of this study area has decreased from 108,920.83 (ha) in 2005 to 90,482.96 (ha) in 2016 which account for 8.72% of the total study area. Whereas the agriculture land has increased from 19,336.80(ha) in 2005 to 34,415.19(ha) in 2016 which account for 7.13%. Following the built-up land from 399.98(ha) in 2005 to 651.68(ha) in 2016. This increase was in built-up land account for 0.85%. In addition, water of study area has been increased from 1,280.54(ha) in 2005 to 2,597.64(ha) in 2016. In addition, for classification accuracy assessment, the overall classification accuracy of the map was found to be 81.25% and Kapa Coefficient about 0.70% Table 2.

ACKNOWLEDGMENTS

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REFERENCE

- Ayele Habtamu, 2011. Land Use Land Cover Change and Impact of *Jatropha* on soil fertility: the case of Mieso and Bati districts, Ethiopia.
- Amna Butt, Rabia Shabbir, Sheikh Saeed Ahmad, Neelam Aziz, (2015). Land use change mapping and analysis using Remote Sensing and GIS: A case study of Simly watershed,

- Islamabad, Pakistan. Department of Environmental Sciences. The Egyptian Journal of Remote Sensing and Space Sciences, 18, 251–259
- Chobtham Somporn, (2008). Optimum Digital Change Detection Techniques For Land Use And Land Cover Monitoring, Pithing Chai District, Nakhon Ratchasima Province, Thailand. Department of Forestry, 2005. Report on the Assessment of Forest cover and Land use during 1982-2002. Ministry of Agriculture and Forestry, Department of Forestry.
- Congalton, R.G. (1991). A review of assessing the accuracy of classification of remotely sensed data. *Remote Sensing of Environment*. 37: 35-46
- Chust, G., D. Ducrot, and J.L. Pretus. (2004). Land Cover Mapping with Patch-Derived Landscape Indices. *Landscape and Urban Planning*. 69: 437-449.
- Chanthakhad, S. (2015). Using Landsat Satellite Imagery to assess the land use and land cover change of PhouKhaoKhouay National Protected Area, Lao PDR.
- Fei Yuan, Kali E. Sawaya, Brian C. Loeffelholz, Marvin E. Bauer, (2005). Land cover classification and change analysis of the Twin Cities (Minnesota) Metropolitan Area by multitemporal Landsat remote sensing. *Remote Sensing of Environment*, 98: 317 – 328
- Gary M.Senseman, Calvin F. Bagley, and Scott A.Tweddale, 1995. Accuracy Assessment of the Discrete Classification of Remotely-Sensed Digital Data for Landcover Mapping.
- Hadgu, K. M. (2008). Temporal and spatial change in land use patterns and biodiversity in relation to farm productivity at multiple scales in Tigray, Ethiopia. PhD Thesis Wageningen University, Wageningen, the Netherlands.
- IGBP-IHDP. (1999). Land-use and land-cover, implementation strategy. IGBP Report 46/IHDP Report 10. Prepared by Scientific Steering Committee and International Project Office of LUCC. Stockholm and Bonn.
- Lambin, E. F., Geist. H. J. and Lepers. E. (2003). Dynamics of land use and land cover change in tropical regions. *Annu. Rev. Environ. Resource*. 28:205-41.
- Liya Sun and Karsten Schulz, (2015). The Improvement of Land Cover Classification by Thermal Remote Sensing. *Remote Sens.* 7, 8368-8390
- Laos Ministry of Agriculture and Forestry, (2005)
- Laos Ministry of Agriculture and Forestry, (2001)
- Laos Department of Land Planning and Development, (2006)
- Laos Forest Inventory Planning Division, (2010)
- Laos Savannakhet Irrigation Section (SIS – PAFO, 2014)
- Laos Savannakhet Province of Natural Resource and Environment Office, (2014)
- Meyer, W. B and Turner, B.L (1994). Change in land use and land cover: A Global and Analysis in the Semi-Natural Ecosystems and Agriculture Land capes of the Central Ethiopian Riff Valley.

- Muttitanon, W. and Tripathi, N. K.(2005). Land use and land cover changes in the coastal zone of Ban Don Bay, Thailand using Landsat 5 (TM) data. *International Journal of Remote Sensing*, 26 (11), 2311- 2323
- NOFIP, 1992. Forest Cover and Land Use in the Lao PDR-Final Report on the Nationwide Reconnaissance Survey. Lao Swedish Forestry Co-operation Programme-Forest Inventory Report No 5, Ministry of Agriculture and Forestry, Department of Forest, National Office of Forest Inventory and Planning
- O.S. Olokeoguna, O.F. Iyiolab , K. Iyiolac, 2014. Application of remote sensing and GIS in land use/land cover mapping and change detection in Shasha forest reserve, Nigeria. Federal College of Forestry, Forestry Technology Department, b Federal School of Surveying, Surveying and Geoinformatics Department, Sustainabilities Limited, Nigeria
- Prabhat Kumar Rai, 2013. Forest and land use mapping using Remote Sensing and Geographical Information System, a case study on model system. Department of Environmental Science, School of Earth Science and Natural Resource Management, Mizoram University Tanhril, Aizawl-796004, Mizoram, India
- R.Manonmani, G.Mary Divya Suganya, 2010. Remote Sensing and GIS Application In Change Detection Study In Urban Zone Using Multi Temporal Satellite. Institute of Remote Sensing, Anna University, Chennai 600 025
- Selçuk Reis, 2008. Analyzing Land Use/Land Cover Changes Using Remote Sensing and GIS in Rize, North-East Turkey. Faculty of Engineering, Department of Geodesy and Photogrammetry, 68100, Aksaray, Turkey. Aksaray University. *Sensors*, 8, 6188-6202
- Thongphanh, Daovorn. 2004. Land and Forestland Allocation Policy: Impacts on Land Use Practices in Hatkhai and Yang-Khoua Villages. Thaphabath District, Bolikhamxay Province, Lao PDR”. Working Paper Series No.3, December. Chiang Mai: RCSD.
- UNDP, 1998. Human Development Report. United Nations Development Program.
- U.S. Geological Survey (USGS) (<https://earthexplorer.usgs.gov/>)

Poster Presentation

Session

1. Analyzing Thai textbooks that Affect Gender Stigmatization of Transgender Students
Kittiwinn Dhedchawanagon¹, Nampueng Intanate and Rangsimawongwongwana
2. The Construct of a comfort zone learning for Social Work learners
Punika Apirukkraisri, Nongyao Nawarat
3. USING JIGSAW TECHNIQUES FOR TEACHING - LEARNING ENGLISH CURRICULUM & INSTRUCTIONS SUBJECT FOR THE PRIMARY SCHOOL TEACHERS 12+4 AT SALAVAN TEACHER TRAINING COLLEGE
Ms. Latsamee VONGSALAD, Teacher at Salavan Teacher Training College
4. Technology integration as Google Apps in teaching English, Faculty of Education, Champasack University
Bounmy Phalychanh
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Analyzing Thai textbooks that Affect Gender

Stigmatization of Transgender Students

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Abstract

This article is part of the dissertation study the stigma of sexual happened to transgender students in Chiang Mai. When considered in the context of a school in Thailand will see a reflection of gender bias toward transgender people. The obvious lesson is spent on teaching certain subjects to continue to offer content that is discrimination and gender harassment of LGBT students, too. This is a new form of social problems that Thailand has never spoken about this before. The content is shown in a study such as bias. It was found that this group of people will describe it in such alienation disorder as well as a warning to females and males in general to watch their interaction with this group. The question of his research is that the scientists and the relevant authorities have given much thought to that is to leave a classroom packed with “gender bias” and “gender discrimination” as this happens?. Many learners with diverse sexual content found in this study. They also feel that they have the disorder. Feel pressure and stresses as a result of the lessons they have to open the book read like a knife to slit my own heart that it is their fault. Make an attenuation value of humanity to it. The prejudices that get straight to the course, all this is a factor that contributes to domestic violence as well. The research was based on the theory that with the stigma of Link & Phelan (2001) as a framework of research that suggests that stigma that society does not agree with the manner of any person or contrary to the belief of a person or pattern culture is generally accepted. The stigma that still leads to overlooking or apartheid. The purpose of such research to understand format stigmatize transgender students studying in Thailand. The study was qualitative research. The main tool to collect and analyze data from a study in Thailand. This research brings basic information about the forms of stigma transgender students studying in Thailand based on such an evocative way for teachers to understand the course perfectly to provide accurate and proper knowledge. This is because the students will have a desirable behavior or does it depend on the analysis and selection of textbooks must be consistent with each other. As a result of being attacked and abused the student with sexuality as well.

Keywords: Stigmatization, Transgender Students, Gender, Thai textbooks

Introduction

When it is said, “Sexual norm” in the school, which we cannot deny that the school is the primary institution of the students in learning about various social norms, especially in the school, which it is the place for children to learn how to socialize the values and relationships between individuals, including sex stories, but nowadays the school still teaches only one side of sex. In fact, the teaching of sex in the school continues to be taught in the matter of “Masculinity and Femininity” in the manner of men and women as the result of the creation of a sex casting system, for example, speech, like being a leader, like challenges

and risks, having a single, strong, violent, aggressive, often used violence to solve, and to remove itself as a hub. These traits are seen as males. The part is a good listener, is the following, is gentle, attentive, caring for others, is delicate, and peaceful. These traits are seen as female (Learning community sex education, 2014), And in the textbook, amount 538 books, which Phimonrat Tansawatwong (2015) has randomly chosen to analyze the data in the subject "Gender in Thai schools: do we grow in the way we have been preaching in school?". Such findings have been found to offer males in a number that is more than female; females are presented at lower levels of males, such as roles, duties, responsibilities, and activities. Men will have a picture of the leaders and in various career roles. While women are limited by the duties of wives and other inferior roles in society, all of which is the question of whether the school has the most ideal environment to cultivate sexual equality or not, because of the bias. Gender in various angles has been formed through school courses and social values that regard the "man" and "woman", is transmitted and can be seen from the classes and teachers.

Where to manage school sex teaching teachers should teach them around the side, not just to teach males and females alone. It is taught to understand a wide variety of sexual lifestyles. It is not to guide students in the direction of what we teach, but teach them to know. Understand and accept other people with different sexual lifestyles. Teachers are considered to be an important person to effectively manage their sexuality in education. The ministry of education recognizes in necessity and sees the importance of sex teaching on campus. Therefore, the company has set up a budget for the management of students in all classes of education. The Public Health Technology Development Organization (PATH) is a management company that accelerates the management of education in schools around the field to the youth of the school in a continuous and thorough system. The emphasis is on learning about sexuality in education, as part of the school curriculum, following the learning standards of the basic education curriculum, to develop the youth to understand sexuality. It has material about the development of ergonomics and covers the main concepts of sexual behavior that refers to sexual expression under the framework of society, culture, biology, and personal nature, with a purpose that allows learners to express their sexual way by respecting other people's rights. Distinguish sexual acts that make life happy with actions that are harmful to themselves and others (Sureeporn Nantapanit, 2009).

When considering the context of a school in Thailand, we will see a reflection of sexual prejudice to transgender. Which is clearly seen some of the lessons used in the course of teaching are still present in the content that is racist and sexually infringing students of gender-rich groups, such as group learning, health, and physical education, grade 1 with content "Sex discrimination in textbooks" by giving meaning of sexual deviation *"is an abnormality in people with sexual feelings, attitudes, as well as inappropriate sexual behaviors, unlike most people in society, are often caused by abnormal mental conditions, making it not possible to control themselves, but do not mean that psychosis or insane is only a psychiatric disorder, unusual personality."*

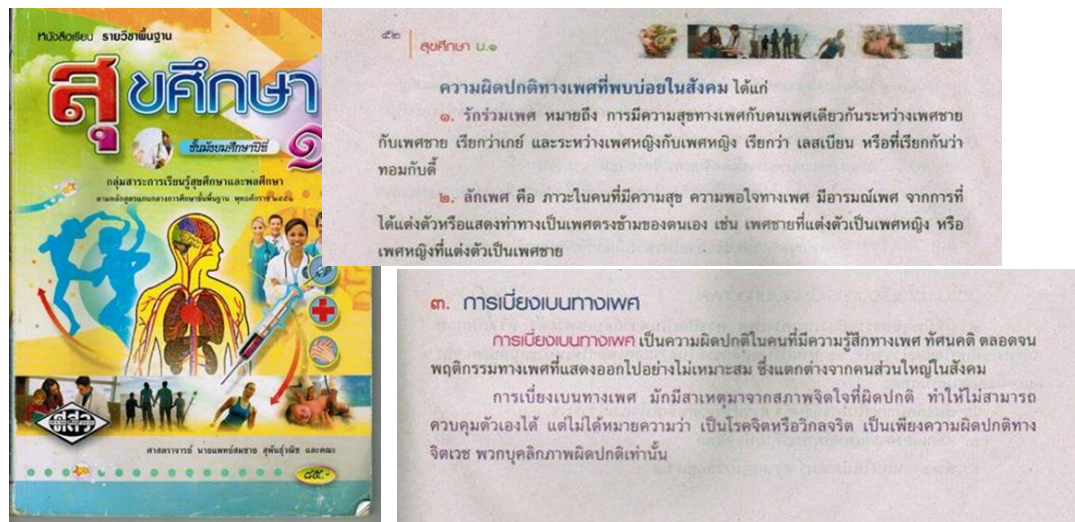


Figure 1: Show the textbook for learning about health and physical education secondary school level according to the core curriculum of basic education, 2008 B.E.

The content displayed in such a class is considered a bias that is found to describe the group of people strangely. It is also important to remind women and males to be aware of interactions with this group of people. The researcher's subsequent question is what the scholars and the authorities need to think of so much is to leave the children's class. How is it packed with "sexual bias" and "stretching" like this? Many children with sexual diversity time meet this content in the classroom. He feels abnormal, feeling pressured, stressed, as a result of the study. He had to open the book, read the content that was the same as the heart of the knife itself. The bias that is stuffed into all classes is also a factor that contributes to the family's violence.

Literature review

The cross-gender situation in school

Assistant Professor Dr. Thomas Guadamuz (2013), a senior researcher states that a place that should be safe like schools, classrooms, and restrooms becomes hell for some cross-gender students. It is a reason that some cross-gender students have to hold their urinary bladder for more than 4 years. It may not be a serious issue for others but it is a serious issue for cross-gender students who are bullied every day as it causes stress. A research team conducted qualitative research and found that cross-gender students who were bullied every day would have mental health issues such as depression disorder, suicide, unprotected sex, and drugs. These problems can lead to other forms of social problems which people have never talked about in Thailand. (Mahidol University, 2013) Thai people often talk about fighting between students, teasing, and using weapons, however, they have never talked about bullying or abuse. People who are abused or bullied every day can accumulate stress and lead to other problems (BangkokBusiness, 2013: 13). These causes make the cross-gender students feel unsafe in their school. It is similar to research by Plan International Thailand, UNESCO, Bangkok Metropolitan Administration, and Mahidol University (2013: 83). These studies have proved that there is an increasing number of people who are intensively abused in all regions in the world due to their sexuality or their gender identity. It can happen to the young generation in many forms such as physical, verbal, social, and sexual abuses.

Besides the mentioned bullying, it is found that gay students or kathoey encounter another bullying in the form of “rape prank” or sexual forcing that makes them embarrassed. While lesbian students, or tomboys, are a group that other students liked the least. Some schools have organized a hate-tomboys group. These students are often bullied by male students in front of the school restrooms. This bullying makes those students do not want to use the restrooms all day. It is also found that the students who study in their middle school are abused by verbal more than in high school. However, in other aspects, there are not many differences.

The concept of stigma

The concept of stigma or Stigmatization can translate into the Thai language can be described in many words include stigma (Pariwutti, A., 2010). Stigma is the feeling that means feeling that is stamped or sin that is embedded in your mind forever. Stigma is what society is created means that the person is seen as a social disorder are very different looks from other people in society, or seen someone with a badge that people completely. This unusual characteristic will be stamped with the party was the social stigma, resulting in a society looking as if that person is a slave or a criminal offense, a study of Feagin's (1963) classification of stigma can win the 3 following categories.

1. The consignor or the stigma caused by physical appearance, physical characteristics, which means different from the usual norms. Physical characteristics, such as incomplete the gender of chronic disease, etc. Stigma in this manner it can be changed according to the perception of a person or patient or any other person.

2. The stigma or the stigma arising from personality, spotted refers to the appearance of abnormal personality deviations from the standard of society, such as the HIV drug. Those are habits that do not match the sex self. Chronic alcohol user's mental disease patients, patients with sexually transmitted diseases, etc.

3. The stigma or the stigma arising from ethnic or prejudices this stigma occurs when groups of people then discovered that another group, the comparison is faulty in the norms of their own created group. This occurs when a group of people aware of race or ethnicity of the self, etc.

The stigma has been developed by researchers associated with the characteristics of a person that is different from others. In a society so this means, including external features and internal features, resulting in the person being valuable in situations (Crocker, Major, & Steele, 1998) and, in other words, Mote is the relationship between negative quality and feature that someone, or something, or the image many people have of a particular type of person or group often is true in reality.

Methodology

This study is a study focusing on education, using the principles of qualitative research to collect information related to the stigma situation. Transgender students in a textbook and understand the characteristics of sexual stigma in the school including the challenges and problems transgender students face in getting sigma from the textbook. Researchers used observation and interviews as the primary method for collecting data. The researcher would like to explain the characteristics of observation and interview used as research tools as follows;

The observation is a technique gathering the research data that the observers use visually watching or studying events. The phenomenon during the teaching of the teacher to understand

the nature and relevance between the elements of the event or phenomenon of the classroom management session. The researchers choose two types of observations: direct observation, which is observed to the sexual stigma of students transgender in the study book. The nature of sexual stigma in the textbook, as well as the challenges and effects that the student group transgender to face the stigma. Indirect observation is an observation of the teacher's teaching method to transgender students. In principle, the observation of the researchers must have a certain goal, to examine the observation, make observation notes try to observe a lot of information. Study the theory that will help to study the relationship between events and information, and to determine the duration of the observation and place them neutral.

In the interview section for data collection, the researcher has compiled a variety of experiences with relationships. Some of the information has been obtained from documents which are curriculum, learning management plans, policies, school regulations including key informant groups that need to be interviewed for information by being a teacher in the subject of health and physical education and social studies learning religion and culture, the number of interviews is 3 people.

Results

Racism in textbooks for health education and Buddhism

Learning and teaching management in health education it was found that the textbooks on health education at the level of grade 6 were not found to have the sexual stigma. But found in the textbook of health education in grade 4 that contains the content of “racism in the textbook”, by talking about sexual values that “Women should not show sexual desire even though they are married, and about dating friends if dating a friend who has wrong behavior such as going out at night, having sexual orientation will cause trouble and no future” and in the textbook of health education at grade 5, With the content of “stretching in class” by discussing sexual deviations, “it can be found in both females and males, which the person will demonstrate inappropriate sexual behavior such as gay and lesbians make the society feel wrong, according to the defined norms of society”, it can be seen that the class in such sexuality is too much of a sex story. The content displayed in such a class is considered a bias that is found to describe the group of people strangely. It is also important to remind women and males to be aware of interactions with this group of people.

The presentation of such content is stigma and makes it possible for people who do not meet their role expectations. Behavior and sex trajectory become sick, mental disorders have not yet helped learners with sex, trajectory, and expression differ from mainstream, well-being, good sexual health, or confidence and self-esteem. As a result of subjects in sexuality, it may also be a cause of a bully of students with various behaviors identified as sexual deviations.



Figure 2: Racism in textbooks, speaking of transgender groups as “sex-obsessed group”

As for the teaching and learning of Buddhism social studies learning group religion and culture in grades 4-6, no stigma transgender students were observed. But found on online media that teachers use in teaching, stating that a man called “ladyboy” is not allowed to become a monk. Still talking about ladyboys in Buddhism, it is stated that "Buddhism calls ladyboy the “sexless man” in the discipline. Using this term means a man who is happy to have sex with a man with a feeling of being a woman. In the past, ladyboys were ordained as monks, then invited the monks to have sex, but being driven away by those monks who are ladyboys, therefore, inviting them to have sex with elephants and horses. When the elephant shepherds had sex with a ladyboy monk, they announced that This Buddhist monk, if not a ladyboy having had sex with a ladyboy. The monks heard the story and told the Lord Buddha, his highness, therefore, ordered not to ordain a ladyboy, and the ordained ladyboy then immediately left the ordination ladyboy is, therefore, the first person in the 11 people who do not allow ordination”.

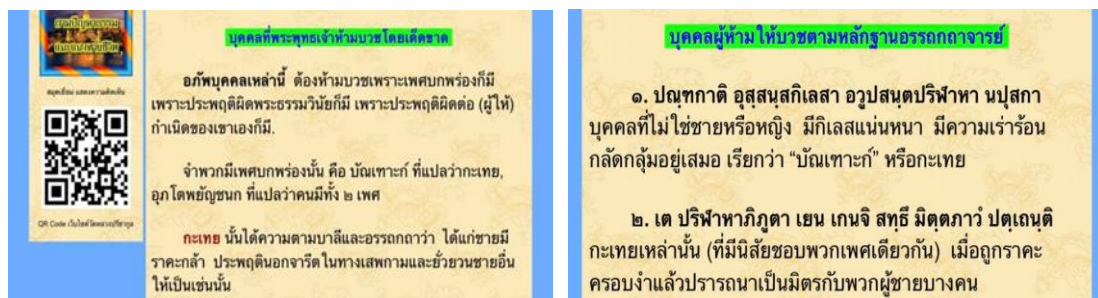


Figure 3: Racism in textbooks on online media

The problem of the past, gender, and sex is the condition of the former society because of the way of thinking about sexuality. It has not happened because, in the old society, gender with sex condition is a difficult and sexuality concept, it is a modern concept that challenges science techniques in the classification of religions, laid based on belief and modern society, based on the base of knowledge that requires accuracy. And is based on a universal knowledge of truth and is available in all situations. The idea of modern sexuality has given the role of the people's duty, unlike the concept of sexuality in religion, that is, the role and duty of the people in society are still directed by gender and sex, these conditions and concepts, which result in people outside the definition of men and women are punished, stigma, discrimination

and leads to being expelled from society. Above all, it is the interpretation of the word "sexless" in the Buddhist past, which gives a broader understanding that the group of sexual diversity is the same as the group that prohibits the ordination. A group of people who have been sexually ordained, as a source of the last religious association, that no Buddhist monks expressed their behavior following their origin sex, the more it is to emphasize understanding and clarify that a diverse group of sexual behavior is a deviation of sex.

Discussion

The findings are following the research of Vichit Wongwareatip (2016:2-3), which studied the class of sex and hygiene at early secondary school, which found that the content of the textbook is also full of sexual bias and bias regarding sexual diversity. Learning about any publisher this is because the world has only two sexes (female and male) and these two sexes are the only normal and natural sex way acceptable only to love a different one, same-sex love or expression (a dress gesture verb) that does not match the sex stem. For example, the transgender is identified as a sexual deviation and is classified as a group of other sexual deviations, such as to show that they prefer to use sexual violence by making others or themselves painful, in which the "sexual deviation" will be judged as a psychological disorder. Content in the "characteristics of sexual deviations" section of the various publisher classes identify the different items. Some publishers are written with 10 or more behaviors, you can see that understanding of each publisher is different, or do not check with modern knowledge internationally, such as the world health organization or the American psychiatric association, classify various behaviors. However, every publisher will choose the portrait of the dress as a ladyboy. Presented as examples of sexual deviations and continued use of the call with bias, such as "homosexuality", "sexual delusion" content in the section of "sexual problems", attempted to provide information in two linked threads, "causes of sexual deviations" and "prevention of sexual deviations", however, the descriptions in these two topics are laid out on old-fashioned knowledge, such as the role, behavior, and relationship of parents, even claiming to be caused by imitation or as a result of the media. Also, the content of violence is not a dimension of violence, which is done based on prejudice to transgender and same-sex lovers.

Conclusions

From the findings, the content displayed on such a class is considered a bias that is found to describe the group of people strangely. It is also important to remind women and males to be aware of interactions with this group of people. The researcher's subsequent question is what the scholars and the authorities need to think of so much is to leave the children's class. How is it packed with "sexual bias" and "stretching" like this? Many children with sexual diversity time meet this content in the classroom. He feels abnormal, feeling pressured, stressed, as a result of the study. He had to open the book, read the content that was the same as the heart of the knife itself. The bias that is stuffed into all classes is also a factor that contributes to the family's violence.

Currently, there is no denying that the problem of textbooks that bias about gender diversity is the cause of bullying in class. That's when it's about school sex teaching, one of the most important findings is that teaching sex in teachers' schools often has different opinions between the teachers. In the course of a sex teacher, the child must learn so that the children will be able to know the same thing. As for the guidance teachers, it looks like teaching sex education is like two options, instead of being good, things may turn out to be bad. Solving the problem of sex teaching teachers are required to understand the subject of gender-rich individuals who can provide assistance and consultation with this group of students. This is

considered an issue in which teachers should focus more and try to make it more important. Teaching the sexual diversity of individuals in the school may not be directly taught. However, it is important to teach all sexes for love, gender, and transgender.

Therefore, for the content that appears in the textbook should be subject to gender enhancement, the role of relationship, gender, and gender diversity, for example, the term of sexual diversity in the course is divided into three groups: a diverse group of sexual identity, diverse groups of sexual orientation, and a diverse group of sexual expression. Also, sexual health issues should be added, such as sexually infectious diseases, to know the anti-HIV/AIDS drugs, and unwanted pregnancies. As well as the knowledge of all-around human life, it is a good thing to pack into the course, because it must be content based on the age range. The suitability of the readiness to recognize and understand the things, therefore, the knowledge of sexual diversity is appropriate, must make the child understand that this is normal in society to respect and honor.

Examples from the UK teach to accept diversity from children in the UK and also focus on sexual diversity. In the past, the Kingdom approved the use of picture books to be used as teaching materials to elementary school students throughout the country on relationships and sex education (RSE), and equality of the group gender or LGBT. This is a comic book that teaches children to learn about accepting differences in society and respecting the equality of social partners. The story of a variety of lifestyles, such as the stories of the gay penguin pair, helps to feed the baby. The story of a boy who wants to dress as a mermaid, as well as the story of a lesbian couple with their children. Although these books are resisted by a conservative parent, the educator suggests that children have to be educated in the equality of the sexual diversity group, which is part of the United Kingdom law today. If Thailand has done such a class, the learner will be able to see sexual diversity to become common in Thai society. When everyone considers each other without a different sex story and is involved, people will be able to truly look at the potential of their abilities, and the people of the Thai society do not have to struggle with this sexual diversity campaign.

References

- Baanjomyoot. (2011). *Cerebral Cortex cerebral cortex The outside of the big brain*. Official Articles Education (Online). Available: <https://www.baanjomyut.com/>. (May 11, 2560).
- BangkokBusiness. (2013). *Social issues. Educational article*. (Online). Available: <http://www.bangkokbiznews.com>. (May 11, 2560).
- Crocker J, Major B, Steele C. (1998). *Social stigma*. In Handbook of Social Psychology, ed.S Fiske, D Gilbert, G Lindzey, vol. 2, pp. 504. Boston, MA: McGraw-Hill.
- Feagin's, J. (1963). *Erving. Stigma: Note on the Management of Spoiled Identity*. (Harmondsworth: Penguins Book, 1963), 121-122.
- Foucault, M. (1978). *The History of Sexuality Volume I: An Introduction*. New York: Pantheon.
- Foucault, M. (1995). *Discipline and Punish: The Birth of the Prison*. New York: Vintage Books.
- Foucault, M. (2004). *Abnormal: Lectures at the College de France, 1974-1975*. London: Verso.
- George Weinberg. (1960). *Gay and Screw*. Manhattan psychotherapist with a doctorate in clinical psychology from Columbia University.
- Goffman, E. (1963). *Stigma: Notes on the Management of Spoiled Identity*. Englewood Cliffs, N.J.: Prentice-Hall.
- Guadamu, T. (2013). *Don't "bullied" me*. Bangkok Media Business Company Limited. Bangkok, Thailand.
- Herek, G. M. (2004). *On heterosexual masculinity: Some psychological consequences of the social construction of gender and sexuality*. American Behavioral Scientist, 29, 563–577.
- Hillier, Frederick S. (2010). *Introduction to operations research: Being bullied*. Boston: McGraw-Hill Higher Education. <Http://www.bugaboo.tv/news/>. Hot News Online.

- Retrieved on April 1, 2560.
- Jackson, P. A. (1999). *Tolerant but unaccepting: The myth of a Thai "gay paradise."* In P. A. Jackson & N. M. Cook (Eds.), *Genders and sexualities in modern Thailand*. Chiang Mai, Thailand: Silkworm Books. pp. 226–242.
- Kansriwien, S. (Online). *Universal human rights and the Universal Declaration of Human Rights*. Accessible from <http://www.baanjommyut.com> (Date of Search: April 9, 2014).
- KrangPibul, K. (2014). *Bisexual degrees, ceremonies and dignity equality*. Bisexual Network Thai Master students Social Work Research Faculty of Social Science Thammasat University.
- King, M., Winter, S., & Webster, B. (2009). *Contact reduces trans prejudice: a study on attitudes towards transgenderism and transgender civil rights in Hong Kong*. *International Journal of Sexual Health*, 21(1), 17–34.
- Kongsakon, K. (2002). *Production creates "masculinity" by the ruling class*. Master of Sociology and Anthropology Thesis Anthropology Faculty of Sociology and Anthropology Thammasat University.
- Kosciw, J. G. Greytak, E. A., Diaz, E. M., and Bartkiewicz, M. J. (2010). *The 2009 National School Climate Survey: The experiences of lesbian, gay, bisexual and transgender youth in our nation's schools*. New York: GLSEN.
- Leach, F. & Dunne, M. (2013). *School-related gender-based violence*. Paper presented at the Asia- Pacific Roundtable Meeting on School- Related Gender- Based Violence, November 2013, Bangkok, Thailand.
- Nithiwirakun, N. (2014). *Alternative Sex in Schools: Do We Accept True?*. Faculty of Education Chulalongkorn University.
- Ojanen, T. T. (2009). *Sexual/gender minorities in Thailand: Identities, challenges and voluntary-sector counseling*. *Sexuality Research & Social Policy*, vol. 6, no. 2, pp. 4-34.
- Olweus D, Limber S, Mihalic S. (2003). *Bullying prevention program*. Boulder, CO, University of Colorado, Center for the Study and Prevention of Violence. (Blueprints for Violence Prevention Series, Book9).
- Pariwutti, A. (2010). *Seminar on "brand identity: creating chains gay sexuality male homosexuals in the Thai media."* [Online URL: www.teen.Path.net.html] accessed on November 2559
- Praekao, P. (2013). *Research Project on Gender Research and Training Center*. Health and Wellness Khonkaen University Faculty of Nurse Khonkaen University.
- Pinheiro, J.Q. (2006). *World Report on Violence Against Children*. *Revue Européenne de Psychologie Appliquée*. 56, 191-198.
- Royal Dictionary. (1999). *Department of the Royal Institute*. Bangkok: Nanmee Book Publications.
- Samosorn, K. (2013). *The story of sexuality education*. Health Promotion Program Sex (Thais).
- Sopakoon, A. (2016). *Gender, Acceptance, Change in the Present Era philosophy*. Doctor of Philosophy Program in Curriculum and Instruction Faculty of Education Khonkaen University.
- Supapueng, N. (2013). *Documentation Workshop Powerful female power in political reform*. Bangkok: Senate, Commission on Women, Youth and the Elderly.
- Supawattanakun, N. (2018). *Transgender: Traveling from the Third Sex to the Real Male World*. Independent newspaper on Prachatai website. Bangkok, Thailand.
- Tansawaswong, P. (2015). *The concept, theory, methodology in the study of sexuality*. Documents of the annual seminar on sexuality education in society. The 1.

UNESCO. (2012). *Education sector responses to homophobic bullying*. Good policy and practice in HIV and health education: Booklet 8. Paris, France: UNESCO. Available at: <http://unesdoc.unesco.org/images/0021/002164/216493e.pdf>

The Construct of a comfort zone learning for Social Work learners

Punika Apirukkraisri*, Nongyao Nawarat**

Abstract

This article is part of a thesis on Empowering Social Workers through the Training Curriculum on Objectives 2. The article study the process of training for women in social work in terms of empowerment as well as synthesizing each process to the conditions and debates of empowerment with the concept applied as follow; concept of creating learning for change and the concept of creating a critical operating space. The sample group in this study is a social worker who participated in a training course on feminism in empowerment, International Women's Partnership for Peace and Justice - IWP) that operated with Women's Health Plan and Sexual Justice Department of Health which has findings about constructing a comfort learning area for social welfare learners. There are 3 important issues: (1) self-learning which are (1.1) learning of their own power within (1.2) learning about things that acts on their own lives and self-management to transcend (1.3) Learn to create joy in the heart as the saying "Planting flowers in the heart" and (2) learning the power of others which are (2.1) learning the power within of others (2.2) exchanging power within between each other (2.3) creating a life area that empowers together as the saying "Creating a flower field" (3) Creating a culture and society of power sharing, the challenge is "what to do in order to create a safe learning area under a society that is not an inequity power relationship?"

Keywords : Learning Area, Comfort zone, Social work learner, Empowerment

Introduction

This article is part of a thesis on Empowering Social Workers through the Training Curriculum on Objectives 2. The article studies the process of training for women in social work in terms of empowerment as well as synthesizing each process to the conditions and debates of empowerment with the concept applied as follows; the concept of creating learning for change and the concept of creating a critical operating space. The sample group in this study is a social worker who participated in a training course on feminism in empowerment, International Women's Partnership for Peace and Justice - IWP) that operated with Women's Health Plan and Sexual Justice Department of Health which has findings of constructing a comfort learning area for social welfare learners. There are 3 important issues: (1) self-learning

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which is (1.1) learning of their power within (1.2) learning about things that act on their own lives and self-management to transcend (1.3) Learn to create joy in the heart as the saying “Planting flowers in the heart” and (2) learning the power of others which are (2.1) learning the power within of others (2.2) exchanging power within between each other (2.3) creating a life area that empowers together as the saying “Creating a flower field” (3) Creating society of power-sharing, the challenge is “what to do in order to create a safe learning area under a society that is not an inequity power relationship?”

Methodology

Research studies have used Qualitative Methodology on phenomenology concept bases, this research focuses on seeking information from the actual phenomenon of natural samples to understand the idea system. The belief system experiences the associated environmental context of social members (in this social worker), which will interpret the information provided by the study to understand the hidden meaning of participants.

This data collection requires information at a level of ideological attitude. Real-life experience the way people's lives are engaged in working with the target audience. Research studies have relied on information that is intended to be accurate and accurate in the world, and the opinions of the participants of the research are key (Chai Photisita, 2007, p.261) is a deep penetration that is deep and meaningful to the participants' lives, so the information collected this time researchers will have to participate in both levels of deep penetration into the sample. Here are the social worker and the environment context level of the sample. Here is a feminism concept training course. The study focuses on operational and observation, engaging with deep level interviews with both individual and group discussions, engaging both the speaker group/designer of the curriculum and social operators attending training courses in the power of empowerment. There are 3 ways to collect data: (1) Engaging in the operational data collection (2) interviews and (3) specific group discussions (groups only)

Result and Discussion

In the process of removing the women's foundation, the boys are far about the development of protection mechanisms and helping those who suffer family violence under the plan to reduce the impact of alcohol, to improve the health of community networks (2016, p.18-19). The concept of creating a social safety area is an elevated power of those who have been in family violence. In other words, the development of a power-enhancing service is coupled with pushing the protection mechanisms, the victims of sexual violence, and the violence in the family, namely strengthening the power. It is aimed at the affected people to change the power of their lives to create their lifestyle changes. Families and communities in which activities are used in the operating the key goal is to “the power to change” or “power = Voice”

Creating a safe learning area for social learners is an important factor affecting the development of the power of both social welfare students. Enhance the learning power of others and create a culture of sharing the power between social welfare students. Therefore, the empowerment of social welfare will depend on creating a safe learning context which has been discovered by major education.

(1) Self-learning, Learn what acts on the life of social welfare and self-management to advance through such unfair justice. It is the use of power to realize the power of self-realization to create changes in themselves to create bargaining power. The context of a secure area must be an area that feels protected from protection. Take care of and heal social learners at the same time to create the growth of ideas and guidance from unfair circumstances.

(2) Learning the power of others this is a secure area to enhance the power between social welfare learners, where the safe areas that are built can expand the area with learning power. The power of others also referred to as “combined power” (power with) by learning the internal power of others with the opening of the internal power exchange area. Creating a shared living space, as such, “Creating a flower field” emphasizes the learner to exchange the story, experience, and recognize each other in a similar experience.

(3) Establishing a society of power-sharing creates a safe space for social welfare learners that are to change the culture of power to the culture of power-sharing, which recovers all of our internal powers. In particular, learners are in an unfair social structure that drives the culture of power-sharing. It is the creation of a safe society that leads to the creation of a competent change of power relationship that leads to social fairness.

Conclusion

This article there is a major challenge: “what to do to create a safe learning space under unfair society?” to strengthen social welfare, it can grow and elevate. To a fair learning area, creating a secure space of fair learning is something that needs to be created as a culture of learning. Social welfare is considered an important role as a social worker is responsible for providing relief to the recipient of social issues and social development, so there is a way of working to achieve the philosophy that helps him to help, by working with him, not working for him so that he can contribute to the development of the nation. By working with a person called specific social welfare or individual work, it works with individual problems. Such a problem could be a family problem. Financial Issues this is by the social welfare efforts to bring out the service of the recipient as a key to correcting and preventing the problem. Or even working with a group called social work, group, or group-level functionality is a method and process that social welfare assists members of group members in each institution or organization to have a good relationship with others.

Reference

- Department of Women and Family Affairs. (2015). *Defining the realization of sexual consciousness to administer social changes: A case study of the male unconsciously*. A long step women's foundation. Faculty of Social Welfare. Thammasat University.
- Grant & Sleeter. (2006). *Working an academically rigorous, multicultural program*. Equity & Excellence in Education, 38(4), 290-298.
- Nawarat, N., (2013). *Introduction to multicultural education learning to live together in the 21st century*. Chiang Mai: Faculty of Education, Chiang Mai University.
- Nieto, S. (2007). *Language, culture, and teaching: critical perspectives for a new century*. Retrieved August 25, 2019, from INSERT-MISSING-DATABASE-NAME.
- Wiwatwongwana, R. (2013). *Lone motherhood in Thailand: Towards reducing social stigma and increasing social support*. (Ph.D. Thesis). The University of Sydney.

USING JIGSAW TECHNIQUES FOR TEACHING - LEARNING ENGLISH CURRICULUM & INSTRUCTIONS SUBJECT FOR THE PRIMARY SCHOOL TEACHERS 12+4 AT SALAVAN TEACHER TRAINING COLLEGE

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Abstract

The research is to study about the using Jigsaw techniques for teaching and learning the Curriculum & Instruction Pedagogy for primary school teacher trainees System 12+4 at Salavan Teacher Training College. This study aims: 1. To examine the efficiency of using Jigsaw techniques for teaching and learning the Curriculum & Instruction Pedagogy that based on the score 80/80; 2. To study effectiveness of the students' learning process for teaching and learning the Curriculum & Instruction Pedagogy; 3. To study of students' satisfactions toward on the using Jigsaw for teaching and learning the Curriculum & Instruction Pedagogy. This research was conducted in second semester of academic year 2017-2018. The research samples were 4th year of primary school teacher students (12+4 System) at Salavan Teacher Training College. Amount of research sample were 19 females of 31 people selected by using purposive sampling. The research tools used consist of 3 types such as: 5 lesson Plans, 25 items of tests to examine students' learning, each items had 4 choices, and one set of questionnaires. The statistics used to analyze data were percentage, mean and standard deviation. The efficiency of the lesson plan using Jigsaw techniques for teaching and learning the Curriculum & Instruction Pedagogy were 86.28/89.16 higher than the set criteria 80/80. The effectiveness index of students' learning outcome to the using Jigsaw technique for teaching and learning the Curriculum & Instruction Pedagogy was 0.82 and equivalent to 80 %. The students' satisfactions toward on the teaching and learning by using Jigsaw techniques for teaching and learning the Curriculum & Instruction Pedagogy was $\bar{X} = 4.33$ and $S.D = 6.05$.

Introduction

English language is an foreign language that are important and play an important role in the use of communications, education, job industry assistance, developed economy, communication between the outside of this. English has used language to communicate with each other and the world. The t 's that children can learn language quickly and be effective, it means technical way of teaching and learning process - teaching is consistent and easy to understand, it can bring these experiences to use in learning - teaching foreign languages used by technical methods taught in the same way they learn their mother (Tough Joan, 1984: 213)

In the course of the management of the school - to teach classes in an elementary language it was the Department of kindergarten – elementary the Ministry of Education to have the capacity of the English language English rice as a core subject in the curriculum of primary objective to create a basic knowledge of English to younger students. The Ministry of Education and Sport has been incorporating English language teaching courses and courses into the primary teacher education curriculum. Therefore, all primary school students must learn English and how to teach English. (Ministry of Education and Sports, 20 16: 1).

The Jigsaw learning is a technical learning format that focuses on learning that teachers have to prepare and plan for students engaged in learning, the activities of the aid group, together solve the water and find out everyone responsible duties as assigned full and the ability of the learner.

Methodology

This research was experimental research conducted in the second semester of academic year 2017-2018. The research samples were 4th year of Primary School Teacher Students 12+4 System at Salavan Teacher Training College. Amount of research tools used consist of 3 types such as 5 lesson plan, 25 items of tests to examine students learning each item had 4 choices and one set of questionnaires. The statistics used to analyze data were percentage mean and standard deviation.

Results and Discussion

The efficiency of the lesson plan using Jigsaw techniques for teaching and learning the Curriculum and Instruction Pedagogy were 86.28/89.16 higher than the set criteria 80/80 in accordance with Xayvat Suthilat's views (2000) and Suvid Moonkham's & Olathai MoonKham's views defined that cooperative learning focusing on students' co-operations in solving problem.

The effectiveness index of student learning outcome to the using Jigsaw techniques for teaching and learning the Curriculum and Instruction pedagogy were 0.82 and equivalent to 80% in accordance with Suvid Moonkham's views defined that cooperative learning open an opportunity to students to help each other effecting to students' achievements.

The students satisfactions toward on the teaching and learning by using Jigsaw techniques for teaching and learning the Curriculum and Instruction Pedagogy was =4.33 and S.D=6.05. in accordance with Bruner's views defined that internal motivations was the main factor to students' achievements.



Conclusion

The research results showed that the efficiency of the lesson plan and the effectiveness index of students' learning outcome to the using Jigsaw techniques for teaching and learning were high, and the student's satisfactions toward on the teaching and learning by using Jigsaw techniques for teaching and learning was high. Therefore, the educator would like to say the

Jigsaw techniques for teaching and learning is very meaningful and important for teachers teaching at schools especially for those teaching at the college to create students' achievements.

Reference

- Ministry of Education and Sports. (2008). National Education System Reform Strategy 2006-2015. Vientiane Capital: Sisophone Printer.*
- Ministry of Education and Sports. (2016). Law on Education.(8th Edition). Vientiane Capital: State Publishing Enterprise.*
- Kittirati. (2529). Corporate Governance Theory. Bangkok: Publications.*
- The Great Hall of Fame (1998). His History of Teaching for the 11 + 3 Teacher Training School. State Printing House.*
- The Sun. (2552). Organizing learning activities to develop interesting reading skills by the 3rd year Primary School , by the Collaborative Learning Group [dissertation]. Graduate School of Curriculum and Instruction . Bachelor's h Degree: University of War College.*
- Good luck (2544). Psychology ScienceEducation (posted the 5th). Bangkok: University Campus.*
- Gold and Gold (2550). 19 How to Manage Learning to Develop Knowledge and Skills (6th Edition). Bangkok: Photo.*

Technology integration as Google Apps in teaching English, Faculty of Education, Champasack University

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Abstract

Technology is necessary to improve language ability. Teachers need to consider the right applications to deliver their teaching and learned to design meaningful teaching experiences by merging technology. Technology typical incorporated into teaching in this study was Google apps. The teachers at Champasack University applied Google Drive to create Google docs including text files, spreadsheets, presentations, and forms supporting their teaching. It is a real-time collaboration tool that allows teachers and students to work on the same document from remote locations, and automatically save every change made. The target population for this study was English teachers at Champasack University. Data collection administered via Google form with multiple choice and checkbox option. The data were analyzed with Microsoft Excel. The majority of the questions made the distribution of answers formatted into a pie and graph for each individual question. They were described respectively. The survey found that technology integration assisted lesson clarification and deliver learning and teaching. Technology deployment able to alter the pattern of learning styles raised stimulation and built an energetic learning environment. Google apps allowed more opportunity for communicating between students and teachers. They encouraged collaboration, facilitated for teaching plan manipulation, created the test and administered it to students. They were an authentic education and enabled to produce teaching performance much more effective.

Keywords: Google apps, Learning language, Teaching, Technology integration, Technology savvy

Introduction

Teaching a foreign language is not an easy task. In the past, EFL teachers depended only on the use of traditional methods. With the technological development, educational technology is used in the field of EFL teaching and learning. Therefore, new methods in teaching and learning have been introduced. At the present time, the deployment of educational technology plays an important role in education because it provides several technological tools that can increase instruction process more effective. The application of educational technology has got a significant place in EFL teaching and learning. In fact, there are different points of view pertaining to its effect on the teachers' role and the learners' level. Thus, the present research work is an endeavor to pronounce the role of educational technology in EFL teaching and learning. It seeks to distinguish between traditional and modern education. It attempts to find out the technological tools that teachers and students use and describes how it can facilitate the learning and the teaching process. The role of technology has been recognized as vital in the education of the English language, and many areas of the world have noted the importance of information technology within the context of English education, which has facilitated and augmented English learning to a great extent.

According to Graddol (2012) indicated that “technology lies at the heart of the globalization process, affecting work, education and culture”. Technology has always been an important part of teaching and learning environment. It is an essential part of the teachers’ profession through which they can use it to facilitate learners’ learning. When we talk about technology in teaching and learning, the word ‘integration’ is used. The technology integration assists teachers choose their own favorite multimedia and software that creates more interactive lessons. The application of technology in education can be a great benefit for instructors. Instructors now have the ability to work together to create more meaningful instruction for all learners without having to arrange planning time. Instructors can use websites to assign requirements and samples for learners [22]. Moreover, Technology becomes an integral part of the learning experience and a significant issue for teachers, from the beginning of preparing learning experiences through to teaching and learning process [7].

Pourhosein Gilakjani and Sabouri (2014) emphasized that through using technology, learners can control their own learning process and have access to many information over which their teachers cannot control. By including technology in their classes, teachers will have the opportunity to engage more learners and lead more energetic classes. Many researchers stated that technology can be used as an instructional tool in teaching and learning skills. Pourhosein Gilakjani (2013) and Bruce and Levin (2001) expressed that technology can be useful in classroom by helping communication, making teaching products, and assisting learners’ self-expression. Friggard (2002), Miner (2004), and Timucin (2006) confirmed that technology increases the development of teaching methods and learners’ knowledge. Technology plays a key role in promoting appropriate activities for learners and has a significant impact on teachers’ teaching methods in their classes. Kurt (2010) stated that technology can be used as a tool for performing meaningful projects to engage learners in critical thinking and problem solving. Technology increases learners’ cooperation. Cooperation is an effective tool for learning. Learners cooperatively work together to create projects and learn from each other through reading their peers’ work [14].

Google has come up with a variety of constructive services that help the industry and education to perform their work effectively. Google apps can be described as an integrated suite of cloud-based solutions, driven by Google app engines, designed to achieve specific educational goals with the aim of transforming the 21st-century educational system. Google Apps were designed to facilitate the provisioning of the Google suite of applications and other collaborative tools, such as Gmail, Google Drive, Google Sites, Google Calendar, Google Docs, Google+, and Google Chat, among others. To meet the challenge of 21st-century educational goals, dramatic alteration should be directed toward the applicability of apps in teaching, research, learning, and administration of universities. Therefore, Educational apps have been instrumental in transforming educational institutions. Google Apps have been central in facilitating collaboration and advancing knowledge. Furthermore, Google Docs facilitates ease of collaboration with multiple editors so users can simultaneously make changes to the same document in real time. Regarding time management and scheduling of collaborations, users now have the ability to add calendar entries directly from their Gmail accounts. Additionally, Google Sites provides faculties and students both communication and collaboration capabilities to achieve optimum productivity within the classroom environment- both traditional brick and mortar and virtual learning environments. Particularly, the real-time editing in Google Groups can make it easier for students to work collaboratively to share projects regardless of their physical location.

Technology that is incorporated into the classroom for the purpose of enhancing the learning process is referred to as technology enhanced learning [6]. The incorporation of technology in the classroom can be quite useful, as “the use of virtual environments for collaboration and learning can result in unprecedented flow of ideas, leading to higher levels of productivity” Google Drive has a simple promise, but its impact is revolutionary. The basic idea is this: rather than creating files on one’s local computer and sharing them with others via

attachments through email, documents are created online and the files are made available by email documents by sharing access through a secure to link to others for collaboration. Google Drive consisted of Docs, Sheets, Slides, Forms and drawing. Instructors are capable of creating documents from or upload existing files. Moreover, instructors can add on the tools in Google Drive with the third-party apps and extensions. The objective of this study about technology integration as Google Apps in teaching English, Faculty of Education, Champasack University.

Methodology

The target population for this study was teachers in the English Department, Champasack University. The online survey was used for data collection and administered via Google form of Google apps. Google form was used to create the survey with multiple choice and checkbox option. These options were used to measure each item on the questionnaire.

Data Collection

This quantitative study was completed using a questionnaire that contained two parts. The questionnaire was divided into two parts. The first part collected demographic data about the participants including general questions about educational level and teaching experience. The second part included specific questions regarding the technology application, experiences in Google Apps, obstacles integrated Google Apps in teaching English as well as the expectation of using the internet at Champasack University. The Likert scale format was used for the second part.

Data analysis

The data were analyzed by Microsoft Excel. The results were drawn with charts and graphs to see where the majority of people fell in this debate. The majority of the questions made the distribution of answers formatted into a pie and graph for each individual question. It was described respectively.

Result

This section described the results of data collection with the target group. Almost questionnaire in this survey pertinent to technology integration in teaching English, questionnaire respondents demonstrated their opinion to Google apps in education, its importance and classroom transformation when they were integrated into teaching. The data illustrated on pie and bar chart with the brief description in the following. Demographic and descriptive statistics.

1. Teacher teaching experience

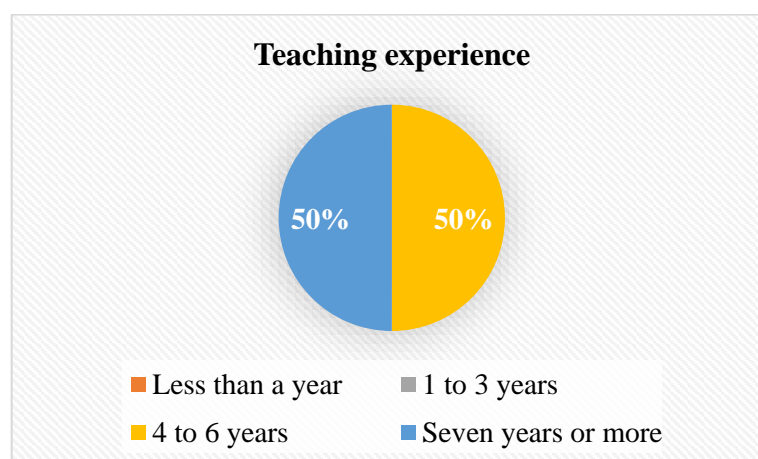


Figure 1: The pie chart illustrated teaching experience

Teaching experience of CU teachers varied. The year ranged was one year to seven and more. The half of teachers had teaching experience ranged from four to six years. Another was more than seven years. It affected instruction and knowledge deliver to students. They have accumulated their capability, knowledge, and skill through teaching.

2. Frequency of technologies integrated into teaching

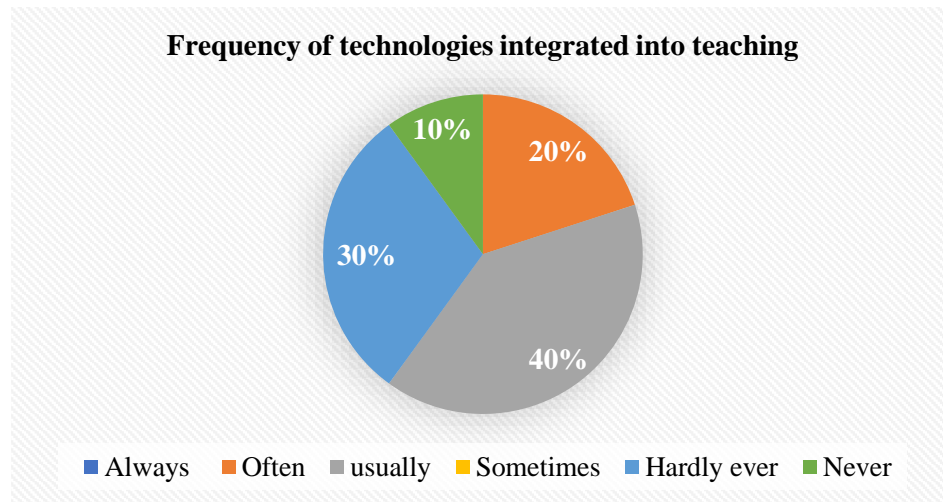


Figure 2: Pie chart showed frequency of technologies integrated into teaching

Technology facilitated teaching and created a motivated learning environment. Students expected their teachers incorporate technology into instruction. That was disappointed when technology unable to integrate only 40% due to many factors. Occasionally, it was hardly ever applied in the classroom because of its inconveniences, primary technology resources uninstalled in the classroom. As a result, it was not supported to deploy other devices in teaching. 20% of them replied they used it when it really needed to deliver some lesson.

3. Types of technology integrated into teaching

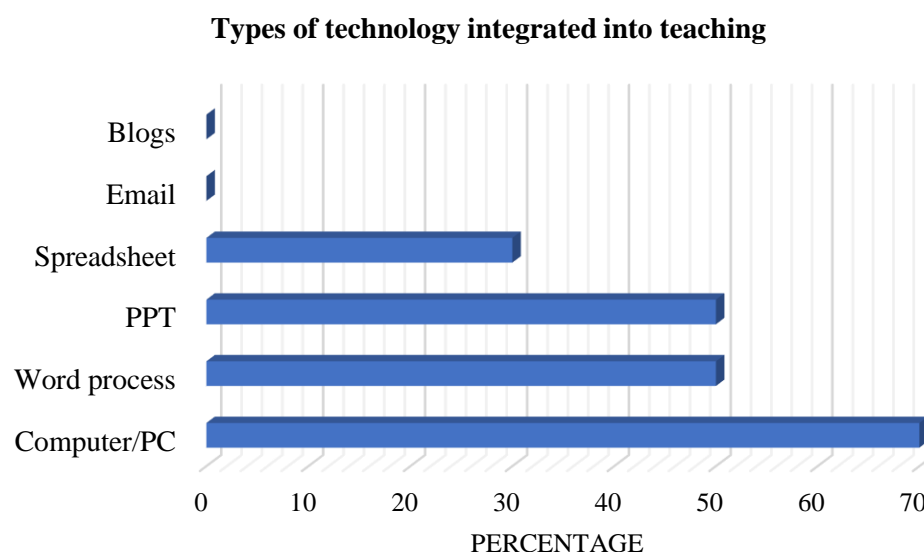
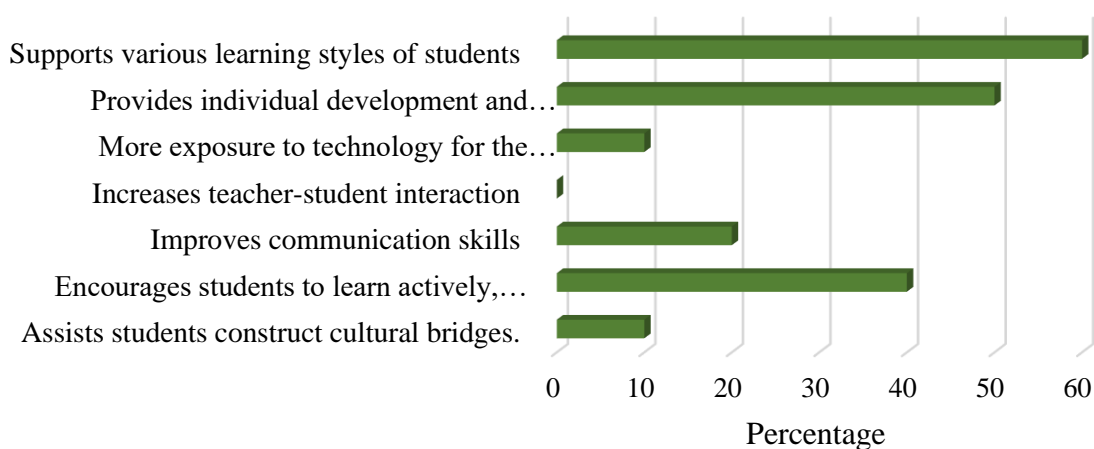


Figure 3: Types of technology integrated into teaching

There are a wide range of technologies in education and have different purposes of employment. But there were only four kinds of technologies mention by respondents. The most

The needs to integrate technology into the classroom



frequent use was computer/PC. This type was daily use for document, lesson plan and report. 50% of usages were word process and PPT. Teaching required PPT to present a typical lesson and deliver it to maximize the understanding. It did not rely on course books and a green board to explain the content. Last technology was Spreadsheet which used to calculate grades or even statistics. Mentioned tools in this survey had different purposes of uses.

4. Platforms used to connect to students

Platforms teachers applied to connect to students

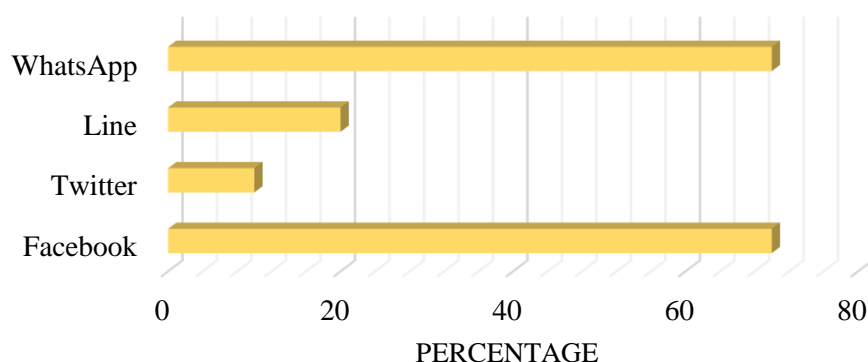


Figure 4: Bar chart illustrated platforms used to connect to students

Technology integration to deliver learning and teaching assisted lesson clarification and increased learning outcomes. Teachers demonstrated their thinking associated with technology merging into their teaching. They approved technology deployment able to change learning style of students, increased motivation and supported individual development as well as teaching method alternation. The technology platform for education designed for collaboration between students and teachers. As a result, it enabled to encourage actively and cooperatively based on learning. It helped students build cultural bridges and improve communication skills. More technology in the classroom tends to expose interaction.

5. The needs to integrate technology into the classroom

Figure 5: Bar chart illustrate needs to integrate technology into the classroom

Technology integration to deliver learning and teaching assisted lesson clarification and increased learning outcomes. Teachers demonstrated their thinking associated with technology merging into their teaching. They approved technology deployment able to change learning style of students, increased motivation and supported individual development as well as teaching method alternation. The technology platform for education designed for collaboration between students and teachers. As a result, it enabled to encourage actively and cooperatively based on learning. It helped students build cultural bridges and improve communication skills. More technology in the classroom tends to expose interaction.

6. Google apps applied the most

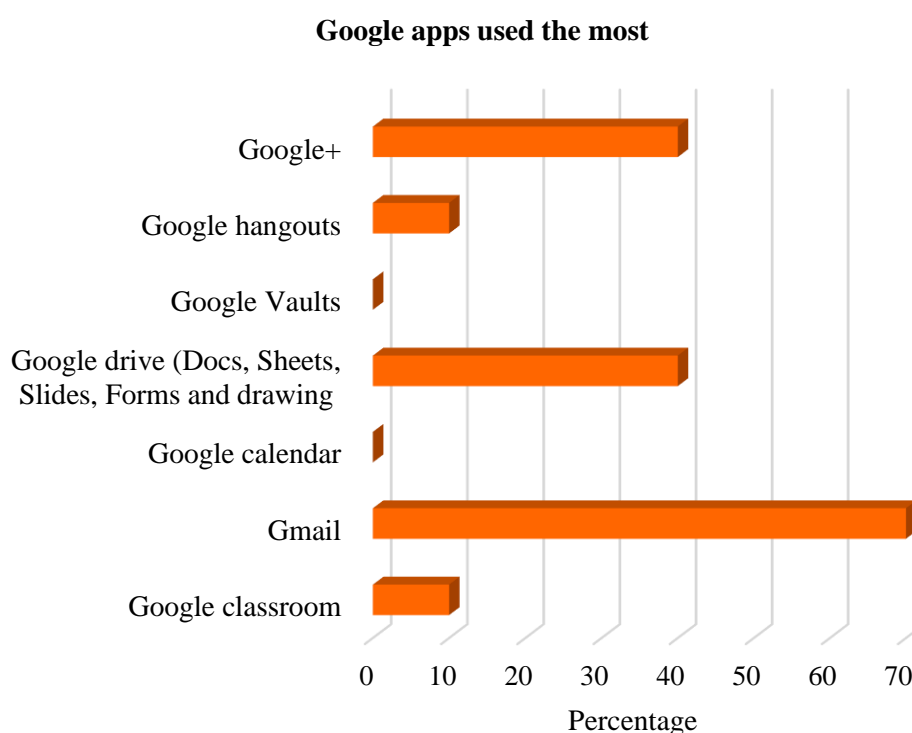


Figure 6: Bar chart illustrated Google apps applied the most

From the bar chart above, 70% of total respondents used Gmail to contact with others. 40% of them applied Google drive for teaching and working. Teachers revealed that they usually employed Google Quiz application to build the tests instead of paper print. They accepted Google apps facilitated lesson plan organization and preparation. They could select apps to fit with their working purpose and produce more outcomes. Apps in Google drive is simple to use even new users. They did not worry file damage and losing because all fills created were saved in it. Additionally, Google + and Google hangouts were used in communication like other social media. Google classroom was applied only 10%.

7. The problems in accessing and applying Google apps

The problems in accessing and applying Google apps

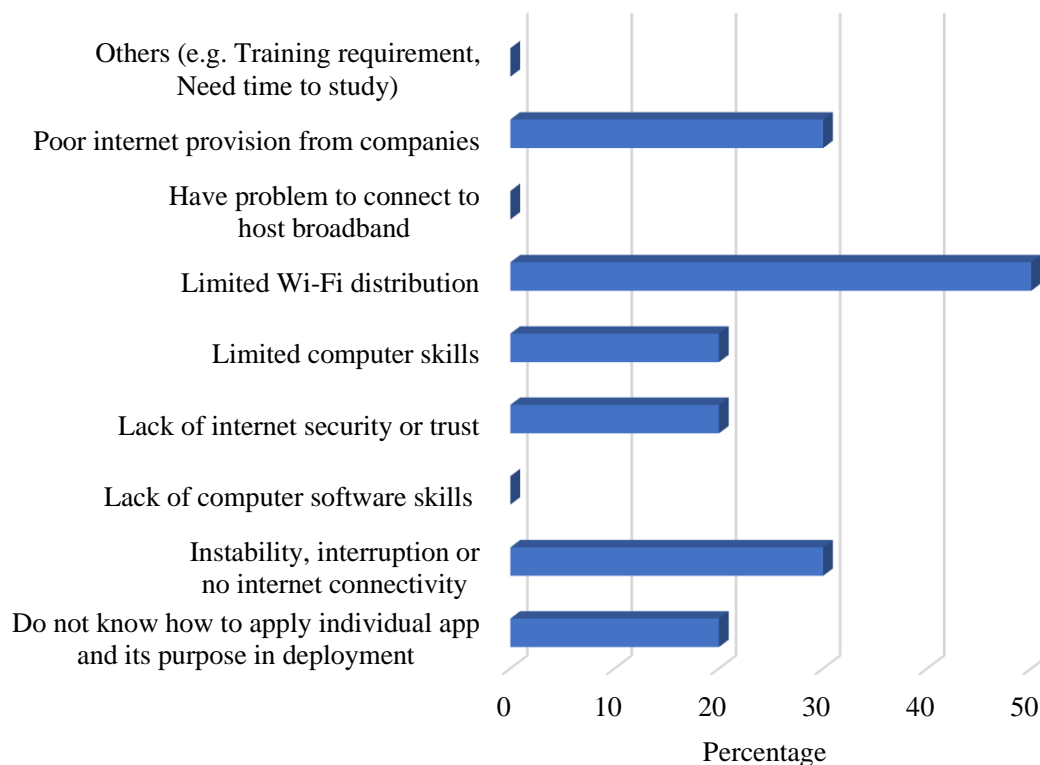


Figure 7: The problems in accessing and applying Google apps

Google apps were common use in the classroom today but they were dependent on the internet to access and use the apps. 50% of survey respondents replied they had problems to access apps due to Wi-Fi distribution to classrooms or office were not strong enough to stable work on apps. They were unable to escape from this obstacle, even they directly connected to internet company provider. Furthermore, internet in Champasack University campus was often interrupted and no internet connectivity when the weather was fluctuated (30%). 20% of them said they had problems with apps usage and needed time to make understanding in real practice. They mentioned they are poor computer skills leading to trouble with using Google apps.

8. Reasons using Google apps for teaching and working

Reasons of using Google apps for teaching and working

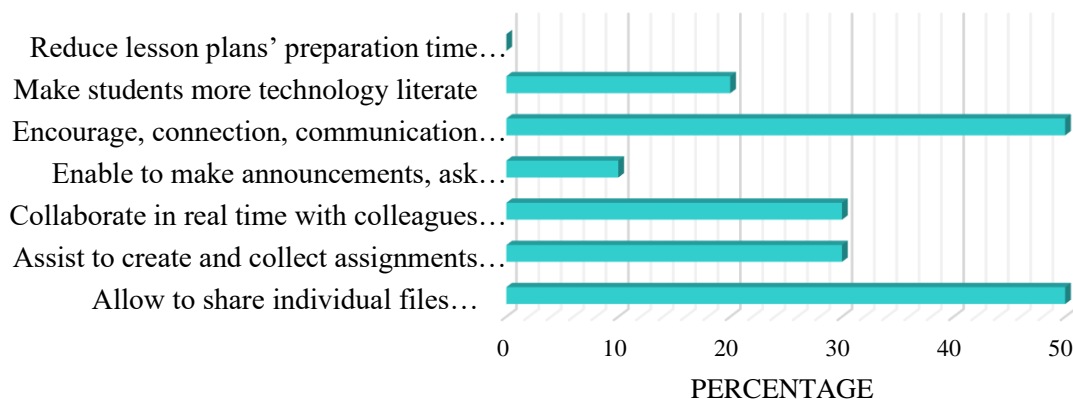


Figure 8: Reasons of using Google apps for teaching and working

According to the bar chart above, it revealed a range of reasons for applying Google apps for teaching and working. The main reason for 50% used for communication and connection through the application. Another uploaded files into Google drive and contributed them to students without flash drive which brought viruses to the computer. Apps also helped teachers build forms, quizzes and lesson plan paperlessly and they enabled to use them in real time cooperation with colleagues. Much more technology merged into the classroom increase awareness of the importance of deploying the technology. Students interacted with authentic use and encouraged technology savvy and literate (20%).

9. The expectation associate with technology integration

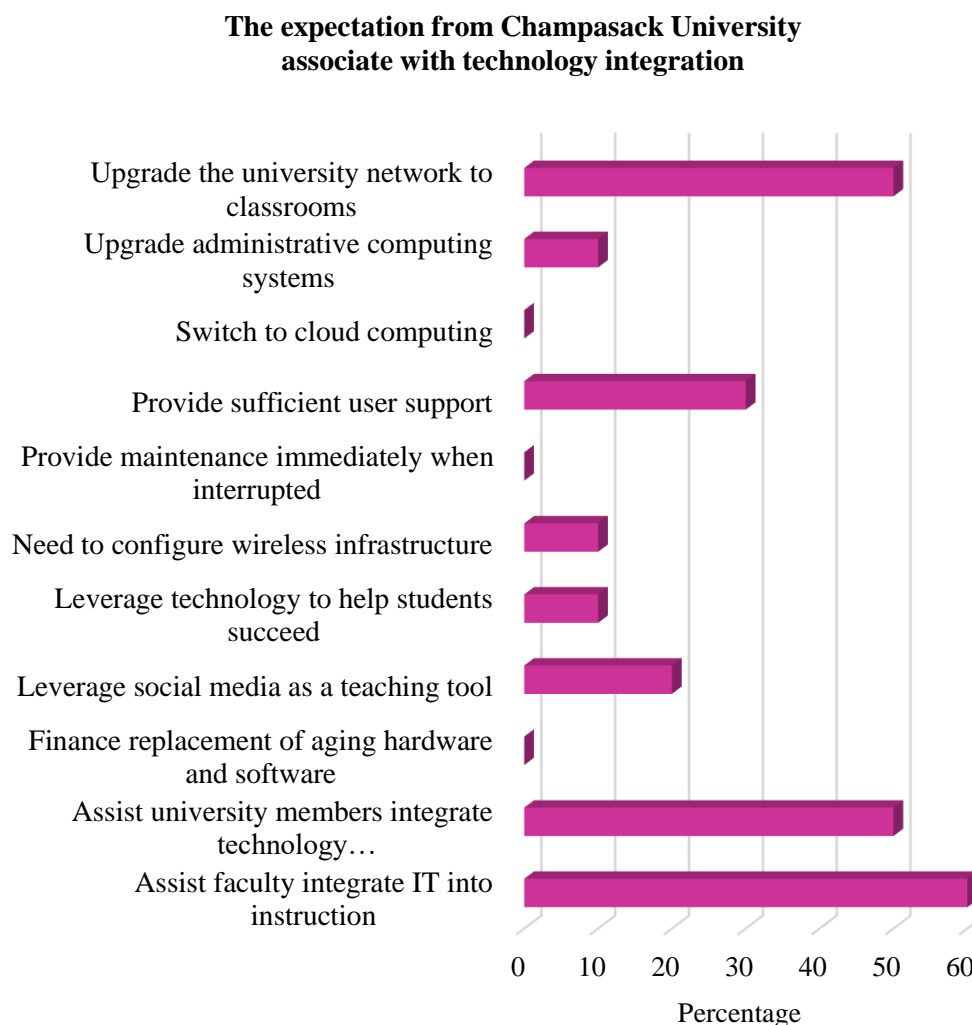


Figure 9: The expectation associate with technology integration

All teachers described the needs and reasons for technology integration above, and this section encompassed the expectation of CU teachers in using technology, internet, and Wi-Fi distribution. More than 50% of survey respondents expressed they needed experts integrated IT into the classroom and upgraded university network more efficiency and usability. They needed university to support technology use, improve and maintain Wi-Fi infrastructure when interrupted. 20% of them needed to incorporate social media into teaching. So, they required institute to upgrade university network, administrative computing systems, configure wireless infrastructure and leverage Wi-Fi distribution more access.

Discussion

According to the survey, participants stated that provide sufficient user support Wi-Fi distribution to faculties in Champasack University is slowly. Teachers are unable to integrate technology into their teaching because there is limited internet connection and teachers still lack of knowledge in applying technology. They also revealed the application of Google apps to facilitate learning-teaching process at CU is currently limited. This is due to a number of factors including low speed of internet, many lecturers still lack computer software skills, and the internet access is still limited as it is not available for students. They hope that CU should improve internet Wi-Fi faster and higher more than this because it will make students and teachers use it for their work in learning and teaching comfortably. Today, having the technology integration in learning and teaching is vital, and numbers of teacher using it in their work. Moreover, the provision of the internet is sometime inconvenient.

Conclusion

Technology integration needed to take account of consideration to increase learning and teaching outcomes. Technology as Google apps for education facilitated teachers organized their tasks, increased effectiveness in teaching and build a motivated learning environment. The frequency of using Google apps raised student technology literacy. Much more technology embedment facilitated learning and teaching performance.

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References

- [1] Baytak, A., Tarman, B., & Ayas, C. (2011). Experiencing technology integration in education: children's perceptions. *International Electronic Journal of Elementary Education*, 3(2), 139-151. <https://www.iejee.com/index.php/IEJEE/article/view/233>. Date accessed: 17 June 2018.
- [2] Bruce, B., & Levin, J. (2001). Roles for new technologies in language arts: Inquiry, communication, construction, and expression. In J. Jenson, J. Flood, D. Lapp, & J. Squire (Eds.), *The handbook for research on teaching the language arts*. NY: Macmillan.
- [3] Chapelle, C. (2003). *English language learning and technology: Lectures on applied linguistics in the age of information and communication technology*. London: John Benjamins Publishing.
- [4] Costley, K. C. (2014). *The positive effects of technology on teaching and student learning*. Arkansas Tech University.
- [5] Dockstader, J. "Teachers of the 21st century know the what, why, and how of technology integration." *T.H.E. Journal* 26(6) (1999): 73-74.
- [6] Dror, I. E. (2008). Technology enhanced learning: The good, the bad, and the ugly. *Pragmatics & Cognition*, 16(2), 215-223

- [7] Eady, M. J., & Lockyer, L. (2013). *Tools for learning: technology and teaching strategies: Learning to teach in the primary school*. Queensland University of Technology, Australia. pp. 71-89.
<https://scholars.uow.edu.au/display/publication76376>
- [8] Frigaard, A. (2002). *Does the computer lab improve student performance on vocabulary, grammar, and listening comprehension?* ERIC Document Reproduction Service No. ED476749 Timucin, M. (2006). Implementing CALL in the EFL context. *ELT Journal*, 60(3), 262-271. <https://doi.org/10.1093/elt/ccl006>
- [9] Gaudin, S. (2010, May). Google exec: Microsoft too far behind in cloud apps. *Computer*
- [10] Google. (2013). Discover a better way of learning: Free web-based email, calendar & documents for collaborative study anytime, anywhere. Retrieved from [http://www.google.com/enterprise/](http://www.google.com/enterprise/apps/education) apps/education
- [11] Hennessy, S., Ruthven, K., & Brindley, S. (2005). Teacher perspectives on integrating ICT into subject teaching: Commitment, constraints, caution, and change. *Journal of Curriculum Studies*, 37(2), 155-192.
- [12] Ionita M, Pastae V, & Stoica A. (2014). Benefits of Setting up Academic Portals on Google Apps. *Proceedings of the 10th International Scientific Conference eLearning and software for Education*, Romania, pp. 252-255.
- [13] Kaimuloa Bates, B. (2011). Using Google Apps in Professional Learning Communities. *Proceedings of the 16th Annual TCC Worldwide online conference*, Hawaii, USA.
- [14] Keser, H., Uzunboylu, H., & Ozdamli, F. (2012). The trends in technology supported collaborative learning studies in 21st century. *World Journal on Educational Technology*, 3(2), 103-119.
- [15] Kurt, S. (2010). Technology use in elementary education in Turkey: A case study. *New Horizons in Education*, 58(1), 65-76.
- [16] Murphy, K., DePasquale, R., & McNamara, E. (2003). Meaningful Connections: Using Technology in Primary Classrooms. *Young Children*, 58(6), 12-18. Retrieved June 17, 2018 from <https://www.learntechlib.org/p/101494/>.
- [17] Patel, C. (2013). Use of multimedia technology in teaching and learning communication skill: An analysis. *International Journal of Advancements in Research & Technology*, 2(7), 116-123.
- [18] Pourhosein Gilakjani, A. (2013). Factors contributing to teachers' use of computer technology in the classroom. *Universal Journal of Educational Research*, 1(3), 262-267.
- [19] Pourhossein Gilakjani, A. (2017). A review of the literature on the integration of technology into the learning and teaching of English language skills. *International Journal of English Linguistics*, 7(5), 95-106. doi: <https://doi.org/10.5539/ijel.v7n5p95>
- [20] Pourhossein Gilakjani, A., & Sabouri, N. B. (2014). Role of Iranian EFL teachers about using *Pronunciation Power* software in the instruction of English pronunciation. *English Language Teaching*, 7(1), 139-148. doi: <http://dx.doi.org/10.5539/elt.v7n1p139>
- [21] Raihan, M. A., & Lock, H. S. (2010). Technology integration for meaningful learning- the constructivist view. *Bangladesh Educational Journal*, 11(1), 17-37.

- [22] Rodinadze, S., & Zarbazoia, K. (2012). The advantages of information technology in teaching English language. *Frontiers of Language and Teaching*, 3, 271-275.
- [23] Sviridova, T., Sviridova, L., & Tymoshenko, B. (2011). Google Apps as solution of communication issues in educational process. Proceedings from IEEE 7th International Conference, 183–184.
- [24] Wolf, C. (2012). Privacy and data security in the cloud: What are the issues? *IP Litigator*, 18(6), 19–28.
- [25] Woodbridge, J.L. (2003). Technology integration as a teaching strategy. Doctoral dissertation. Walden University.

“ Online Teaching Model Develop ”Physical Geography History teacher Students at the Education of Savannakhet University Lao PDR in 2016-2017

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Abstract

This research is an experimental research about “**Online Teaching Model Develop**” for History teacher student 4th years at the Faculty of Education, Savannakhet University in 2016-2017. There are objective such as: 1) To Develop an online teaching model; To Evaluate for learn by yourself from social media and 3) To Study the satisfaction for learn by yourself to online. The target population used in research is History teacher student 4th year for 37 people. That has from the specific randomness only one classroom. Research Tools there are 4 such as: lesson plan, finished video lesson, test and interview. The research process to do that research team had design lesson plan to be finished video lesson in the physical geography follow course syllabus of class. After that, Research team posted Facebook group after that research team notify to the target population into look at the teaching videos in Facebook group after that give students prepare present to be group in the classroom for discuss.

Research results found: 1) Result of learn from teaching by social media found that: there are 5 lessons plan has mean (\bar{X}) more than 7 scores criterion that set up in hypothesis as: lesson plan 2; 3; 4; 5 & 6. But lesson plan 1 is not pass 7 scores criterion which mean (\bar{X}) is 6.59. The caused by students are not understand and never with online teaching therefore student's test do not pass the criterion. But 6 plans found that online teaching model development is cause to student learning at a good level by consistent with research objective and hypothesis. 2) Result of learn for Post-test after social medial are more than Pre-test which there are mean (\bar{X}) of Post-test is 44.27, S.D. is 4.04 and Statistical significance (Sig) is 0.01. It is show that teaching by social media is cause with learner that consistent with research objective and hypothesis. 3) Study the student's Satisfaction from teaching by social media (Facebook group) research team had synthesize opinion of Post-test from sample there are 12 people that able conclusion as: Have a new teaching method that it makes learn innovation to learner, makes teaching had more interesting, make learner more understanding, makes study is easy, want to bring this teaching to teach with students in next term. Another view, students think that want not noise in videos of teaching, explain slowly, improve picture of teaching media to clear, cut time of teaching videos to short, should posted the teaching videos at least before 3 days, posted a video per time and should posted new a content to always.

Introduction

Teaching-Learning process is an important for everyone that knowledge transfer process from a person to another, from who that has knowledge to who don't know that called theses is: “Teaching”. Teacher's teaching of subjects especially geography almost away is Lecture more than another methods in the past and Lack of instructional media to be science. This method will makes learner has least a participant, makes learner lack interesting, lack classroom atmosphere and information is limited. If repair with in the present into technological process cause human's activities to change especially computer development such as internet

network system the longer the day will more develop. Socialization in the globalization is constantly with usage modern teaching aid and new media by general people call that “Social Media” (refer from: Cabinet and Royal Gazette Publishing Office; 2550). Instructional Activities like this able cause teaching has a good performance. So it is necessary technology, communication and educational technology to apply with teaching-learning.

When to 21st century the Online Media is an innovation by has developed from cable connection system by internet signal that is connect between a material to another materials. Social are interesting with usage application as social media such as: Facebook, LINE, We chat, What Sapp... Since children to adults almost have mobile phone to be own and able apply applications by own. If talk about academic found that this age teachers can bring teaching method by bring internet to help the teaching-learning that called that “E-Learning”. The instruction activities making by E-learning system has research result support that: it cans replace the old teaching by performance and successful with learning high level (refer from: Tanath ATSINARTH, 2548; Siliphonethip SOUNGNERN, 2547). For the Geography teacher subject is a science that there are important and necessary about new methods for suitable with new generation and according to technology development. This is because to take technological advances to apply with academic more. Learning by electronic media and internet called “Electronic Learning: e-Learning” (Monxay THIENTHONG, 2547: 3-11) in the present especially usage the e-learning system to apply teaching-learning and training.

Social Media is role with the instruction activities making it makes teacher has easy more, can explain and help the information presentation is better. Students in the Junior-Senior High School are learning about social media (Online media), interesting and use Facebook constantly by mobile phone playing. Facebook is learning center, it is famous constantly that makes the institutions bring Facebook to apply to be the learning center. From found “Facebook for Education” at the Google there are around 922 millions and from found “Learning Center on Facebook” at the Google there are around 173 millions for information. Otherwise, Facebook become media is famous for teachers in the Junior High School -Senior High School more than 2,000 places (reform: Pearson, 2554: edudemic.com).

So, research team is interested that want to develop the Teaching-Learning process by apply social media to be “Facebook” in topic is “Online Teaching Model Develop” in “Physical Geography” History teacher student 4th years, Faculty of Education, Savannakhet University in 2016-2017 for: 1) To Develop an online teaching model; To Evaluate for learn by yourself from social media and 3) To Study the satisfaction for learn by yourself to online.

Objectives

- 1) To Development an online teaching model.
- 2) To Evaluate for learn by yourself from social media.
- 3) To Study the satisfaction for learn by yourself to online.

Literature Reviews and Research Frameworks

Teaching and Learning by used the Social Media on Network has been used in the education from the students’ statistic in local of American (National School Board Association, 2010) get survey students aged 9-17 found that 96% of students using show in the internet (reform: The research of Ornanong KOSITPIPAT, Ph.D, 2016) that found that: score of Post-test more than score of Pre-test and Students’ Satisfaction are high level.

In the present people live by Social Media for tell activities such as: write a story, share experience, article, picture and videos that user write by yourself or maybe found from medias to bring on Social Network by Mobile phone to internet (Khanokchaisakul, 2010; Budrad, 2010).

From the research about “The Development of Learning and Teaching Activities Through Online Social Networking to Promote Creative Using for Students in Tertiary Level” (Eknarin BANGTHAMAI, Asst Prof, 2017) found that: types of Social Media that affects use of internet

to creative is: lecture slides on the web, web board, Books and electronic book, after the learning on Social Networking more than pre-learning.

From the research “Student response to Online Course Materials” in Graduate Study Student (Mattew and Gita, 2001) found: learners almost always has experience and well feeling using internet and after studying from Online Lesson.

The research about “Development of Learning and Teaching by social Network”, Bansomdejchaopraya Rajabhat University found: comparing the achievement scores between the experimental group and control group revealed that the morality achievement scores and the knowledge achievement scores were not statistically significant and the cognitive achievement scores were statistically that for the suggestion of student is most of the experimental group (17 people) did not give suggestion, followed by 7 students who would like to have the lesson in a model of video w.w.w.youtube.com, and 6 students suggested that every course should the develop the instruction on the internet (Sing SINKHAJORN, Asst Prof, 2014).

Methodology

1. Participants

The participants are including target population of this research is History teacher student in 4th years there are 37 people, Faculty of education, Savannakhet University, education year in 2016-2017. Lao PDR. The subject used in research is “Physical Geography” by the videos lesson of teaching posted on the “Facebook Group”.



Figure 1: Sample and face of Facebook group

2. Research Instruments

The research instrument that there are 5 things as below:

- ① Lecture Lesson plan (there are 6 plans)
- ② Lesson plan Videos there are 29 videos (Unit 1 – 6)
- ③ Pre-Test and Post-Test (Pre-test and Post-test to be test the same)
There are 60 questions that we called that “Total test”.
- ④ There are 6 Subtest (analyze from the Total test).
- ⑤ The Satisfaction Interview about Teaching-Learning to social media on Facebook group.
 - Remark: Lesson plans Videos in “Physical Geography”

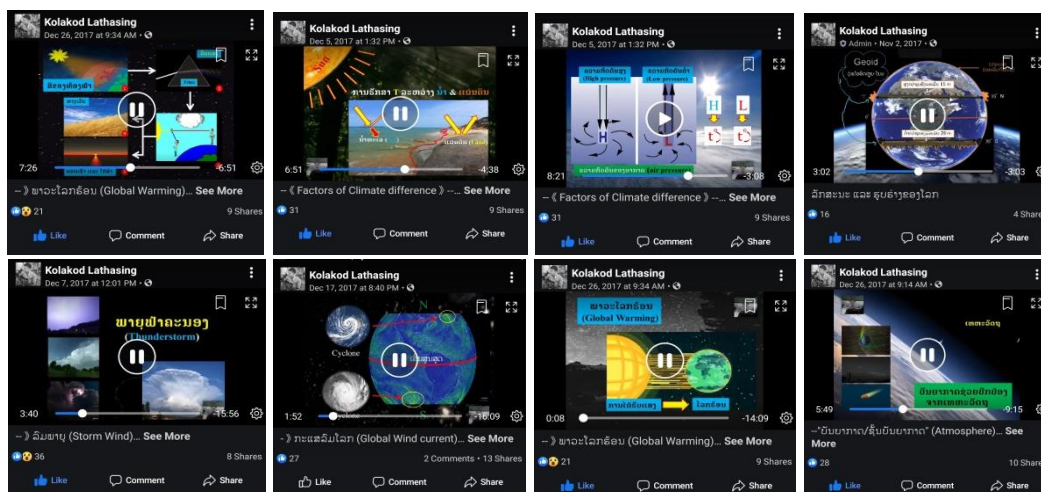


Figure 2: Videos of teaching in the Facebook group

3. Data Collection and Analysis

This research is an Experimental research, so it there are 2 types of data also such as: Quantitative and Quality data. As detail more below:

1) Data Collection:

- Step 1: Bring the “Total test” to test with Students to be Participants as called that “Pre-test” there are 60 questions.



Figure 3: Pre-test (Total Test = 60 questions)

- Step 2: Tell target population to watch the Lesson plan videos to post on the Classroom’s Facebook groups. After next day, research team divide students to be 5 groups by give groups a topic for discuss together and present for conclusion.



Figure 4: discuss together and present for conclusion from the Videos of Teaching

While, Research team teach a lesson plan to finish. Next, bring the subtests for Post-test a lesson plan with the target population that a lesson plan there are 10 questions per subtest (there are 6 subtests).



Figure 5: subtest (6 times)

- Step 3: When, research team teach a lesson plan to finish. Next, Research team bring the Pre-test (Total test) is old test that ever test in the “Step 1” for return with target population again called that “Post-test”.



Figure 6: Post-test (by bring the “Total Test” test a gain)

- Remark: Step: 1; 2 & 3 (Quantitative Data Collection) that data is score:
 - ① Score 1: from Pre-test and Post-test by “Total test” (the same test: Pre & Post).
 - ② Score 2: from Post-test a lesson plan by “subtests” (there are 6 subtests).
- Step 4: Researcher gives the sample groups for comment use the Satisfaction Interview of teaching to social media on Facebook group about “Physical Geography”.
 - Remark: Step 4: To be Quality data.

2) Analysis:

Data analysis there are 2 statistics for use schuss as: Dependent Sample t-test and On sample-test as analyze below:

① From Step 1 & 3: We have data to be score of Pre-test and Post-test. From 60 questions equal 60 score became 10 score for use with this research. When key these data enter the SPSS program by using statistics “Dependent Sample t-test”. For test and response with the research objective by find such: mean (\bar{X}) of Pre-test and Post-test, Statistical significance (Sig) and Standard Deviation (SD) also.

② From Step 2: research team divide of post-test score for a lesson plan (6 subtests). A subtest there are 10 questions equal 10 scores. When key these data enter the SPSS program by use statistics “One Sample t-test” mean (\bar{X}) of Pre-test and Post-test, Statistical significance (Sig) and Standard Deviation (SD) also.

③ From Step 4: Researcher get participants show the opinion with Online Teaching to Facebook by using Interview.

Results

Table 1: Post-test of Lesson plan 1 for compare with criteria by more than 7 scores
(Topic of teaching: The Earth and planets in the solar system)

Method	Amount	Mean	S.D	t	Sig
Result	37	6.59	0.89	-2.751	0.009
Criteria	-	7	-		

From Table 1 found that: data analysis result use one sample t-test do not passed the criteria. It is 6.59 of mean (\bar{X}) lower 7 score, S.D is 0.89 and it is not Sig. It is cause from student has least teaching understand and don’t ever test to online like, this and video of teaching is not clear and sound is not clear.

Table 2: Post-test of Lesson plan 2 for compare with criteria by more than 7 scores
(Topic of teaching: The Earth and Earth’s rotation)

Method	Amount	Mean	S.D	t	Sig
Result	37	7.45	1.28	2.180	0.036
Criteria	-	7	-		

From table 2 found that: student gets more understand with Online Teaching by “Facebook group” that cause research result can pass criteria 7 scores. It is 7.45 of mean (\bar{X}), S.D is 1.28 and it has Significance is 0.05.

Table 3: Post-test of Lesson plan 3 for compare with criteria by more than 7 scores
(Topic of teaching: The moon)

Method	Amount	Mean	S.D	T	Sig
Result	37	8.08	1.72	2.180	0.036
Criteria	-	7	-		

Table 4: Post-test of Lesson plan 4 for compare with criteria by more than 7 scores
(Topic of teaching: Geological construction and topography construction)

Method	Amount	Mean	S.D	T	Sig
Result	37	8.10	1.07	6.273	0.000
Criteria	-	7	-		

From table 4 found that: that test “t” by One Sample t-test it shows that: students get more understand with Online Teaching by Facebook group. Post-test more than criteria 7 scores, it is 8.10 of mean (\bar{X}), S.D is 1.07 and it has Significance is 0.01.

Table 5: Post-test of Lesson plan 5 for compare with criteria by more than 7 scores
(Topic of teaching: Climate)

Method	Amount	Mean	S.D	T	Sig
Result	37	7.64	0.88	4.440	0.000
Criteria	-	7	-		

From table 5: test “t” by one sample t-test found that student get more understand with online teaching on Facebook. Post-test score more than pre-test score it is 8.08 of mean (\bar{X}), S.D is 7.64 and it has Significance is 0.01.

Table 6: Post-test of Lesson plan 6 for compare with criteria by more than 7 scores
(Topic of teaching: Natural resource of world)

Method	Amount	Mean	S.D	T	Sig
Result	37	7.43	1.16	4.440	0.000
Criteria	-	-	-		

From table 6: test “t” by one sample t-test found that student get more understand with online teaching on Facebook. Post-test score more than pre-test score it is 7.43 of mean (\bar{X}), S.D is 7.64 and it has Significance is 0.01.

Table 7: Frequency of pre-test and post-test (total 6 lesson plan)

Pre-test (40 scores)			Post-test (40 scores)		
Score	Frequency	Percentage	Score	Frequency	Percentage
14	1	2.70	36	2	5.40
18	1	2.70	38	1	2.70
20	2	5.40	39	3	8.10
21	1	2.70	40	2	5.40
22	1	2.70	41	1	2.70

Pre-test (40 scores)			Post-test (40 scores)		
Score	Frequency	Percentage	Score	Frequency	Percentage
14	1	2.70	36	2	5.40
18	1	2.70	38	1	2.70
20	2	5.40	39	3	8.10
21	1	2.70	40	2	5.40
23	2	5.40	42	2	5.40
24	6	16.20	43	4	10.80
25	7	18.90	44	3	8.10
26	3	8.10	45	3	8.10
27	7	18.90	46	5	13.50
28	1	2.70	47	2	5.40
29	3	8.10	48	4	10.80
30	1	2.70	49	1	2.70
35	1	2.70	50	2	5.40
			51	2	5.40
Total	37	100.00	Total	37	100.00

From table 7 found that: post-test score more than pre-test score, show online teaching by “Facebook group” is influence with the learning of students.

Table 8: Result of pre-test and post-test by using dependent sample t-test

Method	Amount	Mean	S.D	t	Sig
Pre-test	37	25.05	3.62	32.90	0.00
Post-test	37	44.27	4.04		

From table 8 found that: post-test score more than pre-test score which mean of pre-test is 25.05, but post-test is 44.27 by Statistical significance is 0.01.

Table 10: Interview result for satisfaction with teaching to social media by “Facebook group”

Number	Opinion of student	Reason to opinion
I	Question1	
	How do you opinion about online Learning-teaching by Facebook group?	
1	The learner are comfortable	Information can be viewed on demand There is no limit to the place for learning Mobile search available Watch the back video Save time
2	Learner understand much easier than regular teaching	While the illustrations are animated with descriptions

		Explain clearly
3	An interesting teaching method	It is modern
4	Not as interested as teaching in the classroom	Can't ask when not understood
II	Question 2	
What do students get from this method of teaching?		
1	Get a new way of teaching	Easy to understand, easy to understand and not complicated. The data can be accessed several times Save time Modern, agility
2	Get a new knowledge on the content	Content that is interesting and not complicated
3	Make researching student lesson easier	Easy to understand, Easy to remember and not complicated The lesson can be accessed several times Save time Modern, agility
4	Get students to understand the lesson more	The lesson can be accessed several times Save time Easy to remember and not complicated Save time Modern, agility
III	Question 3	
	What would the students want to suggest in this way?	
1	Do not want the noise to be disturbed and increase the volume of the sound for further explanation	When listening the explanation is not clear
2	Speak slowly	Sometimes not heard yet and picture is not clear
3	Cut videos length down, Video should be posted before 3 days and one video should be posted	If the videos is too long, you may not want to watch it If the video is posted a lot, it will distract the learner.

4	Would like to be update the information	To always learn something new
5	Would like to teach this method to next generation of students	Because the teaching is interesting and easy to understand

From table 10 can be summarized the advantages and disadvantages of teaching on Social Media as below:

❖ **Advantage:**

① The learner are comfortable because: this method can be watched the “Teaching Videos” on Facebook group as needs, no place for learning, can search for information from their mobile phones and watch Teach Videos on the back

② Learners understand much easier than regular teaching because: while the lesson is presented, the animation is accompanied by a lecture that is interesting and help the teacher explain more clearly.

③ An interesting teaching method because: it is a modern.

④ Get a new way of teaching because: Easy to understand, easy to understand and not complicated, the data can be accessed several times, save time, modern and agility.

⑤ Get a new knowledge on the content because: Content that is interesting and not complicated.

⑥ Get students to understand the lesson more because: The lesson can be accessed several times, save time, easy to remember and not complicated, save time, modern and agility.

⑦ Would like to teach this method to next generation of students because: the teaching is interesting and easy to understand.

❖ **Disadvantage:**

① Not as interested as teaching in the classroom because: can’t ask when not understood.

② Do not want the noise to be disturbed and increase the volume of the sound for further explanation because: when listen the explanation is not clear.

③ Speak slowly because: Sometimes not heard yet and picture is not clear.

④ Cut videos length down, Video should be posted before 3 days and one video should be posted because: If the videos are too long, you may not want to watch it and If the video is posted a lot, it will distract the learner.

⑤ Would like to be updates the information because: To always learn something new.

Conclusions and Future work

Research results found: 1) Result of learn from teaching by social media found that: there are 5 lessons plan has mean (\bar{X}) more than 7 scores criterion that set up in hypothesis as: lesson plan 2; 3; 4; 5 & 6. But lesson plan 1 is not pass 7 scores criterion which mean (\bar{X}) is 6.59. The caused by students are not understand and never with online teaching therefore student’s test do not pass the criterion. But 6 plans found that online teaching model development is cause to student learning at a good level by consistent with research objective and hypothesis. 2) Result of learn for Post-test after social medial are more than Pre-test which there are mean (\bar{X}) of Post-test is 44.27, S.D. is 4.04 and Statistical significance (Sig) is 0.01. It is show that teaching by social media is cause with learner that consistent with research objective and hypothesis. 3) Study the student’s satisfaction from teaching by social media (Facebook group) research team had synthesize opinion of Post-test from sample there are 12

people that able conclusion as: Have a new teaching method that it makes learn innovation to learner, makes teaching had more interesting, make learner more understanding, makes study is easy, want to bring this teaching to teach with students in next term. Another view, students think that want not noise in videos of teaching, explain slowly, improve picture of teaching media to clear, cut time of teaching videos to short, should posted the teaching videos at least before 3 days, posted a video per time and should posted new a content to always.

Acknowledgements

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References

- Ekarnin BANGTHAMAI, Asst Prof. (2017). The Development of Learning and Teaching Activities through Online Social Networking to Promote Creative Using for Students in Tertiary Level. Faculty of Education, Silpakorn University; p. 95, 98
- Kachen KONGPILA, Ph.D. (2014). Development Instructional Model Using Social Networking of Fangwittayayon School. Graduate School Khon Kean University; P: 1 & 2.
- Oranong KOSITPIIT, Ph.D. (2016) A Comparison of teaching through Social Media and Community Media Communication Arts Students Enrolled Subjects Public Opinion, p .1 & 10.
- Paitoon PLONGSANIT, (2004, abstract) Comparison study of learning achievement on the basic theory of operational amplifier through E-Learning instruction and normal classroom.
- Phenphanor PHAUNGPHAE, (2016) A Study of behavior for using of Social Media of Presevice Teachers, Faculty of Education, Silapakorn University, p: 1, 4, 5, 11, 12.
- Panuwat KONGRACH (2011, abstract) The Study of Teenager's Behavior in Using Social Networking Sites (SNSs) in Thailand: A case Study of Facebook
- Panicha NITIPORN MONGKHON (2011, abstract) A Study the Attitude of Using and satisfaction of Social Media: A Case of Dhurakij Pundit University; P. 1, 4, 10.
- Sing SINKHAJORN. Asst Prof, (2014). Development of Learning and Teaching by social Network. Bansomdejchaopraya Rajabhat University; P: 1, 4 & 16.
- Surasak SINPRAKORB, (2007; abstract). Development of A problem-Based Learning Model on Social Media in Cooperation With Searching Teaching Techniques to Enhance Critical Thinking Ability of Undergraduate Students. CUIR at Chulalongkorn University.
- Wipas VIGROMSAKUNWONG, (2017). Development of An online lesson Using Social Media Network Based on the Constructionism Theory For Computer Education And Training Subject For Undergraduate students) Rajamangala University of Technology Thanyaburi; P. 4, 10, 14, 15, 16, 27.

A Comparative Teaching Experiments and Teaching Lecture in the Case of Electrical Circuit Phonsavanh Secondary School Savannakhet Province

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Abstract

This study report is a comparative study regarding teaching experimental and teaching lecture about electrical circuits. A total of 60 students (30 experiments and 30 demonstration) at Phonsavanh secondary school were participated in this study. The researchers conducted an experiment to compare 2 class: teaching experimental and teaching lecture about electrical circuits between pre-test and posttest. To measure their conceptual understanding, 20 multiple-choice items have been used, and then analyze the obtained data by using descriptive statistics, i.e. arithmetic mean, standard deviation, frequency, percentage, and inferential statistics such as Independent Sample t-test. The results show that their conceptual understanding of electrical circuits mean score on posttest was significantly higher than the pre-test at the .05 level. Which means that the results of the posttest in the classroom between teaching experimental and teaching lecture are different from the actual teaching that the students' classroom is enthusiastic about Learning because of teaching experimental.

Keywords: *teaching experimental, teaching lecture, electrical circuits.*

Introduction

In the context of Lao PDR country, it is significant to use innovative learning technology for science teaching and learning, such as computer simulations. However, science teachers in Lao PDR appear to rarely use computer simulation in their classes of elementary schools, colleges and universities, even it adds several educational values to science learning activities. In fact, science teaching in Lao PDR seems to focus on content represented on textbooks and by teachers rather than student-centered learning approach and learning science as way of knowing. In terms of science teaching, most of science teacher in Lao PDR teach science subject in class by emphasizing mathematical equations for explaining physical phenomena and lecturing theoretical science without situational and authentic contexts. Experiments play a dominant role in physics and in our attempt to understand the processes of physical phenomena in our world (Psillos and Niedderer, 2002) Studies have shown that school experiments enhance knowledge acquisition to a greater extent than chalk and blackboard teaching. Teaching strategies incorporating experiments are considered the most important educational tools in the science classroom, especially for teaching difficult or abstract concepts (Hofstein and Lunetta, 2004) Their aim is to link theory with practice, and especially help students acquire experimental skills, and expose them to scientific thinking and their consequent cognitive development. Experiments can be real or virtual. The learning benefits can be even greater, when an experiment is designed carefully and learners cooperate with one another (Berry and Etkina, 2002). In this research comparative study regarding teaching experimental and teaching lecture about electrical circuits.

Objectives

Examining comparative study regarding teaching experimental and teaching lecture about electrical circuits (Pretest and Posttest).

Literature Reviews

Teaching experiments are a special type of design studies. Generally speaking, a teaching experiment consists of a sequence of teaching episodes in which the participants are usually a researcher-teacher, one or more students and a researcher-observer (Steffe and Thompson, 2000). The time of duration can be variable (e.g. hours, an academic year). The atmosphere to observe can be from small room-laboratory for interviews, to complete classes or even bigger learning settings.

The main characteristic of these studies is the rupture of the differentiation between teachers and researchers, due to the researchers' interest of experiencing students' learning and reasoning in first person. Researchers become an integral part of the system they are studying by interacting with it. This leads to complex interactions that break the habitual distinction between researchers, teachers and students.

Unlike classroom-based research, in teaching experiments one of the researchers takes the role of the teacher unless the official teacher becomes completely involved in the research process. In addition, in the in-class interventions, the research objectives are valued over what may be better for the students (Kelly and Lesh, 2000; Steffe and Thompson, 2000).

Methodology

4. Participants

The participants in this study were 60 students (30 experiments and 30 demonstration) at Phonsavanh secondary school were participated in the first semester of academic year 2018.

5. Research Instruments

The researchers aim to explore current status of teachers conceptual understanding of Electrical circuit. As such, the researchers used 20 of multiple-choice items to measure science conceptual understanding of Electrical circuit. The teaching process in the study was comprised of four main topics and a total of four experiments related to these topics. The topics experiments and demonstration were the following Table 1.

Table 1

Teaching Experiment (8 hour)	Teaching lecture (8 hour)
1) Experiments on Ohm's Law DC Circuit. 2) Study the electrical circuit connection of direct current. 3) Electric current and electric potential of resistance against serial and parallel. 4) Study the electric potential difference on both ends of the power source.	1) Electric current 2) Ohm's Law 3) Electric resistance 4) Connecting electrical resistance into categories

6. Data Collection and Analysis

In order to explore the conceptual understanding of Electrical circuit, they were administered the 20 multiple-choice conceptual understanding pre-tests for 60 minute and posttest for 60 minutes (experiments and demonstration). For the multiple-choice test, each item was scored by 1 point and total score was 20 points. The responses of students were calculated

by frequency and percentage of the complete score and calculated by Independent Sample t-test.

Results

The results comparative study regarding teaching experimental and teaching lecture about electrical circuits.

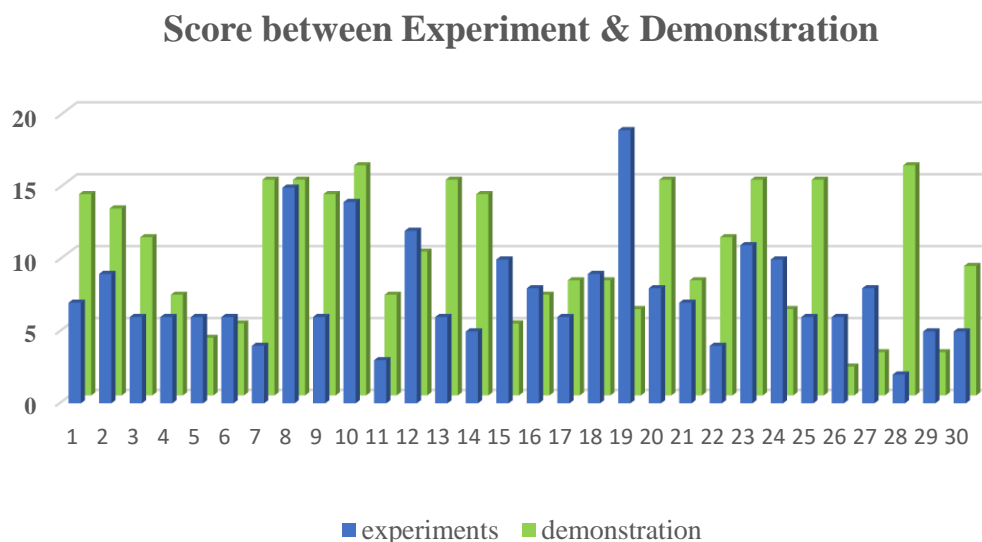


Figure 1. Student's conceptual understanding scores of electrical circuits

Figure 1. Shows the comparison of the results of teaching lecture and teaching experimental, the results of the Experiment teaching indicate a higher academic achievement compared to the Teaching lecture.

1. Comparison of pre-test and posttest levels that were taught in Experimental form secondary class 6/1

The mean scores, standard deviation values of the students on the pretest and post-test applications implemented to determine their conceptual understanding towards electrical circuit are given in Table 2.

Table 2

Testing	N	Score	\bar{X}	S.D.	t	Sig
Pre-test	30	20	4.70	2.05	-5.658	0.00
Posttest	30	20	9.90	4.55		

In this study, which implemented two different teaching strategies, the Independent sample t-test was used to determine whether there was a significant difference by the Experiment teaching of the secondary students toward Science in the pre-test and post-tests. It was found that mean score on posttest was significantly higher than the pre-test at the .01 level.

2. Comparison of pre-test and posttest levels that were taught in Lecture form secondary class 6/2

The mean scores, standard deviation values of the students on the pretest and post-test applications implemented to determine their conceptual understanding towards electrical circuit are given in Table 3.

Table 3

Testing	N	Score	\bar{X}	S.D.	t	Sig
Pre-test	30	20	5.07	2.61	-3.087	0.004
Posttest	30	20	7.63	3.69		

In this study, which implemented two different teaching strategies, the Independent sample t-test was used to determine whether there was a significant difference by the Teaching lecture of the secondary students toward Science in the pre-test and post-tests. It was found that mean score on posttest was significantly higher than the pre-test at the .01 level.

3. Comparison of results Pretest that were taught between Lecture class and Experimental class

Comparison of pre-test levels that were between Teaching experimental form secondary class 6/1 and Teaching lecture form secondary class 6/2 toward Electrical Circuit are given in Table 4.

Table 4

Testing	N	Score	\bar{X}	S.D.	t	Sig
Experimental	30	20	4.70	2.05	-0.604	0.882
Demonstration	30	20	5.07	2.61		

In this study: the results of the teaching and learning of physics subjects on electrical circuits of two class in teaching experimental and teaching lecture. will see that the room with a high score is an teaching experimental with an average total value ($\bar{X} = 4.70$; $S.D. = 2.05$) and teaching lecture with an average total value ($\bar{X} = 5.07$; $S.D. = 2.61$). From the hypothesis testing, it was found that the $Sig > 0.05$ value was not significantly different from the significance of 0.05, which means that the pre-test results of the experiments teaching, and teaching lecture had not different learning outcomes.

4. Comparison of results Posttest that were taught between Lecture class and Experimental class

Comparison of posttest levels that were between Teaching experimental form secondary class 6/1 and Teaching lecture form secondary class 6/2 toward Electrical Circuit are given in Table 5.

Table 5.

Testing	N	Score	\bar{X}	S.D.	t	Sig
Experimental	30	20	9.90	4.55	2.119	0.028

Demonstration	30	20	7.63	3.69
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the results of the teaching and learning of physics subjects on electrical circuits of two class in teaching experimental and teaching lecture. will see that the room with a high score is an teaching experimental with an average total value ($\bar{X} = 9.90$; $S.D. = 4.55$) and teaching lecture with an average total value ($\bar{X} = 7.63$; $S.D. = 3.69$). From the hypothesis testing, it was found that the $\text{Sig} < 0.05$ value was significantly different from the significance of 0.05, which means that the posttest results of the experiments teaching, and teaching lecture had different learning outcomes. From the actual teaching, it was found that the labs were more enthusiastic to learn because in the laboratory there were virtual teaching materials and students experimented with the tools used and were able to understand the lessons faster.

Conclusions

This study is a comparative study regarding teaching experimental and teaching lecture about electrical circuits. The results suggested that student held many understanding scientific conceptions on electric circuit, current law in series and parallel circuit, voltage law in series and parallel circuit, and Ohm's law, from the actual teaching, it was found that the labs were more enthusiastic to learn because in the laboratory there were virtual teaching materials and students experimented with the tools used and were able to understand the lessons faster. Using inquiry-based supporting material and presenting these by employing different strategies in this study not only enriched the learning environment but also provided students with a better configuration of the scientific knowledge in their minds through inquiry. Since the experimental methods and the inquiry conducted in this study were consistent with the nature of science itself, students were able to develop an attitude and awareness that helped them to understand science and look positively at natural phenomena. At the same time, because the experiments were chosen from everyday life experience, the students were able to participate actively in the thought and inquiry process and the entertaining content stimulated their motivation. There is also advantage in increasing the alternatives in terms of teaching tools and providing teachers with more effective strategies and methods to choose from in the different stages of their professional development. All of this will not only provide incentive for inquiry-based teaching but will also expand upon the framework of conducting effective education and instruction.

Acknowledgements

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Reference

- Kelly, A. E. & Lesh, R. A. (2000). *Handbook of research design in mathematics and science education*. New Jersey: Lawrence Erlbaum Associates.
- D. Psillos and H. Niedderer, "Issues and Questions Regarding the Effectiveness of Labwork", in *Teaching and Learning in the Science Laboratory*, D. Psillos and H. Niedderer, Eds. Dordrecht: Kluwer, 2002, pp. 21-30.
- A. Hofstein and V.N. Lunetta, "The laboratory in science education: Foundations for the Twenty-First Century", *Science Education*, vol. 88(1), pp. 28-54, 2004.
- A. Berry, R. Gunstone, J. Lougharan, and P. Mulhall, "Using laboratory work to teach about the practice of science", *Research in Science Education –Past, Present and Future*, Part 6, pp. 313-318, 2002.
- E.Etkina, A.V. Heuvelen, D.T. Brookes, and D. Mills, "Role of experiment in physics instruction-a process approach", *The Physics Teacher*, vol. 40, pp. 351-355, 2002.
- Steffe, L. & Thompson, P. W. (2000). *Teaching experiment methodology: underlying principles and essential elements*. In A. E. Kelly & R. A. Lesh (Eds.), *Handbook of*

research design in mathematics and science education (pp. 267-306). Mahwah, NJ: Lawrence Erlbaum.

Multicultural Education for Pre-Service Teachers

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Abstract

This article examines the dimensions of the study of multicultural education that recognizes the inequalities in education in a society with diversity. The objective to develop a model for teachers, in accordance with the multicultural and experimental study of the development of a multicultural classroom. Using qualitative research in education a multiple case study. By means of field research, observation, interviews, focus groups and action research. How activities outside the classroom, workshops, and follow-up on findings from field data. The specific target students, teachers, trainers in the multicultural school. Chiang Mai, Thailand. A total of 4 people. By pre-service teachers' workshop on organizing an event outside the classroom, all the time is 6 months. To learn about multicultural education. On the issue of diversity in multicultural classrooms. On the issue of diversity in multicultural classrooms. By using the concept of multicultural education Christine E. Sleeter and Carl A. Grant. Said the study in a multicultural society should not focus on changing the course content or the social environment in schools than to cater to the students. To help students with cultural differences in educational success. The study found that pre-service teachers are sensitive to visible differences of students in multicultural classrooms listening to the voice of all students with awareness and understanding. The background story of the ethnic, linguistic, cultural students. Affect behavior, learning, and expression of students in the classroom is very multicultural. As a result, pre-service teachers, experienced teachers must be sensitive to the environment in the design of teaching and learning. Equally to education in multicultural classrooms. As well as the measurement and evaluation of a diverse multicultural classroom. So, this concept not only supports the importance of multicultural education in schools. But the awareness that education is one of the foundations of a multicultural school building as a community of learning to provide stability.

Keywords: Multicultural education, Pre - service teachers, Multicultural classrooms

Introduction

This study studied the issue of multicultural education that realized the non-equivalent in the management of social studies with a wide variety of differences. The objective is to develop a teacher professional experience model in line with multicultural education and develop teachers into multicultural classrooms. Multicultural education are considered to be a study that aims to accept a wide range of differences in classrooms based on acceptance of the rights of freedom and individual duties.

The management of a multicultural approach to the Cortes (1996, p.1) said that a multicultural education refers to the process that the teacher has helped prepare those involved in the management of education with the cultural nuances of understanding. Together, we see the real benefits of relying on a class of dependence. Therefore, students experience teachers '

professional experiences, so it is important to rely on the concept of a multicultural study. To be able to manage the classes that correspond to the actual needs of learners and communities with varying qualities.

Methodology

The study uses qualitative research in a multicast study, using the method of conducting activities outside the classroom with students, training, teacher professions, and track research results from field data. By selecting a specific audience, you are trained in professional experience. Teachers taught in the multicultural school of Chiang Mai, Thailand, a total of 4 people with practical activities outside the classroom for a total of 6 months, 10 workshops, for students to practice their professional experience learning about multicultural education. In a wide range of differences in multicultural classrooms using the extensive cultural concept of Christine E. and Carl A. Grant (1987) that said studies in multicultural societies should not emphasize the modification of course content or conditions. The social environment in school (content-oriented programs) is more than emphasizing learners (student-oriented programs) to help students with cultural differences successfully in education.

Results and Discussion

The study showed that students practiced the teacher's professional experience in learning to organize their studies in multicultural classrooms and treated ethnic students with a positive attitude. The students practiced the teacher's professional experience, seeking to learn how to live together in diversity. Creative activities are held to open the area of exchange, learning with students of multicultural classrooms. Students are trained in professional teachers who have listened to every student's voice with awareness and understanding. However, the background story of the ethnic students, language cultures, also affects the learning behavior and expression of students in a multicultural classroom. This study Sodchuen Daungkumnoi education work (2554), which found that teachers understand and know the potential the student's special ability is a contribution to the student assistance system, resulting in a beneficial contribution to the learning activities. Teachers 'teaching is more efficient and the study of Amonwich Nakornthap (2007:1) say that making children learn the diversity and splendor of diversity, as well as teaching the children to be respected in humanity, there is a significant difference in the initiation of cultural learning that aims to induce love, understanding, and the peace of common humanity.

Multicultural Classrooms



Conclusion

In multicultural classrooms, students have a variety of different ways to have knowledgeable teachers, understanding and recognizing diversity. However, the current management of education in Thai society also requires the process of changing the structure of the curriculum in the school to accept and respect the cultural diversity of students. This leads to a change in education management, taking into account the needs of learners in various fields, and taking into account the context of the learner to encourage learners to suffer. Success in learning and sharing with others in society creatively and happily "multicultural classrooms: the classroom is very limited, but if it is still a space of hope and the possibility. If the new teacher's view is still not a popular school power system, if the teacher believes that all students develop teachers have to open space for all students to develop their potential, so we also have the hope to create a new teacher with a good attitude in a multicultural classroom, to be able to create a change of space in a small classroom."

Reference

- Cortes, E.C. (1996). *Preparing for multicultural future*. Principle. 76(1).
- Daungkumnoi, S. (2011). *Teacher Development in Aspect of the Student Care and Support System at Phonngampitthayanukul School Mahasarakham Province*. Journal of Education Graduate Studies Research KhonKaen University.
- Nakoentap, A. (2007). *Research and Development of Model Local learning in three southern provinces*. Research Fund Office.
- Sleeter, Christine E. and Great A. (1987). "An Analysis of Multicultural Education in the United States," Harvard Educational Review, 57:4.

Evaluation Seed-borne Fungi from Rice Varieties

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Abstracts

This study for evaluation post-harvest diseases of rice seeds varieties at thasano center the purpose were to isolate seed borne fungi and to pathogenicity test and using experimental design in CRD with 4 replications, the results were found fungus 8 species such as *Mucor* sp., *Aspergillus niger*, *Curvularia lunata*, *Aspergillus flavus*, *Curvularia eragrostidis*, *Curvularia oryzae*, *Drechslera oryzae* and *Rhizoctonia* spp. From five varieties of rice seeds, after that bring *C. lunata*, *C. eragrostidis*, *C. oryza* and *D. oryzae* to pathogenicity test in rice leaves of Thasano-7, Thasano-8, Thasano-9, Thadorkkham and Homsavan varieties results showed that all pathogenic fungi were destroy leaves of rice all varieties.

Key words: *C. lunata*, *C. eragrostidis*, *C. oryzae* and *D. oryzae*.

Introduction

Rice is in the family of Gramineae as it is about 20 difference times. There are famous two species for planting such as: *Oryza sativa* L. Asia variety, *Oryza glaberrima* Steud. As Africa variety (Matsuo *et al.*, 1995), it occurred from many thousands of the years, the main food in 2.5 million people are consume it. It cover 9% of rice cultivated in largest Area which is 21% of energy, 15% of protein (IRRI, 2002) there are 50-80% of daily rice consumption per day for Asian people (IRRI, 2001). Statistic in 2015 there are 749.8 million tons of rice production in the world, there are 26 million tons of rice production in developing country, Asia continent is a big place of rice production in the world that is cover 90%, produced as 679 million Tons. China is more produced of rice in Asia which is produced 208.5 million tons; India will be produced 158.2 million ton and Indonesia are 73 million tons. However, it will be produced more of rice production in the world but less export to the market of the world, there were 41.3 million tons, cause of produce for distribution and internal consumption. Thailand is more export country of rice production as 11.2 million tons, india are 9.3 million tons and Vietnam are 6.5 million tons (www.fao.org/ economic/RMM, 2015). Rice production contrition is very different according to production process but but transplanting (submerged in water) it is famous in the world. Rice is one kind of cereal crop (International Year of Rice, 2004). Rice cultivated is in dry season by irrigated (irrigated rice or Narxang) 57%, rainy season (Napi) can be 25%, high land cultivated are 10%, deeply water cultivated are 6% and land can be covered in 2% (Chopra and Prakash, 2002). Rice is economy plant that is very important as 80% of rice cultivated area.

In 2015 Laos can be produced 3.4 million Tons, however Lao PDR can produced more million tons but famers met problem with rice cultivated and the main problem was destroyed by the diseases and many kinds of rice productions can be destroyed by the diseases, the productivity was very low. (Guerrero *et al.*, 1972, Neergaard, 1977) it reported that: rice seed was destroyed by fungus and bacteria more over 100 species, but about 20 species that was destroyed all the time as the rice seed was normal and lost physical of quality, therefore, it was to isolate seed-borne fungi from rice varieties and To pathogenicity test in rice.

Methodology

1. Collection, Isolation and Identification pathogens

In this study collected rice seeds in 5 varieties such as; Thasano 7, Thasano 8, Thasano 9, Thadokkham and Homsavan varieties, selected the rice seeds that show the symptom was isolate with Moist-chamber techniques in 10 seeds put in tissue culture, with tissue cleaning then put slide use distill water was pasteurized poured for little moisture on tissue, incubated at room temperature 24-48 hours observed until the mycelium growth out after that transfer to Water Agar media and Potato Dextrose Agar to get pure culture and Identify morphology under compound Microscope.

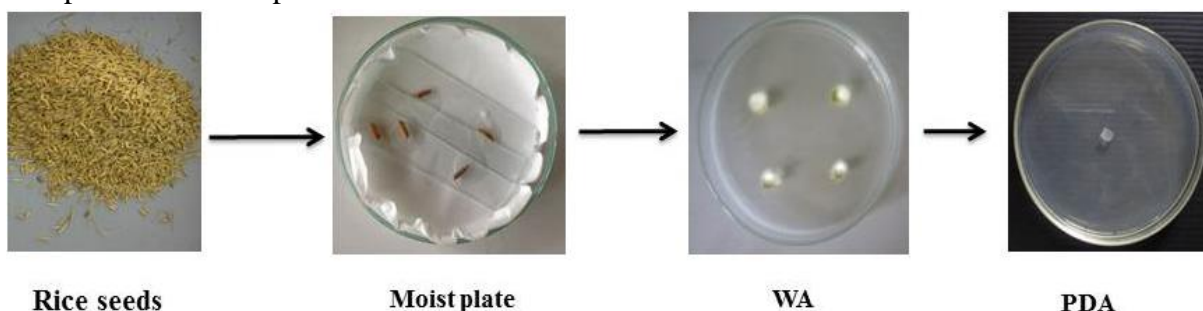


Figure 1. Moist chamber method

2. Pathogenicity test

After the disease was occurred in rice seeds brought for pathogenicity test the experimental design was conducted by using Completely Randomized Design in 4 Replications: Treatment 1: control; Treatment 2: *Curvularia lunata*, Treatment 3: *Curvularia eragrostidis*, Treatment 4: *Curvularia oryzae* and Treatment 5: *Drechslera oryzae*, this method was brought all pathogens culture in Potato dextrose agar (PDA) about 5-7 days. Used sterilized cork borer in the size of 0.5 cm to cut growing mycelium and inoculate to rice's leaves in the age of 15 days, the leaves was wound before used needle injection two points, each point had 5 hole, Treatment 1: control cut only PDA in it, but other Treatment would be brought spore of each pathogens for injection in leaves of each variety, data collected was measured wound size of disease occurred and calculated the percentage of wound. The disease index modify by Vilayphone, 2001 as followed: Score 0: non-pathogenic (0%); 1: Low virulence level (1-25%); 2: moderate virulence level (26-50) and 3: high virulence level (51-75%) and score 4: highly virulence level (76-100%).

Results and Discussion

1. Isolation and Identification pathogens

The pathogens were isolated from rice seeds such as Thasano 7, Thasano 8, Thasano 9, Thadokkham and Homsavan varieties results showed that in Thasano 7 var. were found *Mucor* sp., *Aspergillus niger* and *Curvularia lunata*, Thasano 8 var. were found *Aspergillus flavus* and *Mucor* sp., Thasano 9 var were found four isolated such as *Curvularia eragrostidis*, *Curvularia oryzae*, *Aspergillus niger* and *Aspergillus flavus*, two isolated from Thadokkham var. founded *Drechslera oryzae* and *Rhizoctonia* spp. and *Mucor* sp., was isolated from Homsavan var., Gopalakrishnan *et al.* (2010) reported that found 8 genera and 10 species were isolated from rice seed in 265 samples from 20 varieties collected in different place at Tamil Nadu. Identification *Aspergillus flavus*, *Aspergillus niger* and *Curvularia lunata* which was the

synonym in the present study time.

2. Pathogenicity test

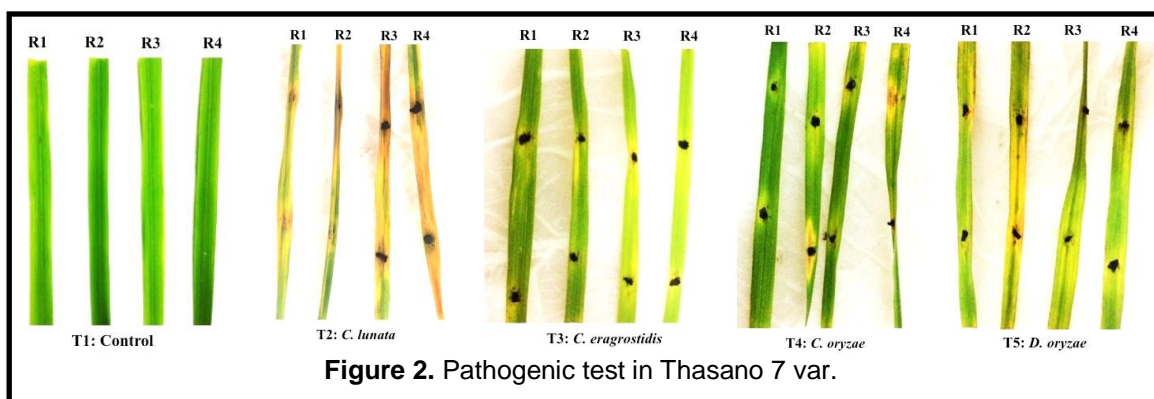
Results showed that after inoculated pathogens in leaf of Thasano 7 var. *Curvularia lunata* was highly virulence level at 94.41% followed by *D. oryzae* disease index was moderate virulence level at 26.23%, for *C. eragrostidis* and *C. oryzae* were low virulence level at 13.27% and 13.68% respectively, when compare to control which non-pathogenic, according to Rujira and Soyong (2015) inoculated *C. lunata* in Thadorkkham 11 was found the disease index level 4 is mean that highly virulence.

Results showed that after inoculated pathogens in leaf of Thasano 8 var. the treatment inoculated with *C. lunata* and *C. eragrostidis* were high virulence level at 66.26% and 62.37% respectively, for the treatment inoculated with *C. oryzae* and *D. oryzae* were low virulence level at 18.26% and 22.04%, respectively when compare to control which was related with research of Kittimorakul *et al.* (2014) tested in the ability pathogenic in palm tree found that *C. oryzae* (NK1) were destroy seedling of palm in high virulence at 48.33%, followed by *Curvularia* sp. (KB1, SR12 and SR13) at the rate of 33.33%, 26.66% and 23.33% respectively.

Results showed that after inoculated pathogens in leaf of Thasano 9 var. the treatment inoculated with *C. oryzae* was highly virulence level at 91.78%, followed by *C. lunata* and *D. oryzae* were showed the moderate virulence level at 46.24% and 32.69% respectively. For the treatment inoculated with *C. eragrostidis* was low virulence level at 18.50% when compare to control with non-pathogenic, according to Siddhardha *et al.*, 2009 reported that seed spot disease was attacked by *C. lunata* and *C. oryzae*, Doungsa-ard *et al.* (2011) reported that leaf spot of palm seedling was attacked by *C. lunata*.

Results showed that after inoculated pathogens in leaf of Thadorkkham var. the treatment inoculated with *C. oryzae* was moderate virulence level at 27.40%, followed by *D. oryzae*, *C. lunata* and *C. eragrostidis* were showed the low virulence level at 12.70%, 9.29% and 7.83% respectively. when compare to control with non-pathogenic, according to Sevilla and Mamicipic (1988) reported that in Philippine *C. oryzae* since 1964 and increase more trend of outbreak in the future by rice seeds was very low productivity in destroyed and wasn't postharvest when highly virulent disease happened.

Results showed that after inoculated pathogens in leaf of Homsavan var. the treatment inoculated with *D. oryzae* was highly virulence level at 71.97%, followed by *C. eragrostidis* and *C. lunata* were moderate virulence at 38.74% and 29.90%, respectively. For *C. oryzae* was low virulence level at the rate 7.37% when compare to control with non-pathogenic and similar with Shabana *et al.* (2008) tested *B. oryzae* caused brown spot of rice Giza 177 var. founded that highly virulence level.



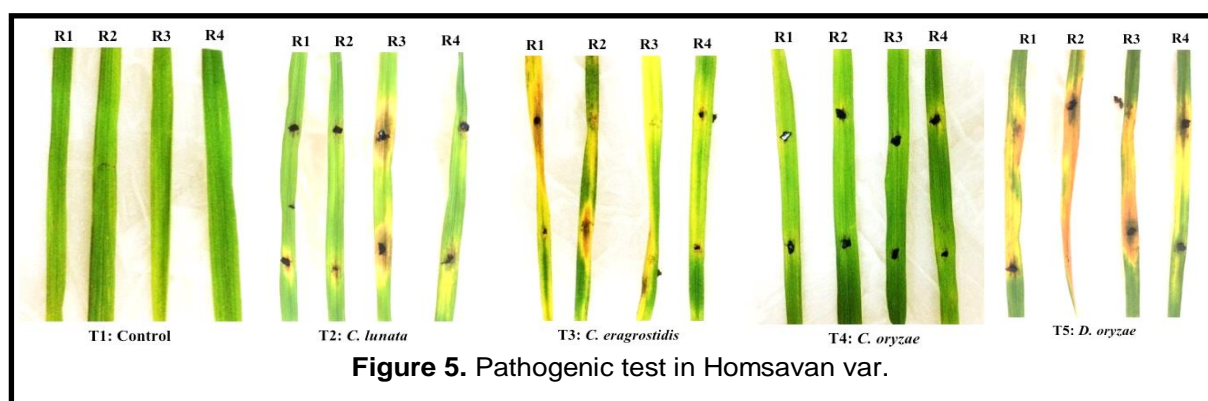
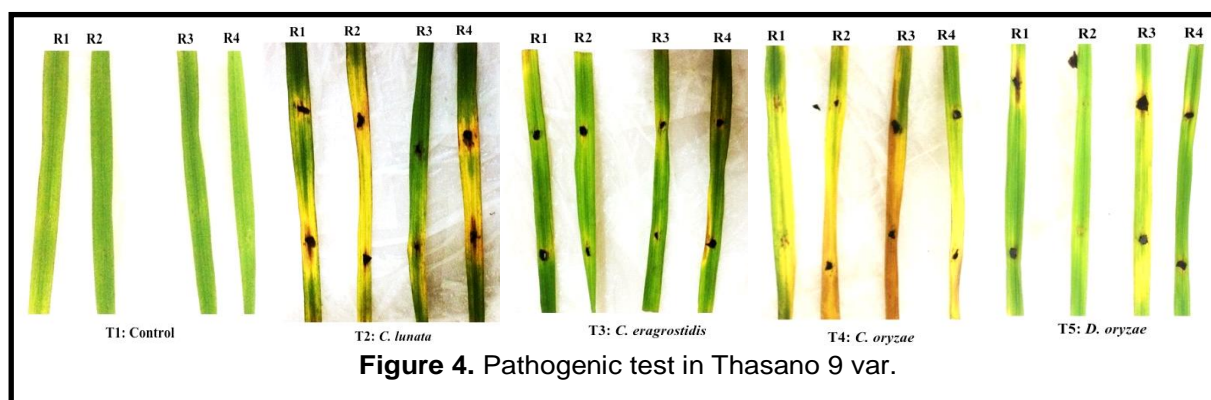
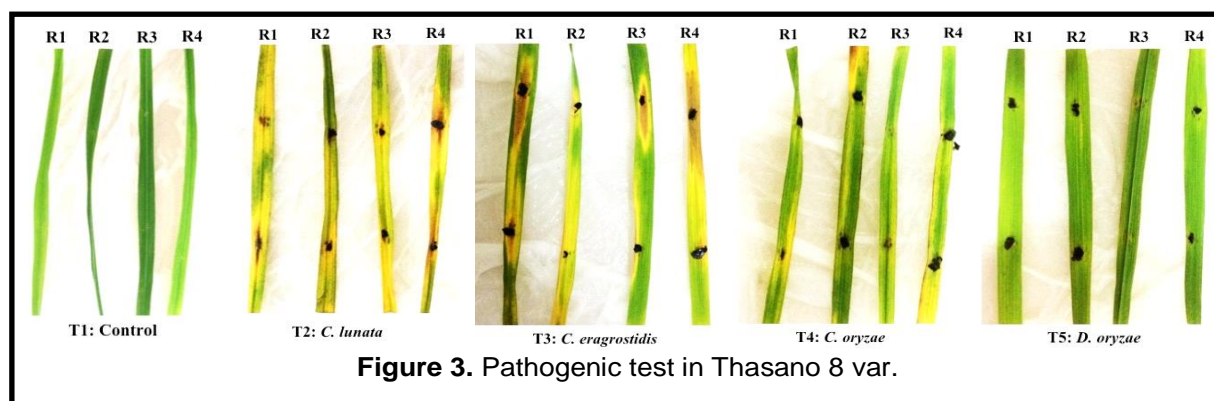


Table 1. Wound size and percentage of wound in Thasano 7 after pathogenicity test in 7 days			
Treatments	wound size (cm)	percent of wound/leaf area	pathogenesis level
T1: Control	-	-	-
T2: <i>C. lunata</i>	5.03±0.14a	94.41±2.30a	Highly virulence
T3: <i>C. eragrostidis</i>	0.70±0.12c	13.27±2.28c	Low virulence
T4: <i>C. oryzae</i>	0.71±0.15c	13.68±3.18c	Low virulence
T5: <i>D. oryzae</i>	1.39±0.07b	26.23±1.47b	Moderate virulence
(CV%)	7.32	6.47	
F-test	**	**	
Note: *highly significantly different 0.01%.			

Table 2. Wound size and percentage of wound in Thasano 8 after pathogenicity test in 7 days			
Treatments	wound size (cm)	percent of wound/leaf area	pathogenesis level
T1: Control	-	-	-
T2: <i>C. lunata</i>	3.53±0.31a	66.26±2.91a	High virulence
T3: <i>C. eragrostidis</i>	3.33±0.26a	62.37±2.70a	High virulence
T4: <i>C. oryzae</i>	0.96±0.06b	18.26±0.97b	Low virulence
T5: <i>D. oryzae</i>	1.14±0.24b	22.04±2.39b	Low virulence
(CV%)	12.14	5.61	
F-test	**	**	
Note: **highly significantly different 0.01%.			

Table 3. wound size and wound percentage of pathogenicity in Thadorkkam after tested 7 days.			
Treatments	wound size (cm)	percent of wound/leaf area	pathogenesis level
T1: Control	0	-	-
T2: <i>C. lunata</i>	2.44±0.14b	46.24±2.77b	Moderate virulence
T3: <i>C. eragrostidis</i>	0.98±0.12c	18.50±2.43d	Low virulence
T4: <i>C. oryzae</i>	5.01±0.79a	91.78±3.17a	Highly virulence
T5: <i>D. oryzae</i>	1.71±0.13c	32.69±2.41c	Moderate virulence
(CV%)	18.31	5.74	
F-test	**	**	
Note: ** highly significantly different 0.01%.			

Table 4. Wound size and percentage of wound in Thadorkkham after pathogenicity test in 7 days

Treatments	wound size (cm)	percent of wound/leaf area	pathogenesis level
T1: Control	0	-	-
T2: <i>C. lunata</i>	0.50b±0.12c	9.29b±1.30c	Low virulence
T3: <i>C. eragrostidis</i>	0.41±0.04c	7.83±0.96c	Low virulence
T4: <i>C. oryzae</i>	1.45±0.20a	27.40±2.24a	Moderate virulence
T5: <i>D. oryzae</i>	0.61±0.11b	12.70±1.87b	Low virulence
(CV%)	16.67	11.68	
F-test	**	**	

Note: ** highly significantly different 0.01%.

Table 5. Wound size and percentage of wound in Homsavan after pathogenicity test in 7 days

Treatments	wound size (cm)	percent of wound/leaf area	pathogenesis level
T1: Control	0	-	-
T2: <i>C. lunata</i>	1.55±0.21c	29.90±4.30c	Moderate virulence
T3: <i>C. eragrostidis</i>	2.07±0.09b	38.74±1.58b	Moderate virulence
T4: <i>C. oryzae</i>	0.38±0.04d	7.37±0.89d	Low virulence
T5: <i>D. oryzae</i>	3.72±0.10a	71.97±1.81a	High virulence
(CV%)	7.49	6.77	
F-test	**	**	

Note: **highly significantly different 0.01%.

Conclusion

Isolated pathogens from 5 rice seed varieties such as Thasano 7 var., Thasano 8 var., Thasano 9 var., Thadorkkham and Homsavan var. were found 8 species: *Mucor* sp., *Aspergillus niger*, *Curvularia lunata*, *Aspergillus flavus*, *Curvularia eragrostidis*, *Curvularia oryzae*, *Drechslera oryzae* and *Rhizoctonia* spp.

The results of pathogenic city in Thasano 7 var., Thasano 8 var., Thasano 9 var., Thadorkkham and Homsavan var. founded Thasano 7 var. was attacked from *C. lunata* in highly virulence level at 94.41%, Thasano 8 Var. treatment inoculated *C. lunata* was highly virulence level at 66.26%, Thasano 9 var. was highly virulence level with *C. oryzae* at the rate 91.78%, in Thadorkkham var. the treatment inoculated with *C. lunata* was moderate virulence level at 27.40%, Homsavan var. treated with *D. oryzae* was highly virulence level at 71.97%, finally can confirm that pathogens were attacked all rice varieties.

Reference

- Doungsa-ard, C., Athipunyakom, P. and Shivas, R.G. (2011). *Curvularia* (*Curvularia oryzae*). Available from: <http://www.padil.gov.au:80/thai-bio/Pest/Main> [accessed on July 24, 2013]
- Gopalakrishnan, C., A. Kamalakannan and V. Valluvaparidasan (2010). Survey of Seed-Borne Fungi Associated with Rice Seeds in Tamil Nadu, India. Libyan Agriculture Research Center Journal International 1(5):307-309.
- International Rice Research Institute, (2001). Rice Research and Production in the 21st Century. (Gramene Reference ID 8380).
- International Year of Rice (2004). "Rice and water: a long and diversified story". (Gramene Reference ID 8372).
- Kittimorakul, J., Petcharat, V. and Chuenchitt, S. (2014). Chemical and Biological Control of *Curvularia oryzae* Leaf Spot of Oil Palm, Songklanakar Journal of Plant Science, Vol. 1, No. 1: 39-47.
- Radhajeyalakshmi, R. (1998). Biological control of seed-borne diseases of rice. M.Sc. (Ag.)

ThesisTamil Nadu Agricultural University, CoimbatoreIndia.

- Rujia Tongon and Kasem Soyong (2015). Applicaton of Nano-Partical from *Chaetomium globosum* to control leaf spot of rice. Journal of Agriculture Technology 11(8):1919-1926.
- Sevilla, E.P. and Mamicpic, N.G. (1988). Rice seed exchange in the Philippines. Rice Seed Health. International Rice Research Institute. Manila, Philippines. 33-48 pp.

WATER USER'S GROUP ON IRRIGATION MANAGEMENT FOR CROP PRODUCTION OF HUAY XAY WEIR IRRIGATION PROJECT XAYPHOUTHONG DISTRICT SAVANNAKHET PROVINCE LAO P.D.R

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Abstract

This research was conducted in the HWIP, 1) To examine members of Water User Group's perspective in current situation of water irrigation management. 2) To explain the empowerment of committees in the water management of the scheme. 3) To identify the level of knowledge, understanding and participation of farmers about water management. 4) To compare the level of knowledge, understanding and participation of farmers about water management. The population consisted of 60 of members of WUG and 10 of administrators of HWIP. A questionnaire was applied as a tool to collect data which were then processed by a computer program. Analytical statistics that were used in this research were percentage, mean, and standard deviation, coefficient of variance, maximum, minimum, regression, one way ANOVA, and descriptive statistic with the statistical level of significance set at 0.05.

The results of the study showed that, water management of HWIP was still none system as Nearly 50% of respondents accounted with none system and most of members of WUG didn't follow the legal that administrators has set on water used from the Scheme accounted for 12.33%, in addition water receiving of members of WUG wasn't fully adequate, accounted for 65.75%. For the empowerment of president and committees was low of role accounted for more than 54.55% was none respected to president and committees of members of Water User Group (WUG).

For the level of knowledge and understanding of members of WUG on water management of HWIP shown that almost of members of WUG has knowledge and understanding on planning with low level accounted for 2.78 of average and SD is 0.98. After that knowledge and understanding of member of WUG about water used form HWIP revealed that most of members of WUG has knowledge and understanding in the low level, accounted for 2.53 of average; while SD 1.04. Finally, knowledge and understanding of members of WUG about maintenance was in the low level which accounted for 2.93 of average; while SD is 1.00

Generally level participation of members of WUG about water management of HWIP shown that almost of members of WUG has level of participation between medium level to high level such as level participation of members of WUG on planning was in the medium level accounted for 3.19 of average, and SD 0.92. After that level of members of WUG on maintenance the irrigation system accounted for 3.43 of average with medium level and SD is 0.92; finally, level participation of members of WUG about water management on get benefits shown that almost of members of WUG has participation level with high level accounted for 4.00 of average, while SD is 0.94

Introduction

Irrigation is the largest water user in the Lower Mekong Basin; but it only uses 12% of the average annual flow. All the countries of the basin have policies and plans to expand

irrigation areas to increase crop production especially rice production and exports, diversify food production, respond to food security needs or address rural poverty. Various scenarios of current and planned developments suggest that future flows in the mainstream will accommodate the expansions of irrigation areas planned by all countries (Barry Hall, Itaru, Minami; Prasong, Jantakad; Cong, Nguyen Dinh; 2014). Irrigation also contributes to increase agricultural production, a dominant sector of the gross domestic product in developing countries (Herath, 2002). According to the food and agriculture organization; on average; crop yield per hectare produce by irrigated agriculture are 2.3 times higher than those from rain-fed agriculture (FAO, 2007). Due to its importance, government in developing countries have invested million dollars in irrigation development, either through their nation budget or funds provided by donors, e.g. the world bank or Asian Development bank (Herath; 2002).

In 2013 president of Lao P.D.R has promulgated law of the using irrigation. Water User Group (WUG) is establish by farmers that use water and get benefit from irrigation project. (WUG) was establish to protect and use of irrigation to efficient and sustainable and Water User Group should have a participation share comment or idea on irrigation activities has set on (article 14 of the law of using irrigation). Moreover; the Water User Group must follow the rules and laws on irrigation strictly (president, 2013). Agriculture is the primarily livelihood and household income of Lao population; for the 79.7 percent of the total population is engaged in farming. Agriculture also is the mainstay of the economy in Laos; accounting for 27.54 percent of the Gross Domestic Product (GDP) meanwhile, Vietnam 17%; Thailand 10.23%; Cambodia 28.24%; Myanmar 27.83%; According to (WorldBank, 2014). Consequently; Lao government has set a policy to development the nation economic by taking agriculture as the basic of economic, to supply policy of government Department of irrigation; Ministry of agriculture and forestry (MAF); has find the supply and development of water resources is the main factor of agriculture production by construction of the small to large irrigation projects nationwide total 21.279 of irrigation (Xayyavong, 2012)

The irrigation system in Xayphouthong District there are 18 projects; 7 pumps can used 5 projects and 2 projects cannot be used; reservoir 5 projects; weir 5 projects; 2 projects cannot be used; drainage water supply of wetland 1 projects (Agriculture and forestry office; 2016). After having finished the construction irrigation system was hand over to farmers in this area to manage are use it. But without training technical on water use administrative properly and maintenance to farmers. So irrigation management by farmers in the past non system therefore course more problems as lack of proper management, almost of farmers are averted the liability and throw to government sector, has conflict of water use between farmer; unreliable distribution; low of knowledge and understanding about irrigation water management of farmers; low level of farmers participation and maintenance on irrigation management (Chizari, Ali Asghar Shahroudi and Mohammad, 2007); weak organization empowerment on water management (WachirapornKumnerdpet, 2010).

To resolve these problems the government has cooperative planed with local authority's irrigation by estimated the water users' group to reduce burden of government sector and encourage farmers to have a role in cooperative water management to develop sustainable irrigation system, which has focused on empower of water users' group. Because it is a method that enables farmers to manage water more efficiency, the farmer has system and well management it helps enhance farmer's product; increase income and social security as a result to water management and efficient maintenance of irrigation system (Phatsavanh xayyavong, 2012).

Methodology

- **Sample size.**

The population of this study was consisted of farmers on three villages as: Namphou; Mouangkhai and Donetoom villages there are 320 household. All of these three villages are direct beneficiary from this scheme by rice production in the wet season and crops production in the dry season to create economic and household income of farmers in these areas.

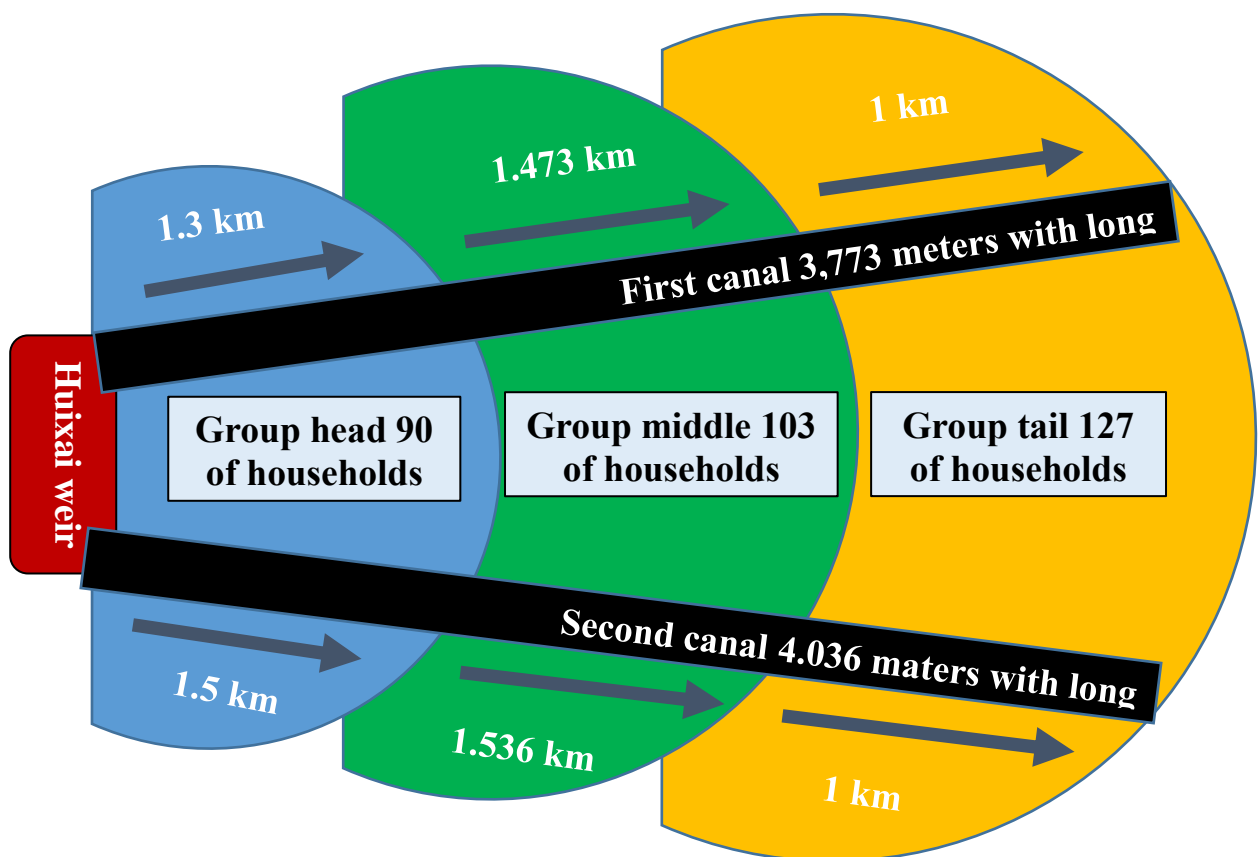
- **Sample sampling.**

The study has selected beneficiary farmers and use water from irrigation areas, with 320 household of samples included 3 villages and the sample size was estimated using percentage (%) of population. For the finding a sample of household in each group as Head; Middle and Tail. Especially 10 persons of committees were calculated by using a sample selection as disperse proportion form formula:

Table 1: population and sampling procedure in each group

No	Group	Population	%(population)	n=60
1	Head	90	28	17
2	Middle	103	32	19
3	Tail	127	40	24
4	Total	320	100	60

Figure 1: sample of households in each group



Results (Results should be clear and concise.)

- **Huayxay Weir Irrigation management implemented.**

The water management of small-scale irrigation system of Huayxay Weir Irrigation Project (HWIP) shown that most of respondents said that the water management of Huayxay Weir Scheme was according to members of Water User Group (WUG) which shown that 19 persons accounted for 26.03%. In this it's means that the water management of HWIP was lacking of orderliness as shown about 9.59%, and follow the committees was only 2 persons accounted for 2.74%, meanwhile water management according to president of members of

WUG was only 13 persons accounted for 17.87%. Moreover about 18 of respondents accounted for 24.66% said that the water management of Huayxay Weir Scheme was none system.

Table 2: Frequency and percentage (%) of Huayxay Weir management

No	Content	Frequency	%
1	According to committees	2	2.74
2	According to head of villages	1	1.37
3	According to members of (WUG)	19	26.03
4	According to president of (WUG)	13	17.81
6	Has system	2	2.74
7	Lack of lesson	5	6.85
8	Lack of rule	7	9.59
9	Make group	6	8.22
10	None system	18	24.66
11	Total	73	100.00

- **Receiving water perspective of members of WUG from irrigation management.**

The water receiving of members of Water User Group (WUG) from Huayxay Weir Irrigation Project shown that most of farmers about 48 persons accounted for 65.75% were not enough received water from irrigation management; because the reservoir wasn't large; in addition HWIP was used water from natural; but nowadays because of increasing cultivated activities of farmers which destroy of forest with origin of water that flow to the reservoir become lower in every year; while the system management of administrators isn't better. So it's effect to farmers on crop productions on the water management of HWIP, in this there are only 12 persons accounted for 16.44% in all of members of WUG has received enough water from irrigation Scheme and meanwhile; about 5 persons accounted for 6.85% of members of WUG which has received of water but still not enough; after that some of members of WUG about 4 persons accounted for 5.48% has received enough of water in some year

Table 3: Frequency and percentage (%) receiving water perspective of farmers

No	Content	Frequency	%
1	Enough only in raining season	1	1.37
2	Water not supply	2	2.74
3	Not enough	48	65.75
4	Not enough in dry season	1	1.37
5	Received	12	16.44
6	Received but not enough	5	6.85
7	Received enough some year	4	5.48
8	Total	73	100.00

- **Right and empowerment of president and committees on water management.**

The empowerment of president and committees on water management of HWIP shown that the major empowerment of president and committees on water management of HWIP most of the respondents understand that they were responsible for checking a point of damaged of scheme which accounted for 32%. Meanwhile some of president and committees about 24% said that the empowerment of administrators was responsible for protected the scheme and while some of respondent accounted for about 24% empowerment of administrators was responsible for water distribution, then about 8% of administrators understand that they were

responsible for guide the members of WUG on production. After that about 4% of administrators of HWIP revealed that they were responsible for collected fees after finished of production in each season and they were also responsible for maintenance the irrigation system in the point of damage, in addition president and committees of HWIP also production for both season as raining season and dry season which accounted for 4.00%.

Table 4: frequency and percentage (%) empowerment of president and committees

No	Content	Frequency	%
1	Check point damage of scheme	8	32.00
2	Collected fees	1	4.00
3	Guide in the production	2	8.00
4	Maintenance	1	4.00
5	Production	1	4.00
6	Protect the scheme	6	24.00
7	Water distribution	6	24.00
8	Total	25	100.00

- **The role of president and committees on water management.**

The role of president and committees has more important for water distribution and cultivation of members of WUG; but in fact, for the role of president and committees of HWIP shown that most of the respondents accounted for more than 54.55% was none respected to president and committees of members of WUG. So, it was effect to water management and water distributed of HWIP was lacking of the rule with accounted for 4.55%; while some of respondents accounted for 13% that role of president and committees was made water distributed has more system. After that role of president and committees also shown that some of members of WUG accounted for 13.64% with has more role of president and committees on agriculture productions; moreover about 9.09% of respondents was shown that president and committees also have more role on made production of members of WUG has more rule.

Table 5: Frequency and percentage (%) role of president and committees on water management.

No	Content	Frequency	%
1	Have more role for production	3	13.64
2	Make production has rule	2	9.09
3	Make water distribute has system	3	13.64
4	Lack of rule	1	4.55
5	None respected of members of WUG*	12	54.55
6	Promoter on production	1	4.55
Total		22	100.00

- **Level of knowledge and understanding.**

The level of knowledge and understanding of members of WUG on water management of HWIP shown that almost of members of WUG has knowledge and understanding on planning with low level accounted for 2.78 of average and SD is 0.98. After that knowledge and understanding of member of WUG about water used form HWIP revealed that most of members of WUG has knowledge and understanding in the low level, accounted for 2.53 of average; while SD 1.04. Finally, knowledge and understanding of members of WUG about maintenance was in the low level which accounted for 2.93 of average; while SD is 1.00.

Table 6: level of knowledge and understanding of respondents on water management

No	Content	SD	Average	Result
1	knowledge and understanding on planning	0.98	2.78	Low
2	knowledge and understanding on using of water from Scheme	1.04	2.53	Low
3	knowledge and understanding on maintenance	1.00	2.93	Low
4	Total	1.02	2.67	Low

- **.Participation level of members of WUG on water management.**

Level participation of members of WUG about water management of HWIP shown that almost of members of WUG has medium level to high level such as level of members of WUG on maintenance the irrigation system accounted for 3.43 of average with medium level and SD is 0.92; finally level participation of members of WUG about water management on get benefits shown that almost of members of WUG has participation level with high level accounted for 4.00 of average, while SD is 0.94.

Table 7: Level participation of members of WUG about water management

No	Content	SD	Average	Result
1	Level of participation on planning	0.92	3.19	Medium
2	Level of participation on maintenance the Scheme	0.92	3.43	Medium
3	Level participation on get benefits	0.94	4.00	High
4	Total	1.09	2.87	Low

- **Comparison level of knowledge; understanding on planning by zone.**

Knowledge and understanding of members of WUG on water management about planning shown that group head have knowledge and understanding higher than other group which in the medium level; accounted for 3.07 with average and SD is 0.86. For the members who was in the middle has knowledge and understanding between low level accounted for 2.58 with average and SD is 0.65. Meanwhile members of WUG in the group tail has knowledge and understanding was low level more than another group accounted for 2.53 with average and SD is 0.69.

Table 8: Knowledge and understanding of respondents on planning by zone.

Zone	N	Mean	Std. Deviation	Std. Error
Head	17	3.07	0.86	0.21
Middle	19	2.58	0.65	0.15
Tail	24	2.53	0.69	0.14
Total	60	2.70	0.76	0.10

- **Comparison level of knowledge and understanding on water used.**

According to the comparison level of knowledge and understanding of members of WUG about water management of HWIP on water used by zone shown that for the members of WUG in the group head knowledge and understanding in between low level to Medium level which accounted for 3.50 of average and SD is 0.77. After that members of WUG who was in the group middle has knowledge and understanding with medium level which accounted for 3.20 of average, while SD is 0.96. For the members of WUG who was in the group tail has knowledge and understanding with low level accounted for 2.53 and SD is 0.62, so the

difference of areas of members of WUG it was made level of knowledge and understanding of members of WUG has difference level.

Table 9: knowledge and understanding of respondents on water used by zone.

Zone	N	Mean	Std. Deviation	Std. Error
Head	17	3.50	0.77	0.19
Middle	19	3.20	0.96	0.22
Tail	24	2.53	0.62	0.13
Total	60	2.63	0.88	0.11

- **Comparison level of knowledge and understanding on maintenance.**

For the comparison level of knowledge and understanding of members of WUG about maintenance HWIP revealed that group head has higher knowledge and understanding than others group such as group middle and group tail, in this the group head has average about 3.18; while SD is 0.92 and group middle has average 3.19 while SD 0.75, in these activities group head and middle has knowledge and understanding in the medium level, meanwhile group tail has low level of knowledge and understanding than other group by average 2.68 and SD is 0.66.

Table 10: knowledge and understanding of respondents on maintenance by zone.

Zone	N	Mean	Std. Deviation	Std. Error
Head	17	3.18	0.92	0.22
Middle	19	3.19	0.75	0.17
Tail	24	2.68	0.66	0.14
Total	60	2.98	0.80	0.10

- **Comparison level of participation on get benefit from HWIP.**

The comparison level of participation of members of WUG on get benefits from HWIP according to zone shown that almost of members of WUG in the group head has highest level of participation more than group middle and group tail, in this group head has 4.02 of average and SD is 0.48, after that for the group middle has 3.18 of average while SD is 0.76 and finally for the group tail has 2.63 of average and SD 0.59.

Table 11: mean and standard deviation on get benefits by location

Zone	N	Mean	Std. Deviation	Std. Error
Head	17	4.02	0.48	0.12
Middle	19	3.18	0.76	0.18
Tail	24	2.63	0.59	0.12
Total	60	3.19	0.84	0.11

Discussion

Huayxai Weir the irrigation management is the small irrigation, and use water from the natural flow to the dam. So, it's looks like enough at the beginning, but when the times pass until now the water resources is decrease everyday because peoples destroy forest for cultivation that is cause effect to the water resource, so water is less flow to the dam now.

In these areas there three villages that get benefit from this irrigation, that means most of peoples in theses three village are engage on farmer, example in wet season they plant rice and in dry season they plant crop such as corn, groundnut, vegetables, watermelon, bean, chili etc, it's comfortable to done this cultivation at the beginning because the irrigation just completed constructed, and water resources in that time was enough, but now everything has change, water resources was less, the canals were damaged, the water management was none system, using rules was not strict, can not governance water user's group, level participation on maintenances the canals was low. So, farmers in these areas face with water not enough for crop production in dry season, this main result significance this thesis.

Conclusions

Water management of HWIP

Water management of Huayxay Weir Irrigation Project (HWIP) shown that, has many problems and different idea that most of respondents about 36 persons accounted for 49.32% said that Water management of Huayxay Weir Irrigation didn't has system and orderliness; because the members of Water User Group (WUG) didn't follow the legal that administrators has set on water used from the Scheme; meanwhile some of members of WUG accounted for 12.33% said that the water management were still lacking of monitoring and attention of committees. Moreover some of the respondents about 8 persons accounted for 10.96% told that Water User Group (WUG) weren't respected to the legal of president's Huayxay Weir Irrigation Project (HWIP) has determined, than about 5 persons of respondents accounted for 6.85% said that water management was lacking of exactly determine timetable on distributed water in each brand of the canals, after that about 4 persons of the respondents accounted for 5.48% answer that water management was lacking of good planning and 4 persons accounted 5.48% all of respondents were need more water to production.

water receiving of members of Water User Group (WUG) from Huayxay Weir Irrigation scheme found that most of farmers about 48 persons accounted for 65.75% has not received enough water from irrigation management; because the reservoir wasn't large enough; in addition Huayxay Weir Irrigation Project (HWIP) was used water from natural; but nowadays because of increasing cultivated activities of farmers which destroy of forest with origin of water that flow to the reservoir become lower in every year; while the system management of administrators isn't good enough.

- **Empowerment of president and committees on the water management of HWIP.**

the empowerment of president and committees on water management of Huayxay Weir Irrigation Project (HWIP) shown that the major empowerment of president and committees on water management of HWIP most of the respondents understand that they were responsible for checking a point of damaged of scheme which accounted for 32%. Meanwhile some of president and committees about 24% said that the empowerment of administrators was responsible for protected the scheme and while some of respondent accounted for about 24% empowerment of administrators was responsible for water distribution, then about 8% of administrators understand that they were responsible for guide the members of Water User Group (WUG) on production. After that about 4% of administrators of HWIP revealed that they were responsible for collected fees after finished of production in each season and they were also responsible for maintenance the irrigation system in the point of damage, in addition president and committees of HWIP also production for both season as raining season and dry season which accounted for 4%.

On the water management of Huayxay Weir Irrigation Project (HWIP) revealed that role of president and committees has more important for water distribution and cultivation of members of Water User Group (WUG); but in fact for the role of president and committees of HWIP shown that most of the respondents accounted for more than 54.55% was none respected

to president and committees of members of Water User Group (WUG). So, it was effect to water management and water distributed of HWIP was lacking of the rule with accounted for 4.55%; while some of respondents accounted for 13% that role of president and committees was made water distributed has more system. After that role of president and committees also shown that some of members of WUG accounted for 13.64% with has more role of president and committees on agriculture productions; moreover about 9.09% of respondents was shown that president and committees also have more role on made production of members of WUG has more rule.

The using rule on water management of HWIP shown that using of the rule on water management to members of Water User Group (WUG) it was weak of rule; which shown that almost of respondents accounted for higher of percent about 70% with none strictly of the rule; meanwhile some of respondents accounted for 30% which used strictly of rule on the water management of HWIP. So, in this it was effect to water management lacking of system and lacking of legal on water used of members of Water User Group (WUG).

- **Knowledge and understanding about water management of members of WUG.**

For the level of knowledge and understanding of members of WUG on water management of HWIP shown that almost of members of WUG has knowledge and understanding on planning with low level accounted for 2.78 of average and SD is 0.98. After that knowledge and understanding of member of WUG about water used form HWIP revealed that most of members of WUG has knowledge and understanding in the low level, accounted for 2.53 of average; while SD 1.04. Finally, knowledge and understanding of members of WUG about maintenance was in the low level which accounted for 2.93 of average; while SD is 1.00.

- **Participation level of members of WUG on maintenance of Huayxay Weir Irrigation Project.**

Generally level participation of members of WUG about water management of HWIP shown that almost of members of WUG has level of participation between medium level to high level such as level participation of members of WUG on planning was in the medium level accounted for 3.19 of average, and SD 0.92. After that level of members of WUG on maintenance the irrigation system accounted for 3.43 of average with medium level and SD is 0.92; finally level participation of members of WUG about water management on get benefits shown that almost of members of WUG has participation level with high level accounted for 4.00 of average, while SD is 0.94.

Recommendations.

For this thesis was study on Water User Group (WUG) on irrigation management for crop production of Huayxay Weir Irrigation Project Xayphouthong district Svannakhet province. The researcher would like introduce on the water management as

1. Should has more cleaning of the canals before distribution of water to areas.
2. The using of legal on water management or water distribution should more strictly and clearly.
3. Should has training technical about water management to members of WUG has strength on water used.
4. They should be monitoring of committees when water distribution.
5. Should has determined clearly of time on water distribution.

The researcher would like to advice for who would like to continue on this topic:

1. Should study on water quantities of reservoir that fully adequate or not.
2. Factors which effect to the success on water management of the Scheme.
3. Strength of Water User group about technical on water management of the Scheme.

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I am heartily to my supervisors, Assoc. prof. Dr. Vudinh Ton from the Vietnam National University of Agriculture (VNUA) and academic affaire cooperation in master course of Savannakhet University (SKU) and Msc. Phoudthavong SENGSOURIYA of Savannakhet University (SKU) for their constant supervision, support and feedbacks from the very beginning till the end of this thesis work; which has helped me to again an understanding of my topic and then complete this thesis work, thank you very much for the inspiration and the encouragement.

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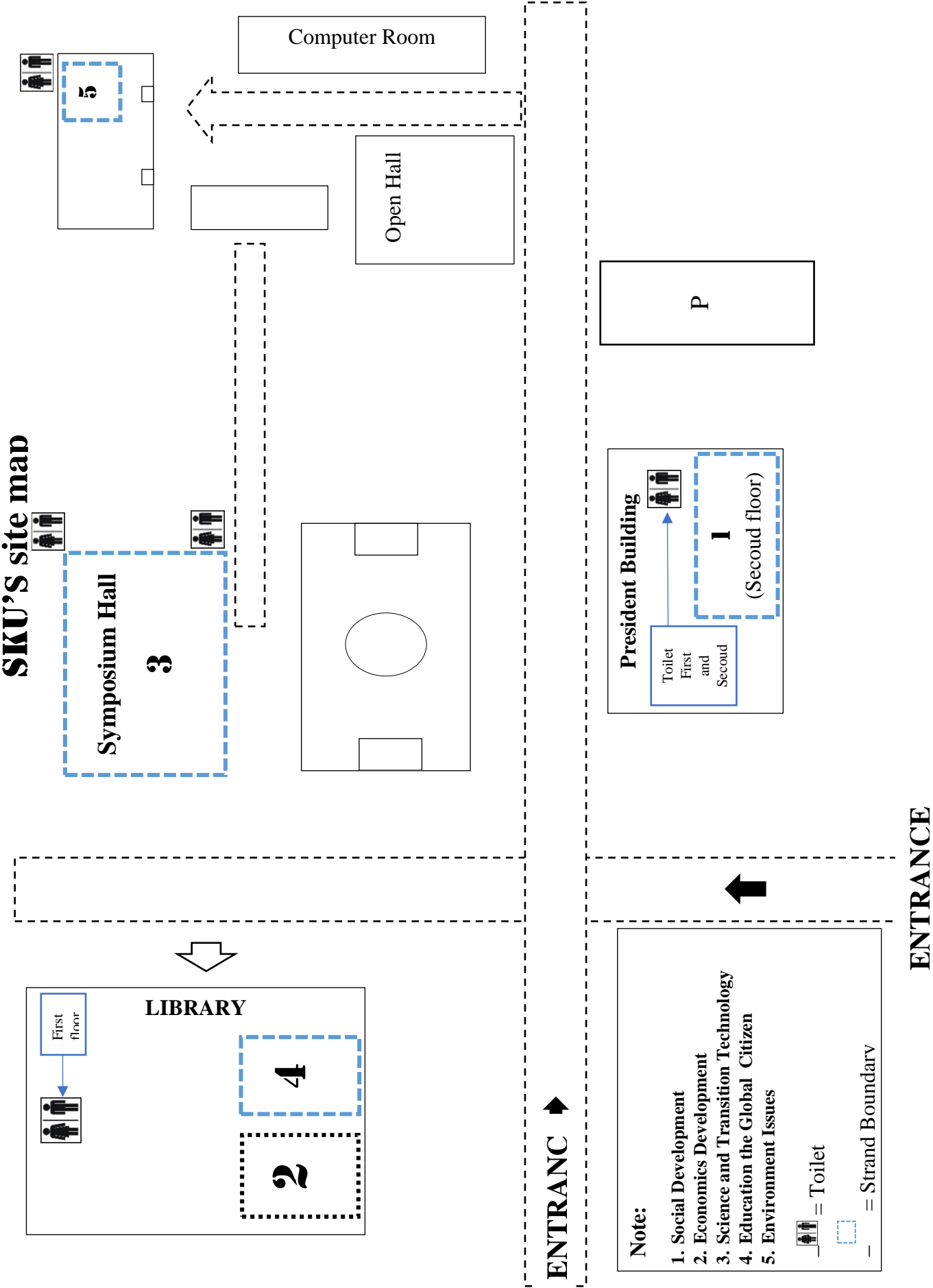
References

- Barry Hall, Itaru, Minami; Prasong , Jantakad; Cong , Nguyen Dinh;. (2014). Irrigation for Food Security, Poverty Alleviation and Rural Development in the LMB.
- Chizari, Ali Asghar Shahroudi and Mohammad. (2007). Farmer's participation in irrigation water management in northeast Iran.
- FAO. (2007). Water at glance. <http://www.fao.org/nr/water/art/2007/glance/index.html>. Website accessed on 12 Sept. 2014.
- Herath. (2002). Issues in irrigation and water management in developing countries with special reference to institutions. In Berna; D. (Ed.), Water policy reform: lessons from Asia and Australia (pp. 149-160). Proceedings of an international workshop.
- president, D. o. (2013). About promulgation of the law on the irrigation. Article 46 establish Water User Associate.
- WachirapornKumnerdpet. (2010). Community Learning and Empowerment through Participatory Irrigation Management: Case Studies from Thailand.
- WorldBank. (2014). Global Data Base, International Bank for Reconstruction and Development, Washington, DC <http://data.worldbank.org>.
- Xayyavong, P. (2012). Water user's Group on irrigation management: A case study Nongdaeng project, Saravane province, Lao PDR.

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Poster guideline

After received Notification for acceptance of Poster presentation

Presenter should follow this instruction :

1. Stand by for present your own paper in the poster presentation zone
2. Preparing your poster presentation including :
 - 1) Topics /Name of researcher/department/faculty/university or institution/Location of conducted the research
 - 2) Introduction
Objectives (included in this section)
 - 3) Methodology
 - 4) Results and Discussion
 - 5) Conclusion
 - 6) Reference (the most relevant to the paper)
3. The content in the poster should not too much, you should summary only the main, compact , and clear content. The poster should equip the picture, table or the chart.
4. The size of poster : 80 centimetres width and 160 centimetres height equipped the X-stand
5. Font : Arial

Gallery of Symposium



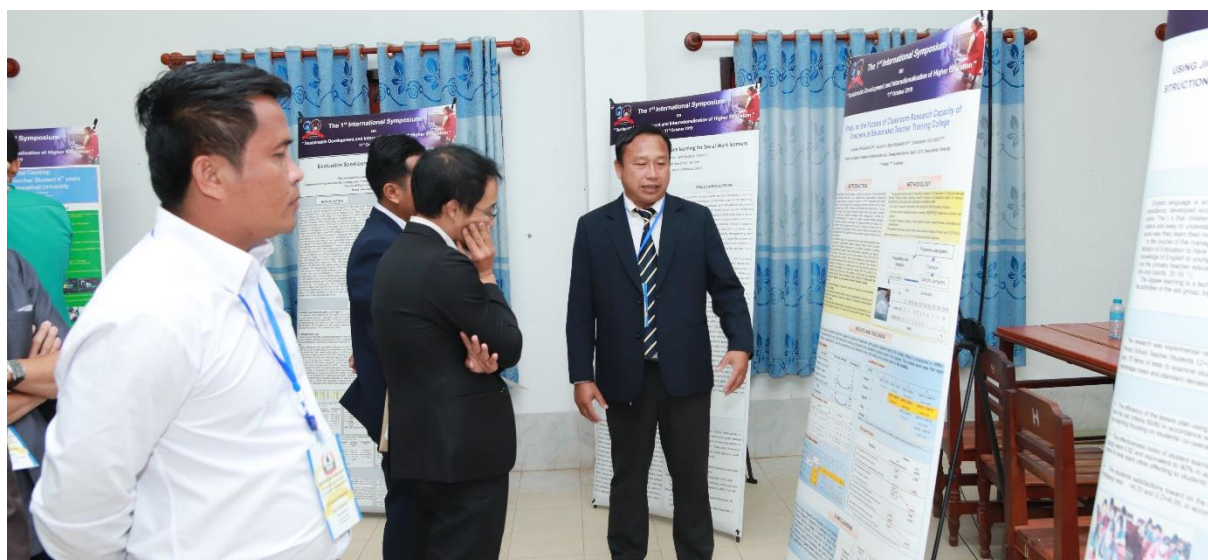
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Strand of Sciences and Transition Technology

