

#### Development Guidelines for Online Lesson Media Format for Service Industry Students

## <sup>1</sup>Susaraporn Tangtenglam,<sup>2</sup>Ariya Pongpanic,<sup>3</sup>Chearnkwan Saesow <sup>4</sup>Chonchanok Chidprasert, <sup>5</sup>Manasin Sonthanong <sup>[1] [2] [3] [4] [5]</sup> Faculty of Hospitality Industry Kasetsart University <sup>[1]</sup>Susaraporn.t@ku.th; ORCID: https://orcid.org/0000-0001-8541-2730 [2]Ariya.p@ku.th; ORCID: https://orcid.org/0000-0002-5000-3563 [3]Chearnkwan.s@ku.th; ORCID: https://orcid.org/0000-0003-2088-5531

<sup>[4]</sup> Chonchanok.c@ku.th; ORCID: https://orcid.org/0000-0001-6755-6378
<sup>[5]</sup> Manasin.s@ku.th; ORCID: https://orcid.org/0000-0002-9086-3226

Received 16/04/2022 Abstract:- The advancement in technology has caused competition in education, resulting Revised 11/05/2022 in the present world moving into a society of wisdom and learning or a knowledge-based Accepted 11/05/2022 society. The most important factor is the availability of quality human resources, which reflects the importance of an educational system that must be able to respond to this changing and a new paradigm, especially that higher education institutions have. The duty of creating people to be knowledgeable and able to compete with foreign countries, as announced by the Ministry of Education on Higher Education Standards for the Creation and Development of a Knowledge-Based Society and a Learning Society states that Higher education institutions must seek to create and manage knowledge accordingly. Guidelines and principles lead to a knowledge-based society and a learning society, and in terms of graduate quality, higher education graduates must be knowledgeable, proficient in their fields, and able to learn, create and apply knowledge. To develop oneself to be able to work and create jobs to develop society to be able to compete internationally. This paper aimed to study guidelines for developing an effective online lesson media format for students. The sample group in this study consisted of 2nd-year students, consisting of students in the hotel and tourism management field. Tourism Innovation Branch, English for Service Industry Aviation Business, and Hotel and Restaurant Management Project to establish the department of service Industry and Language Innovation Faculty of Arts and Sciences at Kasetsart University. (Kamphaeng Saen Campus), 500 people. Research tools consisted of questionnaires and documented data-quantitative data analysis from questionnaires using statistical software packages. The statistics used consisted of descriptive statistics such as frequency, percentage, mean and standard deviation. The results showed that analysis The results of an analysis of the demand for online lessons Character and color Overall, it was at the highest demand level, with an average of 4.99. When considering the sub-issues of the demand level, it was found that the high demand level was the suitability of font styles. With the highest mean, mean of 4.32, followed by the suitability of font color and background, mean of 4.25, suitability of font placement, mean of 4.23 linguistic accuracy, mean of 4.11 Appropriate font size, mean of 4.08, The prominence of the topic, average 4.06, respectively, for still images, overall, it was at the most demanding level, with an average of 4.00. The highest mean is 4.23, followed by color and fit of the picture means 4.11, suitability of picture in the frame, the mean 4.03, the balance of the picture, the mean 4.03, the balance of the number of shots, the mean 4.03, the picture consistency. With the content, average 4.06, respectively. Keywords: Guidelines; Online Lesson; Service Industry

#### Introduction

COVID-19 has created problems and difficulties for Thai education. But on the other hand, it's a variable in creating change in education and is the driving force in bringing technology into the Thai education system. All parties in the Thai education system work together to build a strong education mechanism that will be able to drive education during different situations can certainly be a good education system should be flexible. adaptable to the situation and context environment is not only in the country but also in the world management of the education system in the 21<sup>st</sup> century, therefore, has to adapt to "Square education" that will change from One-Size-Fits-All to meet the needs of learning



and individual development, Even more, need to look at more broadly than just the education system, but "Ecosystem" Thai Education (Office of the Basic Education Commission. 2020).

New normal (New Normal) is a new lifestyle that is different from the past because there is something affected until the patterns and practices that people in society are normally familiar with and have been able to anticipate change to a new way under the new standard, unfamiliar with this new way of life. It consists of a way of thinking, a way of learning, a way of communicating, practicing, and managing a new way of living. After a great change and severe one forcing humans to adapt to cope with the current situation rather than maintaining the traditional way? Throwback to the past after the global recession in the early 21<sup>st</sup> century (2007–2008) was born. Big changes in the economy some manipulations that were originally considered abnormal have become common things and are used in other contexts such as science to communicate and understand climate change conditions such as rising temperatures and seasonal changes in the "New Normal" section in the context of the epidemic situation of "Covid-19" during the end of 2019 to 2020 can be described as The situation was so fast and severe that it spread in countries around the world. People got sick and died so many that it became another great loss for humanity Humans, therefore, need to protect themselves. Johnson (1997) To survive by modifying lifestyle behaviors that are different from the old way by adjusting the way of life new designs to keep infection safe coupled with potential healing and recovery efforts economic and business leading to the creation of new inventions, new technologies, adapting concepts, visions, management methods, as well as habitual behavior the familiarity that was originally normal in many dimensions in terms of food, dress, maintain hygiene education communication, business, etc., which these new things have become the new normal, until ultimately, over time, it becomes familiar and becomes part of the normal way of life of people in society (Phrombut, S., 2020)

The change in learning space is the most noticeable with today's technology and innovation Creating content to facilitating teaching at your fingertips enables us to learn every content from anyone, anywhere, anytime, but that doesn't mean your teacher and student interactions will diminish. Learning is still there, but the space is shifted from university to mobile phone or computer only. Everyone might be familiar with a picture of a classroom where many students gather to use the same books. The teaching media are the same and have the same methods and same evaluation to reach the same goal of learning that new way The aim of the study may remain the same, but students can use different methods to reach their goals. Some students may learn faster if they look at pictures or clip videos, but some students may enjoy listening to the lecturer's lecture because each person's learning style is not the same the university, therefore, has to determine the appropriate teaching and learning management guidelines to be able to continue teaching and learning has demonstrated the management of teaching styles after COVID-19 (Social Distancing) and management education that corresponds to the new normal is important for management. This reflects that teaching and learning management requires a change in learning styles to be appropriate to the situation of the Covid-19 epidemic that has occurred (Heath. 1997)

At the same time, technology has changed the way of teaching and learning. Whether it is Online collaborative learning in the digital classroom, VR and AI technologies have influenced classroom teaching and learning systems around the world and will continue to grow in the future. The Internet has changed the way we receive information that allows us to access more information. It is this access to this information that will change the way we learn soon. It can be seen that nowadays many online courses are happening Digital classrooms or MOOCs (Massive Open Online Courses) are online teaching and learning systems that offer unlimited opportunities for users. Wherever you are in the world, you can take courses at top universities. It's the kind of restorative online education that allows children to design their own learning style, be in control, at the pace and choose where they study. It can be seen that nowadays there are many online courses. But in the future, there will be mass-customized adapted to each student because each human being is different whether it is a learning style or a lifestyle path the education, they receive should also help meet their individual needs (Seguin. 1995)

From problems, principles, and reasons during the outbreak of the coronavirus disease (COVID-19) has spread rapidly. To make teaching and learning operations effective. The research team is interested in guidelines for developing an effective online lesson media format for students for hotel

[2]



and tourism courses that allow visitors to unlimited and still, project-based makes it meet the needs of students and can be applied in real life. It can also be applied to teach entrepreneurs who are interested in increasing their knowledge in the field of hotel and tourism in the form of short-term learning in the future.

## **Objectives**

The objectives of this research article were to study guidelines for developing an effective online lesson media format for students.

## Methodology

**Population and sample group:** the population studied consisted of using 2<sup>nd</sup>-year students, consisting of students in the field of hotel and tourism management. Tourism Innovation Branch, English for Service Industry Aviation Business and Hotel and Restaurant Management Project to establish the Department of Service Industry and Language Innovation Faculty of Arts and Sciences Kasetsart University Kamphaeng Saen Campus, 500 respondents by non-probability sampling and accidental sampling. The number was obtained by calculating the formula without the population at a 95% confidence level, and the sample size was set as follows

$$n = \frac{Z^2 P (1-P)}{E^2}$$

Where:

n = Size of the sample group

Z = Reliability level

P = Proportion of the population

E = Highest error value that will happen

The acceptance level was following the statistical significance level at 0.5

$$n = \frac{(1.96)^2 (0.5)(1 - 0.5)}{(0.05)^2}$$

The sample size was 385 respondents. However, 500 questionnaires were gathered by using a probabilistic sampling method between June 2021 - October 2021.

**Research Instrument:** In this research, it is research to create innovations in designing 360degree online teaching materials, and hotel and tourism courses. The investigators experimented to determine the efficacy of the online lesson material: a design for production interaction and multimedia by allowing the sample group to make a model test before class and test after class to examine the effectiveness of the lessons according to the 80/80 criteria and find the learning achievement by giving the sample group to do the test before and after school. The experiment was divided into two stages as detailed below.

1. Small group experiment small group experiment. The objective is to find an appropriate time to examine problems, deficiencies, and obstacles that may arise. It was possible in the experiment to find out the real efficiency was carried out by the sample used was 2nd-year hotel and tourism management course students before starting the lesson. The researcher recommends the experimental procedure and methods for studying lessons for the sample group by giving students did the test during the class and after studying the content of 6 lessons and then doing the test after studying and ask questions about problems, obstacles, ask students' opinions on the lesson, as well as set a timer for each unit of study. After that, the experimental results are analyzed to improve Flaws for field trials.



2. Field trials are aimed at finding the performance of the lesson series and to find the effectiveness of learning. The sample used was 500 hotel management students and the researcher introduced the experimental procedures and methods study lessons for the sample group. Then start taking the test before studying and then study each unit lesson. After studying all the content, take the quiz after class. During the experiment, the researcher distributed a questionnaire. The students' opinions on the lesson for students to show comments along with. After that, the results of the experiment to analyze and draw conclusions creating research tools.

It is divided into 3 parts as follows: Part 1 is online lesson materials, part 2 is a performance and achievement test, and part 3 is a satisfaction survey.

1. Online Lesson Materials Developing the innovative design of online teaching materials 360 degrees, hotel and tourism courses For the production of interactive media and multimedia, the process is divided into operations by creating a content network chart (Content Network Chart), which brings various subjects. Necessary to create a lesson, which is derived from the topic chart (Concept Chart) to create a content network chart (Content Network Chart), taking into account the order of learning before - after. Or learn in parallel without being related to each other through network analysis (Network Analysis) until a network is obtained complete content determine how to present and behavioral objectives (Strategic Presentation Plan Vs Behavior Objective) unit and set behavioral objectives of each unit corresponds to the content to be presented, and then define the lesson presentation plan as a course flow chart. Create a module presentation chart for each unit (Module Presentation Chart) to show the format. The presentation of the lesson content according to the teaching principles is the introduction to the learning content, summarizing the knowledge-enhancing activities, and the evaluation of each unit.

1.1 Developing a framework for lesson content (Development) write content details (Script Development) according to the format that has been defined by writing a framework must write according to the plan and arrange the content (Storyboard Development) by bringing the content frame or written in Script to arrange for the presentation that was planned, which the content frame will be in the form of a document.

1.1.1 Bring all content frameworks to content experts for validation. The content integrity and content integrity (IOC) of the learning content. The researcher has considered the reliability following the course content In the media, innovations in the design of online teaching materials, 360 degrees, the hotel and tourism courses by using 3 experts

1.1.2 Make improvements to content according to the proposal. Expert advice then takes it to experiment with the group. Examples used in idiom analysis, 3 people to examine idioms used in interpreting meanings that affect the learning of the learners

1.1.3. Create quizzes for during and after lessons for each unit. The quality of the test was assessed by analyzing it to determine the difficulty, discrimination power, and confidence of the test to be packed It is part of the courseware.

1.1.4 Bring content and media that have been prepared, imported, developed in design software such as Adobe Photoshop, and Adobe Flash and executed according to the plan which will be a multimedia medium 360 Degree Online Lessons Hospitality and Tourism Courses.

1.1.5 Bring already created lessons to experts' technical production of online lesson materials, checking the quality and accuracy in production, amounting to 3 persons, if found an error, then bring it to improve continue to be correct.

1.1.6 Use online lesson materials to test for efficiency in using lessons to check problems and obstacles arising from learning lessons. It was used with a sample of 500 students to experiment with lessons, observe and ask students about problems and obstacles while studying and



apply the information to be corrected. Before taking the lesson series experiment to find efficiency and real results.

1.1.7 Prepare user manual. Prepare lesson manuals to support learning with multimedia lesson materials. Developing the innovative design of online teaching materials in 360 degrees.

**Data analyses:** Research tools consisted of questionnaires and documented data. Quantitative data analysis from questionnaires using statistical software packages. The statistics used consisted of descriptive statistics such as frequency, percentage, mean and standard deviation.

#### Results

Regarding general data of the respondents, the following was found: Summarize the results of the personal factors of the respondents

Personal data of students of the Department of Service Industry and Language Innovation Project establishment Faculty of Arts and Sciences From the analysis of general data of the respondents, namely subject, gender, and equipment for online learning. Online learning requirements. The reason for choosing the online system type for studying 500 people found that

Majors, Most of them are students of majors. Hotel and tourism management of 500 people, accounting for 82.2%, followed by tourism innovations, 46 people, or 9.2%, English for the service industry, 28 people, accounting for 5.6%, and aviation business, 11 people, representing 2.2%, the hotels and restaurants, 4 people, or 0.8%

Gender: Most of them are female, 392 people, representing 78.4 percent, and 108 people, accounting for 21.6%.

Online learning equipment most of them studied through mobile phone systems of 361 people, representing 72.2 percent, followed by people aged 18 years and over, 55 people, representing 11%, aged between 18-19 years, 52 people, representing 10.4% between the ages. 20 - 21 years old, 32 people, or 6.4%

Online learning requirements, Most of them have a bachelor's degree, 409 people, representing 81.8 percent, followed by notebooks, 107 people, accounting for 22.4%, and online systems such as Zoom Meet Webex, 49 people, accounting for 9.8 percent.

Reasons for choosing an online system type to study, Most of them already have a phone, 345 people accounted for 69.0%, followed by 72 people who were easily logged in and remembered, or 14.4% were portable, 59 people accounted for 11.8%, and were able to see clearly 24. People accounted for 4.8%

# The results of the analysis of guidelines for developing an effective online lesson media format for students.

The results of the analysis of the demand for an online learning system model. The demand for the online learning system model first, the need for an online learning system model. The content structure covered the lesson objectives of 500 students, representing 78.2%, followed by helping to enhance the self-learning skills of 177 students, accounting for 55.4%, with easy access to course content, 153 students, or 50.6%. Can be repeated to increase understanding, 81 people, accounting for 28.2%, adding modern learning channels, 40 people, accounting for 20.0%. Interaction design is easy to use, with 37 people, accounting for 17.4%. Appropriate and beautiful proportions of 8 people, representing 17.2 percent, increasing the opportunity to access learning content. From various devices of 4 people, representing 6.4 percent, respectively.

The results of an analysis of the demand for online lessons character and color overall, it was at the highest demand level, with an average of 4.99. When considering the sub-issues of the demand level, it was found that the high demand level was the suitability of font styles. The highest mean, the



mean of 4.32, followed by the suitability of font color and background, the mean of 4.25 The suitability of the font, the mean of 4.23 =. The linguistic accuracy, the mean of 4.11 The suitability of the font size, the mean. 4.08 The prominence of the topic, the average 4.06, respectively.

Table 1 Demand for online lessons character and color			
Demand for online lessons character and color	Average	Meaning	
Suitability of font styles	4.32	High	
Suitability of font color and background	4.25	High	
Suitability of the font	4.23	High	
Font size	4.08	High	
The prominence of the topic	4.06	High	
Overall	4.99	High	

The results of the analysis of online lesson demand for still images were at the most demanding level with an average of 4.00. The highest mean was the mean of 4.23, followed by the color and fit of the picture, the mean of 4.11, the suitability of the picture in the frame, the mean of 4.03, the balance of the picture, the mean of 4.03, the balance of the number of shots, the mean of 4.03, the picture consistency with the content, average 4.06, respectively.

Table 2 Online lesson demand for images

Online lesson demand for images	Average	Meaning
Color and fit of the picture	4.11	High
Suitability of the picture in the frame	4.03	High
Balance of the picture	4.03	High
picture consistency with the content	4.06	High
Overall	4.00	High



Figure 1 Use These 3 Steps To Accomplish More Effective Online Teaching By Drew Perkins, Director of Teach Thought PD.



Figure 2 Best practices for teaching By Jessica Cole. September 10, 2018

#### Discussion

The results of an analysis of the demand for online lessons character and color overall, it was at the most demanding level with an average of 4.99, consistent with Wat (2008), studying interactive online lesson creation on pre-print technology to determine the quality of online lessons by content and media production experts and presentations to assess the learning achievement of online learners and assess their satisfaction of learners towards online lessons. The tools used include 1. Online lessons interactive Pre-print technology 2. Lesson quality assessment form for experts 3. Learning achievement test 4. Student satisfaction measurement from the samples were bachelor's degree students in the first year of the Faculty of Industrial Education and Technology, the King Mongkut's University of Technology Thonburi consisted of 28 students and first-year undergraduate students in the Department of Printing Technology, Faculty of Industrial Technology, Suan Sunandha Rajabhat University totaling 54 people. Online lesson The interactive model is effective. Content quality assessment was equal to 4.25 at a good quality level. Media production and presentations were equal to 3.95 in good quality level. Learners have academic achievement after study higher than before with a statistical significance of 0.01 and the satisfaction of the sample with the lesson was 4.30 at a very satisfactory level, consistent with (Atthaphut, B., Sittiwong, T., & Theeraputhon, D., 2017) researched subject Social Media Effects together with proactive learning In the course of designing and producing computer graphics media for undergraduate students, it was found that the students used social media on average 5-6 days a week and used 3-4 hours a day per day. Inthakanok, P. (1998) important to the use of social media is very much, which the researcher has the opinion that the font and color. It is attractive to students at the undergraduate level. This makes it a huge focus of the online learning process which makes the learners not bored in learning as well. The results of the analysis of online lesson demand for still images were at the most demanding level, with an average of 4.00, consistent with Masae, W. (2006) studying lesson development and efficiency. Computer-assisted teaching with simulations on shooting motion pictures. Educational photography by special techniques aimed at developing and finding the efficiency of computer lessons Help teach with simulated situations on motion photography, subject of educational



photography through Special techniques and comparison of academic achievement before and after learning with computer lessons. Help teach the researcher created. The sample group used were students who enrolled in the 2002 educational photography course. Department of Mechanical Education Faculty of Industrial Education King Mongkut's Institute of Technology North Bangkok, Academic Year 1/2006, totaling 30 people. The research model used was a single group. Exams before and after classes and compare the student's academic achievement by testing the Thonburi Rajabhat University 46 t (t-test). The results of the research showed that computer-assisted instruction. The efficiency was 82.0/88.0. The mean score of the post-study test was significantly higher than the pre-study test score of .05, consistent with Anan, U. (2006). Developing online edutainment lessons using animation on educational measurement and evaluation. The purpose is to create and find the quality of online lessons study efficiency, achievement, and satisfaction of learners with lessons online research results. It was found that the content quality assessment of online lessons was an average of 4.25 at a good level. The media production quality assessment of online lessons was an average of 3.87 at a good level. The efficiency of the online lessons created 87.58 / 86.41 was higher than the specified threshold of 85 / 85 when pre-test and post-test scores were analyzed for achievement. It was found that after-school test scores were statistically significantly higher than before at 0.01 level, and the sample's satisfaction with online lessons was averaged at 4.18 at a high level. The researcher has an opinion that online learning systems, in addition to subtitles or text content and lectures from teachers. There should be still images and animations. To increase interest in learning and make learners see examples of lessons that are easy to understand. It may also make the learner concentrate and focus on learning.



Figure 3 Model Development guidelines for online lesson media.

## Conclusion

Thailand announces to change the opening hours for the 1st semester of the academic year 2020 using the education model online or distance education. There is support for online teaching methods and building a knowledge base or content service schools use for free the education system uses an online system to support teaching in the normal system. By studying online in tandem with different proportions of practice in each field of study use online media including textbooks for educational purposes For universities, there is an online system to replace the normal education system by using various applications as Teaching tools and communication between teachers and learners in various systems was used during Implement, trial, develop, train teachers and create a learning network to lead



to substitute teaching in class Dear, with the hope of being able to use the online system more effectively.

The epidemic situation of the COVID-19 crisis is an important opportunity to organize education in a new way. Normal, which is a major change in the concept that must be consistent and connected with student learning by adjusting Courses in line with the COVID-19 situation and communicating to all concerned parties to increase the flexibility of the structure of the learning time and the variety of learning styles of teachers designed the unit for learning and teaching. with an appropriate plan, including raising the level of assessment for development so that students do not lose the opportunity to develop knowledge and skills, especially knowledge of the language and numeracy even without covid-19 (Thachaipong, P., & Durongkaverot, P.1998) The Thai education system is changing all the time from many driving factors both economically and socially, such as the changing population structure, Disruptive Technology that changes the skills that are needed and political and administrative aspects such as Policy implementation of the Ministry of Education, etc., COVID-19 is a catalyst for the changes that are pending to happen faster, such as the use of technology for learning more widely.

#### Recommendations

## A. Recommendations for Practices

The results of an analysis of the demand for online lessons character and color overall, it was at the highest demand level, with an average of 4.99. When considering the sub-issues of the demand level, it was found that the high demand level was the suitability of font styles. The highest mean, the mean of 4.32, followed by the suitability of font color and background, the mean of 4.25 The suitability of the font, the mean of 4.23 The linguistic accuracy, the mean of 4.11 The suitability of the font size, the mean. 4.08 The prominence of the topic, the average 4.06, respectively.

1. Use of this online lesson material It should have a high speed and stable internet connection to avoid delays in downloading data which has both pictures and video. However, online tutorials can help reduce the problem of capacity consumption of electronic devices and the compatibility of different operating systems.

2. Teachers should involve all learners in every activity after studying through online lessons to exchange ideas and creative skills because the study of studying and doing the test alone may be able to demonstrate knowledge and understanding of the content but cannot reflect the concept of creativity is as good as creating real work.

3. An application that is easy to use, not difficult to the menu, and supports a variety of devices to help promote learning that is not limited to being in the classroom only. This allows students to use their free time to review or study by themselves. Therefore, it is suitable for teaching and learning materials that will enhance students' achievements.

## B. Recommendations for Further Research

The results of the analysis of online lesson demand for still images were at the most demanding level with an average of 4.00. The highest mean was the mean of 4.23, followed by the color and fit of the picture, the mean of 4.11, the suitability of the picture in the frame, the mean of 4.03, the balance of the picture, the mean of 4.03, the balance of the number of shots, the mean of 4.03, the picture consistency with the content, average 4.06, respectively.

1. There should be comparative research on learning achievement. By using online lessons with many teaching methods such as teaching projects cooperative teaching before learning, multi-wisdom teaching, etc.

2. There should be research and development of online lessons to have a variety of styles so that students will not be bored. The traditional online learning style also allows students to contact teachers immediately.



## References

- Anan, U. (2006). *Developing online education lessons using animation on measurement and Evaluating the results of the study.* Thesis Master of Education, Department of Education Technology, King Mongkut's University of Technology Thonburi.
- Atthaphut, B., Sittiwong, T., & Theeraputhon, D. (2017). *Design and Development of Multimedia for Learning*. Bangkok : Chulalongkorn University.
- Heath, Marilyn June. (1997). The Design, Development, and Implementation of a Virtual Online Classroom. [Online].

Available:http://wwwlib.umi.om/dissertations/fullcit/ertations/fullcit/9803569.

- Inthakanok, P. (1998). Comparison of teaching and learning with the Internet that tells and does not give directions. Research on the educational achievement of high school students with learning styles different. Ph.D. thesis Bachelor's degree in Educational Technology and Communication College, Chulalongkorn University.
- Johnson, B. (1997). *Enabling the reuse of World Wide Web documents in tutorials*. [CDROM]. Abstract from: Dissertation Abstract On disc (March.1997)/Item I97386300
- Masae, W. (2006). The Development and Efficiency of Computer-Assisted Teaching Lessons. Simulated situation on motion photography in educational photography subject by method Special techniques. Thesis, M.A. Technology, King Mongkut's University of Technology North Bangkok.
- Office of the Basic Education Commission. (2020). *Education in the digital age*. [Online] Retrieved March 29, 2021, from https://www.posttoday.com/social/general/.
- Phrombut, S. (2020). *New normal with changing lifestyles*.[Online] Retrieved March 28, 2021, from https://dsp.dip.go.th/en/category/
- Seguin, C. A. (1995). Teacher's use of the electronic information highway (Internet) for curriculum and professional activities. Dissertation Abstract International. 58(7): 2612A.
- Thachaipong, P., & Durongkaverot, P., (1998). Information Technology for Education: Study Report. Bangkok: Research for the drafting of the National Education Act, printing and printing houses, Charoen Phon.