THE RESULTS OF DEVELOPMENT OF AN INSTRUCTIONAL MODEL BASED ON CONNECTIVISM THEORY FOR PROMOTING INFORMATION LITERACY OF MATTAYOM SUKSA 1 STUDENTS

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ABSTRACT

The purpose of this research was to study the results of development of an instructional model based on Connectivism theory of MattayomSuksa 1 students. The sample group in this study was the MattayomSuksa 1 students who took the information and communication course in the first semester of the academic year 2017 at PueaiNoiSuksa School. The research instruments used in the study were the plan of the instructional model based on Connectivism theory for promoting information literacy of MattayomSuksa 1 students and the information literacy test. The results of the research was that the students who studied by using the instructional model based on Connectivism theory had a progress in information literacy at 68% (E.I. = 0.68). The average score after learning by using the instructional model based on Connectivism theory was higher than the before learning's score at the statistically significant level of .05.

Keywords: Development of an instructional model; Connectivism theory; Information literacy

Introduction

Introduction The 21st century's rapid transformation of society is due to the growth of information technology and communication. The world can be linked to each other easily and without borders. There are many organizations that are preparing their own youth by developing a 21st-century living skills framework to accommodate the changes that have taken place. With the rapid growth of technology, the 21st Century Learning Collaboration Network has developed a vision for students' success in the new global economy as the core learning framework with the primary aim of achieving the success in the areas of work and lifestyle amidst the changes in the 21st century. The framework was approved and integrated knowledge, specific skills, expertise and knowledge of the various areas together.Under the context of the content of the core subjects, students in the 21st century need to have the important skills: critical thinking, problem solving, creative thinking, communication and collaboration (Panich, 2012:18). The 11th National Economic and Social Development Plan of Thailand has assessed the situation and risks of Thai society that the rapid changes through globalization and cyberspace have caused Thai people seek happiness and personal formed contemporary subcultures which have various themes and group of people who share the same interests. Thus, social networking group becomes larger. As a result, the 12th National Economic and Social Development Plan has the key principle: "Use people as the center of development." Amidst various problems that are the obstacles to develop the country, it is, therefore, recognized that in order to develop Thailand into a

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developed country – the country that is stable, prosperous and sustainable in the long run - ensuring that everyone has a good education and an opportunity to have a lifelong learning is needed. All of these can be done by setting the vision of the National Education Plan that all Thais will be educated, have a lifelong learning opportunity and live happily according to the Philosophy of Sufficiency Economy and the transformation of the world in the 21st century.From the concept and strategy of country development, it can be seen to be consistent with the changing world in the digital age. According to the objectives of the country's development strategy, there are important skills that 21st century citizens need to learn in order to use them as a lifelong learning tool and the analysis and selection of appropriate identity through social networks and it has media. Those are information, media and technology skills. The information, media and technology skills consist of using new technologies effectively, using and evaluating information and analyzing and selecting appropriate media. These skills will make students stand out from others (Wongkitrungruang & Jittarurk , 2008:43). Connectivism theory is the concept that supports the teaching in the digital age and has expanded rapidly. The 21st-century learning emphasizes on the use of technology for learning anywhere and anytime according to the interests of the learners. The learners will learn all the time which will develop society and provide maximum benefits to the learners. This theory is believed that learning is dynamic and the knowledge occurs in every second, which brings about the rapid change (Tunhikorn, 2008:13).Under the concept of learning theory for digital is the theory that supports knowledge and change from new discoveries which happen quickly.The knowledge that learners received has evolved over time and from a great amount of information, learning is not limited only in the classroom, but also out of the classroom.Humans need to adjust, learn and keep up with the past by using important sources such as internet, community and ecology in order to join the group and learn from each other (Sungpum, 2008:50).

From studying Connectivism theory, in order to implement it in teaching, the teacher will have to design activities by mixing them with various media. For instance, the teacher can use media in video file, create a knowledge base for students to study and arrange a communication channel that engages learners to interact with teachers or experts, such as using a video conference and an online community. The teacher may design as a node of the activity in order for the learners to learn both in and out of the classroom and to know that in some situations and some problems which sources they need to explore to solve the problems (Downes, 2015 as cited in Sungpum, 2008). For example, the sources may be a popular online social network, news boards, community knowledge boards, the sources that the instructor has prepared and from communicating between learners, instructors, and experts as well as channels on various related networks in order for the learners to integrate their new knowledge and original experience into the durable knowledge.The knowledge that students gained will appear in the form of portfolio and assessing the real condition in the classroom.

The important duties of the instructor are to integrate the content and technology properly and also to select the appropriate tools on the Internet. Similar to Kathleen Dunaway (2011:online), she stated that Connectivism theory was appropriate to be used in teaching information literacy, because it was consistent with the new standard of information literacy which focused on the study of knowledge from various disciplines and the adaptation of the knowledge gained into the new knowledge. From above, it is concluded that the use of modern technology is an important basis for developing 21st century learning skills.

However, the use of information in the information age has a huge impact on the user as it can be seen from the occurrence of the Act on Computer Crime B.E. 2550 to prevent inappropriate use of information. However, there are continuing

crimes regarding the use of computer and information whether it is a violation of personal privacy or a comment on the defamation of others on various websites.These behaviors indicate that the user is using the wrong information and causing the damage to other users as well. This led to the development of many theoretical approaches, but it was a predigital theory .At that time, as it does today. There fore, Connectivism theory is the appropriate learning theory to explain the learning that occurs in the digital age.

From the information mentioned above, the researcher developed the instructional model based on Connectivism theory for promoting information literacy of MathayomSuksa 1 students by studying the principles of developing instructional model theoretical framework, documents, research related to the development of the instructional model based on Connectivism theory and the research concept in order to promote information literacy of the students. This instructional model is called 5s Model. It consists of five steps: (1) Start: it is to identify the issues to look for the answer, (2) Search: it is to survey and search, (3) Self-Assessment: it is to evaluate information, (4) Show: it is to exchange the evaluated findings and (5) Share: it is to decide on choosing information and publish. The focus of this model is on learners to be able to exchange knowledge through networks that interests are commonly shared by utilizing learning sources on the Internet through tablet devices or smartphone, which students can learn at anywhere and anytime. digital did not play a vital rolein humanlife

Objective of the study

To study the results of the development of the instructional model based On Connectivism theory for promoting information literacy of Mathayom Suksa 1 students in both before and after learning.

Theoretical framework

Independent variables

The process of the instructional model based on Connectivism theory for promoting information literacy of MathayomSuksa 1 students:

Step1 Start : to identify the issues to look for the answer

Step2 Search : to survey and search

Step3 Self –Assessment : to evaluate information

Step 4 Show : to exchange the evaluated findings

Step5 Share : to decide on choosing information and publish

Dependent variables

Information literacy on four aspects:

1. Define and Access Information
2. Information Management
3. Analysis and evaluation of information
4. Ethics in Information use

Research instruments

The instructional model based on Connectivism theory for promoting information literacy consisted of the following tools:

1. The instructional plan in the learning unit of information management based on Connectivism theory for promoting information literacy of Mathayomsuksa 1 students consisted of seven plans. Each plan took two hours. It was in total 14 hours. The procedures were as followed:

1.1 Basic Education Curriculum B.E. 2551, instruction Manual of Career and Technology of

Ministry of Education and the school curriculum of Puai Noi School were studied.

1.2 The content of the instructional plans in the learning unit of information management from the description of information technology and communication and the timing of learning were studied.

1.3 The relationship between the content, the main idea, and the learning objectives in the learning unit of information management were analyzed.

1.4 The chairman and the thesis supervisor validated the content, the learning objectives, the learning activities, the learning media and the evaluation of the instructional plans created by the researcher. Then, the instructional plans were adapted according to the recommendations of the chairman and the thesis supervisor in the areas of the activities, the appropriate time used for each plan, setting criteria for assessing learning behavior and a clear assessment for the work performance.

1.5 The instructional plans were reviewed and evaluated in the areas of the quality, the content accuracy and the relevance of terminology by five experts.

1.6 The researcher reviewed and edited the instructional plans according to the experts' recommendations, and then submitted them to the thesis supervisor committee for evaluating the content validity before trying them out with MattayomSuksa 1/1 students who were studying in the first semester of the academic year 2017at PueiNoiSuksa School after that using the results obtained to correct the mistake section.

1.7 A complete instructional plan was published in order to implement it with the sample group for further research.

2. Creating the information literacy test for MathayomSuksa 1 students by using Criterion-Referenced Evaluation. It was a multiple choice – choosing from four choices – with the total of 30 items. The steps of creating the form were as followed:

2.1 Information literacy standards, indicators and information literacy behaviors from textbooks, articles, research articles of some organizations and scholars: American Association of School Librarians [AASL] and Association for Educational Communication and Technology [AECT] (1998) , Association of college and Research Libraries [ACRL] (2006) and adapted fromInformation Literacy Assessment (Ann Viles,1999) andInformation Literacy Test (Richard Stockton College of NJ,2005) were studied and analyzed.

2.2 For a 30-item multiple choice test, students would get 1 point for each correct answer and 0 point for each incorrect answer.

2.3 Five experts who have knowledge and experience reviewed and provided recommen dations on the test, and then the test was edited according to the experts' in order for the test to be more accurate and consistent with the indicators.

2.4 The results of the quality assessment of the information literacy test by the experts were that the four-multiple-choice information test was accurate. However, the experts had reported that some of the correct answers in the test were clearer than the tricky choices. They should be adjusted. Moreover, the language used in the questions and choices should also be adjusted.

2.5 The researcher implemented the revised information literacy test with 26 students in the MattayomSuksa 1/1 in the first semester of academic year 2017, and then graded the tests. After that, the score was calculated for the item difficulty, the discrimination and the reliability of the test. It was found that the item difficulty was between 0.21-0.80, the discrimination ranged from 0.25 to 0.99 and the reliability was at 0.87.

3. Creating virtual learning environment: PNS Online Classroom A virtual learning environment is based on the concept of Connectivism theory to promote information literacy of MathayomSuksa 1 students. The following steps were how to create a virtual learning environment:

3.1 Documents and research related to

virtual learning environment were studied and analyzed, and then, used the data obtained from the research of Phase 1 in the area of the elements related to information literacy to design virtual learning environment. The structure should consist of four main components:

1) The administrative system consists of permission creation, user authorization, back-up and tracking the usage.

2) The lesson consists of press release, news and the course display.

3) The lesson management section consists of the following content presentation, uploading files, lessons, work sheet, students' performance, course description, assignment exercises and assessment.

4) The learning support section consists of editing learning information, online chat room, bulletin board, electronic mail and learning progress display.

3.2 The researcher designed the lesson by writing a story board based on the lesson plan that was developed. After that, IT experts validated it before presenting to the thesis advisor.

3.3 The story board was edited according to experts' recommendations.Then, it was used to developthe teaching system by using Moodle to develop a learning management model.

3.4 The virtual learning environment: PNS Online Classroom that had been developed was validated by three education technological experts in order to ensure the quality, the appropriateness and the usability. According to the experts' comments, the overview of screen design of the instructional model based on connectivism theory for promoting information literacy of MattayomSuksa 1 students was at the highest level (X = 4.61 , S.D. = 0.30).

3.5 The virtual learning environment: PNS Online Classroom was edited according to the experts' feedback. Then, the researcher submitted it to the thesis advisor for approval before implementing it in the classroom.

Research methodology

Comparative analysis between information literacy and achievement of students who were taught by using the developed instructional model in both before and after learning had the steps below:

1. Implement the instructional model in the class. The researcher conducted the following steps:

1.1) The population and sample used in the research were defined as followed.

1.1.1) The population was 77 MattayomSuksa 1 students in the first semester of academic year 2017 at PueaiNoiSuksa School, the Secondary Educational Service Area Office 25

1.1.2) The samples were 26 students studying in MattayomSuksa 1/1 in the first semester of academic year 2017 at Pueai Noi Suksa School, the Secondary Educational Service Area Office 25. The samples were selected by using simple random sampling.

1.2) The samples were pre-tested by using the information literacy test. It took 45 minutes for the test.

1.3) The researcher implemented the instructional model, 5S Model which consisted of seven plans that took 14 hours for teaching, in the classroom.

1.4) The samples were post-tested by using the information literacy test. It took 45 minutes for the test.

2. Evaluating the use of the instructional model by analyzing the scores of the information literacy pre- and post-tests.

2.1) The researcher evaluated the information literacy by calculating mean ($\bar{x}$), standard deviation (SD) and percentage of information literacy pre and post- tests' scores, and then analyze the effectiveness index (E.I.)

2.2) The researcher compared the difference between information literacy pre- and post-tests' scores by using the Dependent Sample t-test at the statistically significant level of .05

Results

From implementing the 5S Model which consisted of seven plans that took 14 hours for teaching in the MattayomSuksa 1/1 classroom in the first semester of the academic year 2017 at PuaiNoiSuksa School and pre-and post- testing by using the information literacy tests for Mattayom Suksa 1 students and also evaluating during learning, the results are presented in the following topics:

1. The results of promoting information literacy by using the instructional model based on connectivism theory for promoting information literacy of Mattayom Suksa 1 students (5S model)

The progress of information literacy of the students who were taught by using the 5S Model was presented with an Efficiency Index (EI) as follows.

Table 1 The results of promoting information literacy of MathayomSuksa 1 students

Tests	Number of the students (N)	Score			
		Available points	$\bar{x}$	Total points received of all students	Effectiveness Index (E.I.)
Pre-test	26	30.00	15.92	414	0.68
Post-test	26	30.00	24.73	643	

From the table above, it was found that before implementing the model in the classroom, the average score ($\bar{x}$) of the students was 15.92 from 30 points, but after learning with the 5S Model, the students had an average score ($\bar{x}$) of 24.73, and the Effectiveness Index was at 0.68. It was concluded that the students who learned with the 5S Model had a progress in information literacy at 68%.

2. The results of the comparative analysis of information literacy before and after learning of the students who were taught by using the developed instructional model

The results of the comparative analysis of information literacy before and after learning of the students who were taught by using the developed instructional model were presented as follows:

2.1 The results of the comparative analysis of information literacy before and after learning

Table 2 The results of the comparative analysis of information literacy before and after learning

Tests	Number of the students (N)	Score		Df	t	Sig
		$\bar{x}$	S.D.			
Pre-test	26	15.92	15.92	25	29.47	.00*
Post-test	26	24.73	1.77			

* .05

From the table above, it was found that the students had the average score ($\bar{x}$) before learning at 15.92; the standard deviation (SD) was at 15.92, and the average score ($\bar{x}$) after learning was 24.73; the standard deviation (SD) was at 1.77. When comparing the pre-and post-test information literacy average scores by using Dependent Sample t-test, it was found that the value of t was at 29.47, and the value of sig

(2-tailed) was at .00. It was concluded that the MathayomSuksa 1 students who learned with the 5S Model had the pre- and post-test information literacy average scores at the statistically significant level of .05. pre-test's score.

2. The results of the efficiency evaluation of the instructional model based on Connectivism theory for promoting information literacy of the Mattayom Suksa 1 students after implementing it in the classroom

The researcher analyzed the observation of learning behavior, the worksheet activities, the test after learning and the results of the information literacy tests in order to find the process efficiency of the instructional model based on Connectivism theory for promoting information literacy of the 26 MathayomSuksa 1 students The

2.1 The score of post-test was higher than the results were demonstrated below.

Table 3 The average scores from the instructional model

Instructional plans	Score			
	Available points	$\bar{x}$	S.D.	Percentage
Plan1Definition of data and Information	29.00	21.61	2.54	74.51
Plan 2 Types of data	12.00	9.38	1.35	78.16
Plan 3 Data processing methods	9.00	7.46	0.81	82.88
Plan 4 Characteristics of good information	9.00	7.53	0.81	83.66
Plan 5 Social networking resources	9.00	7.73	0.82	85.88
Plan 6 Information Systems	12.00	10.19	1.02	84.91
Plan 7 Levels of information	12.00	9.84	1.04	82.00
Average score of all plans	13.14	10.53	1.19	81.71

From the table above, it was shown that the average score ($\bar{x}$) of the Mathayom 1 students at PuaiNoiSuksa School who were taught by using the instructional model based on Connectivism theory for promoting information literacy was 10.53 and the standard deviation (SD) was at 1.19 from 13.14 available points, or 81.71%.When considering the score according to each plan, it was found that the students made the highest score on Plan 5 Social networking resources with the average score ($\bar{x}$) of 7.73 and the standard deviation (SD) of 0.82 from 9.00 available points, or 85.88%, while the lowest average score was onPlan 1 Definition of Data and Information with the mean score ($\bar{x}$) of21.61 and the standard deviation (SD) of 2.54 from 29.00 available points, or 74.51%.

Table 4 The results of effectiveness evaluation of the instructional model after implementing it in the classroom

The results of the instructional model trial						
Score during learning			Score after learning			Effectiveness E1/E2
Average of available Points	$\bar{x}$	Percentage (%)	Available points	$\bar{x}$	Percentage (%)	
13.14	10.53	81.71	30.00	24.73	82.43	81.71/82.43

From the table above, it was shown that the effectiveness of the instructional model based on Connectivism theory for promoting information literacy of MathayomSuksa 1 students according to the criterion (E1/E2) 80/80 was 81.71 / 82.43.

Discussion

According to the findings, it can be discussed as follows:

The strength of the development of the instructional model based on Connectivism theory for promoting information literacy of the students by using 5S model was that the instructional model was in harmony with the nature of today's learners, where they can access knowledge and seek knowledge through their communication devices. Also, the interaction through social networking and joining groups which share the same interests or contexts of the learners led to the experience and knowledge sharing with each other. The 5S Model is the instructional model which is easily accessible both in the classroom and out of theclassroom. Learners can use the communication devices as a tool to learn and seek knowledge anywhere and anytime. However, with a great amount of information information. In learning management, it is necessary to develop the knowledge that learners truly understand the context and have the interpretation process of the information they need.Learning with the 5S Model is the process that encourages students to be able to define and access information. Step 1 Start: it is the step that identifies the issues to look for the answer. This is an activity that aims to educate the learners and make them understand the main idea of the content, including encouraging students to identify what information they need before going to Step 2. Step 2 Search: it is the step that surveys and searches. This step allows the learners to define the scope and keywords to access the source and plan on searching for the information by using the appropriate keywords to the context. With the speed of technology, the users at times lack the awareness in forwarding information. This results in widespread damage. Therefore, the 5S Model developed by the researcher has the process that can assist students to analyze and evaluate the information. Step 3 Self –Assessment: it is the step that evaluates information. It is intended for the available, the students are facing the problems in searching of the quality the evaluation criteria of information resources on the Internet: relevance, accuracy, authority and currency. This step can be done by organizing activity that the students have to do the check-list with the information that they have searched. The students must consider and analyze by themselves first before checking the data or information again. Step 4 Show: it is the step that exchanges the evaluated findings and Step 5 Share: it is to decide on choosing information and publish. The learners must present the information in a polite language and accept the different opinions. If other learners need more information, the student must be able to further their search.

According to the findings, it was found that the instructional model based on Connectivism the-

ory for promoting information literacy of MathayomSuksa 1 students can assist the students to have more information literacy at 68% (E.I. = 0.68). When comparing the pre- and post-test information literacy scores by using Dependent Sample t-test, it was found that the students had the pre- and post-test information literacy scores at the statistically significant level of .05. The average score of post-test was higher than the pre-test. In learners to consider the reliability of information by themselves according to she studied the use of virtual learning environment for integrating it with her information literacy teaching in elementary level, it was found that the students had information literacy skills at the statistically significant level of .05. The information literacy skills after learning were higher than the before-learning skills. From all above, it showed that the instructional model based on Connectivism theory for promoting information literacy has a process that encourages students to gain information literacy through 5-step learning activities which are developed from the concept of Connectivism theory. The theory supports the teaching in the digital age which has grown rapidly and focuses on a lifelong learning, because 21st-century learning emphasizes on using technology as a tool for learning which the learners can learn anywhere and anytime according to their interests and keep them learning all the time. The researcher designed the natural learning model of communication technology used by people who usually use social networking as a means of communication. The researcher designed the activity that learners can be familiar with the accordance with Kingsawat (2013:237), seeking self-knowledge. Similar to Promwang (2013, p. 226), The developed the instructional model through virtual classroom by using online social media based on Metacognition theory and Constructivism theory for junior high school students by using online social media to learn, discuss, converse, share experiences and exchange opinions such as Chat, Web board, Facebook and Line. It assists the students search for information and seek knowledge independently. Moreover, the students enjoyed learning on the Internet. As a result, it increases the ability of information literacy efficiently. Conclusion It was found that MattayomSuksa 1 students who had studied by 5s Model had the pre- and post-test information literacy scores at the statistically significant level of .05 The average score of post-test was higher than the pre-test. From this result, it can be seen that 5s Model can promote students' information literacy because the instructional model based on Connectivism theory is the learning management on the Internet, which is combined with a variety of online media. The teacher must design the learning both in the classroom and out of application which promotes learning and because of the things around the learners, but the learning will happen when the learners participate in various activities and interact with others. In addition, this kind of knowledge will facilitate learning through the networking of people in the society and sources in order to employ the learning model according to the principle of the instructional model based on Connectivism theory for promoting information literacy that the researcher developed.

Recommendations

1. Recommendations for the application of the research results

1.1 From the research results, it was found that the instructional model based on Connectivism Theory can promote information literacy of MattayomSuksa 1 students. They obtained information literacy on all four aspects: (1) Define and Access Information, (2) Information Management, (3) Analysis and evaluation of information and (4) Ethics in Information use. Thus, high School teachers should employ in other courses that they teach, especially in the learning units that require research and query. the classroom, because Connectivism theory believes that knowledge occurs self-knowledge by using quality and accurate information.

1.2 Information literacy should be taught for students in all levels as knowing information will guide the learners to seek

2. Recommendations for further research

2.1 The instructional model should be developed to accommodate large group of learners in order to achieve a stronger learning network.

2.2 Up-to-date online communication tools should always be used in order to promote students to gain information literacy and keep up with developing technology.

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