Learning Model Using Cloud-Based on U-Learning Environment in the New Normal Covid-19 for Enhancing Students' Learning Achievement

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Abstract

The objectives of this study were: 1. to develop a learning model using Cloud-based on U-Learning Environment in the New Normal Covid-19; 2. to evaluate learning model using Cloud-based on U-Learning environment in the New Normal Covid-19; and 3. to investigate the result of using the learning model. The study consisted of two steps: 1. Synthesis of the learning model, and 2. evaluation of the learning model. The sample group for the study consisted of 48 students taking Computer Study selected by purposive sampling. The research instruments were: 1. learning model using Cloud-based on U-Learning environment in the New Normal Covid-19 situation, 2. a questionnaire evaluating the learning model, and 3. achievement test. The statistical procedures used for data analysis included percentage, standard deviation, and t-test.

The research findings were as follows:

1. The learning model using Cloud-Based on U-Learning environment in the New Normal Covid-19 to enhance students' learning achievement consisted of five components, namely: 1) teacher, 2) learners, 3) Learning Process, 4) Cloud Knowledgebase, and 5) Scaffolding System.

2. The developed learning model is appropriate at a high level, and is able to be applied in learning management in the COVID-19 situation.

3. The learning achievement after learning is higher than before learning with statistical significance at the level of .01

Keywords: Learning Model, Cloud-Based Learning, Ubiquitous–Learning Environment, New Normal Covid-19 Situation

Introduction

Currently the learning management process has placed emphasis on building body of knowledge by oneself in an active learning style with the teacher as a facilitator who specifies the problem, guides problem solving methods and knowledge repository or a source for the learner to search for the answer to the problem. Therefore, the teacher has to emphasize the learning management process and think of the way how the learner would learn from various

activities designed by the teacher. Based on the learning management in the 21st century, both the teacher and learners have to get access to body of the knowledge and do learning activities any where and any time using the internet which is basic infrastructure technology for the learner to practice, review his knowledge and follow learning advancement at all times without limitation of places, time and learning aids.

At present learning-teaching could not be performed in a regular manner because of COVID-19 pandemic from the end of 2019 up to present. The spread of this virus has caused a lot of deaths to people all over the world, making them to be cautious and protect themselves such as wearing facial masks, washing hands with alcoholic gel, keeping social distancing by limiting the number of people in the same place. Such situations have created changes in the education circle by applying technology, whether it be internet, computer and smart phones to use in education so that the teachers and students at schools could communicate and set up learning activities to meet the school's objectives. During the first period of changes, Thailand operated learning management through DLTV Online and DLTV Offline in the classroom in conjunction with learning by Home School. The change from One-Size-Fits-All , the teaching-learning in the 21st century, has to be adjusted to be what is called squared education using a new normal way of life because it could not be operated as in the past (Pacharaporn Duangcheun, 2020). The form of teaching-learning at schools has to be online. From a study, teaching online is a combination of e-learning and m-learning called U-Learning (Ubiquitous Learning Environment) used to present the content and activities to students through which they can learn from computers and every communication aid that works like a computer such as notebook, tablet, and smartphone. U-Learning can be adjusted to suit learners and their context in their real existing environment. The U-Learning environment is composed of five component: Microprocessor, ULE Server Module, Wireless Technology, Sensors and Learning Management Process (Nazime Tuncay and Huseyin Uzunbotylu, 2012). These factors have different functions and each factor will have perfect relation which constitutes learning on cloud generally called learning on the cloud. Cloud computing technology is an idea of opening an area on server which provides software services, repository, and the system that make learners learn using cloud-based learning by cloud technology to help the learners have their own personal learning area, keeping their files and working software on the internet. Thus, the learners can learn by different areas without necessarily having their own personal computers or smartphones. By Cloud-based Learning, the learners have diversity of learning such as online self-paced courses, electronic newspapers, podcast (disseminating knowledge using technological streaming in the voice form and or/ video), simulation, testing, suggestion checking, virtual classrooms, games, learning community, and collection by portal which collects resources and services together (Jaithip Na Songkhla, 2018). In the New Normal of the COVID-19 situation, managing online teaching and learning should be an adaptive learning system that utilizes technology to provide immediate feedback to learners during their learning activities. Adaptive learning systems can differentiate instruction by adjusting the pace and difficulty level of assigned tasks for both high-achieving students and those facing learning challenges (Isha DeCoito and Estaiteyeh, 2022). On the other hand, responsive systems provide feedback and guidance to learners as they engage in the same set of exercises, in the same order, and at the same pace. Additionally, managing online teaching and learning should incorporate learning analytics to predict when learners might be struggling (Vivolo, 2019).

Based on the mentioned above the researcher is inspired to have an idea to develop a learning model using cloud-based on U-Learning environment in New Normal Covid-19 situation to enhance learners' learning achievement with the aim of applying it in online learning management during COVID-19 situation where regular lessons could not be operated.

The developed learning model would help enhance learners' learning achievement to be higher when compared with the online teaching-learning management operated in the past.

Objective

1.To develop a learning model using Cloud-based on U-Learning Environment in the New Normal Covid-19.

2.To evaluate the learning model using Cloud-based on U-Learning Environment in the New Normal Covid-19.

3. To investigate the result of using the learning model of Cloud-based on U-Learning Environment in the New Normal Covid-19.

Literature Review

Learning Model

Suchitra Kheawsri (2007) and Jiraporn Nuhsawat (2011) state that learning model refers to plan or form or structure set up according to philosophy principle, theory or ideas expressing the relationship between important factors of method of teaching and different teaching techniques in each step in a systematic manner. The efficiency of the model must have been proved, tested or accepted so that it could be typical for making teaching and learning to achieve its objectives.

Learning model is a structure of teaching-learning which has stipulated a framework that is related and in line with the learning theory so as to help the learner achieve the set learning objectives. The designed learning model must be evaluated in order to constitute reliability.

Cloud-based Learning

Cloud-based learning or learning on the cloud or cloud computing is an idea of opening an area on the service server, using software, depository and system is supportive to cloud-based learning, flexible in learning by using cloud. This helps learners have their own personal learning area, collect, reflect their ideas and use it at low cost. Keeping working files and software in the internet or cloud enables the learners to learn in different areas according to their convenience. Based on the Cloud-based learning, various forms of learning can be referenced and made such as online learning called self-paced courses, e-book, podcast which disseminates knowledge by streaming technology in the form of voice and /or video, simulation, testing, checking and giving suggestions, virtual classroom, games, learning community and collecting by portal that collects resources and services together for cloud-based learning which consists major components that enhance learning, namely:

1. Implementing knowledge, documents and document sharing that is up-dating new knowledge all the time constitutes a wide range of searching in order

to keep up with digital literacy, discriminate, select and use with realization of esthetics principles and logics in learning with searching, collect, and keep using document link and classification.

2. Personal learning environment for keeping, selecting the received knowledge and classifying as well as disseminating area for creativity and disseminating the knowledge.

3. Communicative cooperation, communication for learning, inquiry with correction, cooperative learning, online adjusting in real time or at different time using cooperative learning through communication, analysis, criticizing, communication through written critiques without time coordinating, such as blog, document correction, idea planning for exchanging and sharing, do computing by using thinking tables and intellectual instruments together.

4. Being oneness in carrying on learning activities using various tools for flexibility and aptitude and learners' style in each duration of time in order to go up to the cloud groups, and being able to learn continually at all time and places.

5. Knowledge disseminating and idea testing. The learner will synthesize, and systematically rearrange the ideas, evaluate the received knowledge, disseminate by testing real societal group for an evaluation, critiques, and discussion to top up the idea.

Learning in the New Normal COVID-2019 situation with U-Learning

Globish a stated that Learning model after COVID-19 would have four forms which were in line with New Normal depending on readiness as well as appropriateness for each school sizes, namely:

1. 100% online learning appropriate for the school with readiness on teaching-learning system and curriculum, learners are appropriate for online learning, and the guardians are ready to help or support, as well as the aids are also appropriate such as computer, notebook, tablet, smartphone and the internet. The teaching-learning has to be developed to be interesting and allow the learners to participate in the process so that it can be efficient. For the past online learning, a number of schools leaded in opening the schools for the learners, guardians and teachers could adjust themselves.

2. Classroom learning is suitable for a school with a small number of students and with an area enough for following the policy of social distancing and to intensively and strictly take care of students' hygiene along with getting the students to wear medical masks, and washing their hands frequently using alcohol. Besides, the school has to frequently kill germs at every corner at school as to prevent virus epidemic to reoccur.

3. Mix learning online and offline is suitable for a big size-school with a large number of students but without experience in online teaching-learning. In view of Globish, it is suggested to divide the students into two groups and come

to school in an alternate order two days per week for each group. For the third day, the students study online from home.

On the day the students come to study at school, the school can follow the social distancing system and intensively keep students' hygiene. To have efficient teaching, it is suggested that the school should teach practical subjects in classes where students can work together while other subjects can be taught through online.

4. Home school learning is expected to increase in Thailand because students' Guardians may have worry about their children's safety from diseases, sickness, pollution and other threats. The guardians will play their roles in learning management in the forms appropriate for the learners which may be online courses along with having a specific-subject teacher responding to the children's style of learning to teach at home and apply to the curriculum of the Ministry of Education. However, home school is suitable for the children who need special needs and those who have personal disease which are risky to go out to school (Benjawan and others, 2021) U-Learning is a kind of environment management that facilitates the learner to join the learning activity that the teacher has designed the process of building the knowledge for the learners to be able to learn by themselves. There is acknowledgement of the learners' context by detection technology and wireless technology which will help us to know the real environment of the learner while learning. Therefore the form of learning could be appropriated to suit the learners' wants and needs. The learners can get access to use it all the time by through the instrument with the Microprocessor and Memory functioning as the computer. U-Learning can be used as an online learning course in the New Normal COVID-2019 in order to follow up the learners' behavior and progress on online learning and also help the learners in case of they have suspicion while learning online instead of learning with the teacher.

Conceptual Framework

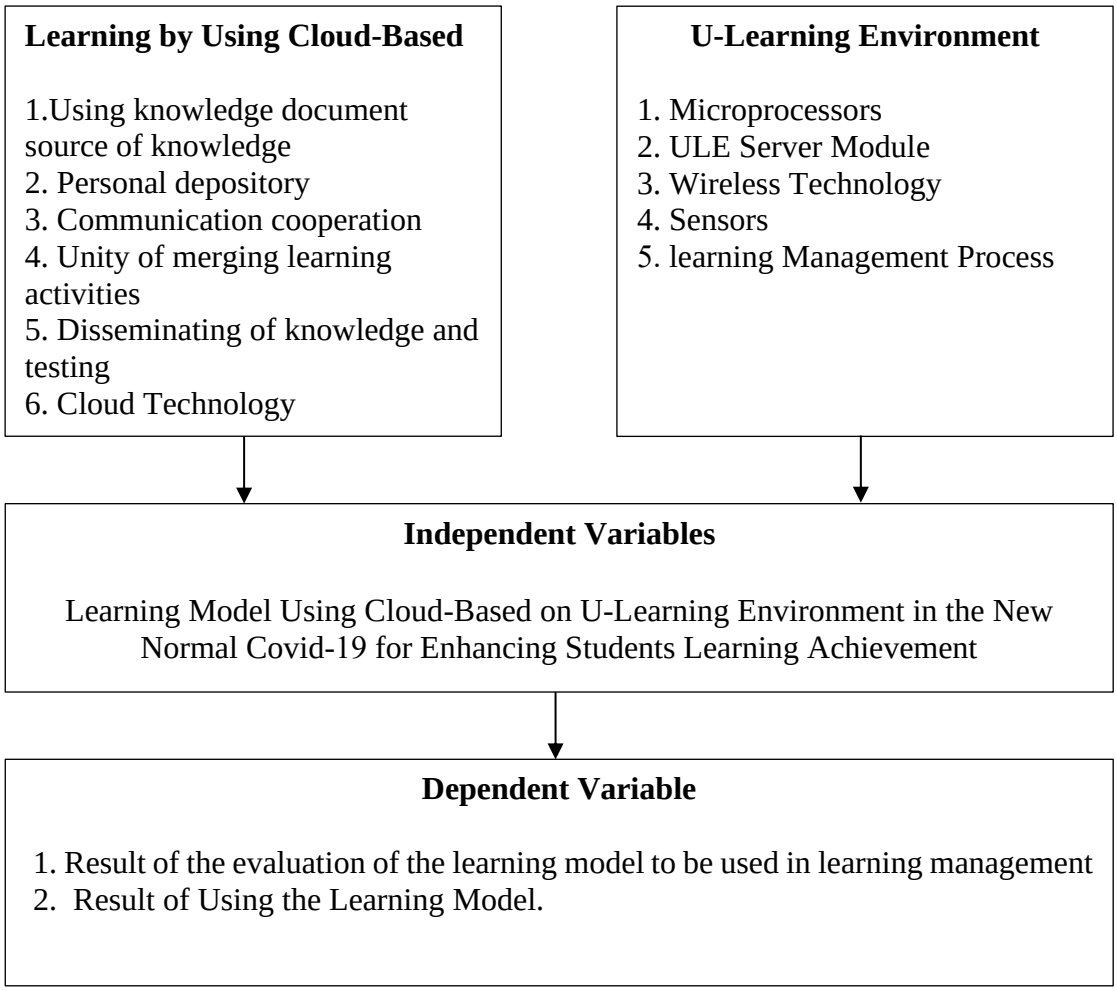

Figure 1: Conceptual Framework

From Figure 1 the researcher has investigated and analyzed learning using cloud-based in U-Learning environment to develop or synthesize as a learning model. Then the learning model is evaluated for appropriateness before using for learning management in order to compare the learning achievement before and after teaching.

Research Methodology

A synthesis to study the results of the learning model using Cloud-based on U-Learning environment in the New Normal Covid-19 situation to enhance the learners' learning achievement started from an investigation of the teaching-learning problems, theories and related studies as the guideline for the synthesis of the teaching-learning conceptual framework and then developed to be a learning model. on synthesizing, experts on different areas of study joined together and shared their ideas using Delphi Technique. The sample group consisted of experts on information and communication technology, digital learning design, and learning management design for the learners to study by themselves. The researcher received the information from the experts' opinions for the synthesis as a learning model and then evaluated its appropriateness by experts before accepted as a learning model.

How to create research tools

The researcher constructed a questionnaire as research consisting of three parts, namely: 1) a questionnaire derived from learning framework, 2) a questionnaire evaluating appropriateness of the learning model, 3) an achievement test. The steps of construction are as follows:

1. Construction of the questionnaire from the learning framework having these steps:

1.1) Draft the question items from the learning framework with four sides, namely: 1) general state of learning model, 2) ideas on learning using cloud-based, 3) ideas on U-Learning environment according to the learning model, and 4) ideas on learning scaffolding.

1.2) Find the validity of questionnaire contents using five experts purposively selected to check and judge the content validity of the questionnaire by the criteria of interpretation of each item between -1 to +1. It the value of the item is less than 0.60, it shall be improved or cut off.

1.3) Write an open-ended question for the experts to express their opinions and give suggestions on the learning model in the first round and then send it to the experts.

1.4) Summarize the experts' opinions expressed in the first round and then design a five-point rating scale questionnaire for the experts to consider in the second round within the framework of the experts' opinions in the first round.

1.5) Construct a five-point rating scale questionnaire to ask the experts' opinions in the second round, forward it to the experts, and then use the information from the experts' opinion to construct a five-point rating scale questionnaire to confirm their opinions in the third round.

1.6) Construct a five-point rating scale questionnaire to confirm the experts' opinions in the third round (last round) with value of the median and range between the quartile computed and then sent it back to the experts for their confirmation once again.

2. Construction of a questionnaire to evaluate suitability of the learning model using Cloud-based on U-Learning environment in the New Normal Covid-19 situation to enhance students' learning achievement, being the questionnaire to evaluate suitability of the learning model from experts with the following steps.

2.1) Construct a draft of the five-point rating scale questionnaire to ask for the experts' opinions on suitability of the learning model.

2.2) Construct a draft the questionnaire with its objective and write its items in line with its objectives.

2.3) Find the content validity of the questionnaire by using five experts purposively selected to check and consider the content validity of the questionnaire by finding IC: Index of

Consistency using the criteria of interpretation of each item between -1 to +1. If the value of the item is less than 0.60, it shall be improved or cut off.

2.4) Construct a draft of the questionnaire to evaluate suitability of the learning model by the experts.

3. Learning Achievement Test

The learning achievement test is a tool to assess the results of the learning achievement both before and after learning which has the following steps.

3.1) Make a draft of four- multiple choice test covering the content which was in line with the behavioral objectives and in proportion of the number of the test items, each learning topic and learning unit.

3.2) Find the IC: Index of Consistency between the test and the behavioral objectives of the learning achievement test by three experts to check and consider the content validity and the IC was at 0.82 level.

3.3) Select the test items in line with the behavioral objectives and improve the test following the experts' suggestions.

Data Analysis

The step of an analysis of the data for the development of learning model using cloud-based in U-Learning environment in the New Normal Covid- 19 situation to enhance students' learning achievement consisted of the following analyzing steps.

1. Analyze the conceptual framework in developing of learning model, teaching-learning problems, literature and related theories and studies.

2. Find the content validity of the questionnaire from the experts' point of view in synthesizing the learning model by identifying the IC: Index of Consistency of the questionnaire items asking the experts' opinions towards the learning model with regards to validity between the objectives and the content.

3. Synthesize the learning model based on the experts' opinions and suggestions for making a conclusion in developing the learning model through Delphi Technique in order to inquire the experts' opinions.

4. Analyze the data collected from an evaluation of suitability by the experts in order to evaluate suitability of the drafted of learning model by analyzing the mean and standard deviation and then made the conclusion.

5. Analyze and compare the learning achievement before and after learning.

Research Finding

Objective 1 The result of development of the learning model on U-Learning environment in the New Normal Covid-19 situation to enhance the students' learning achievement was divided into two natures: 1) logical conceptual framework of the learning model, and 2) the learning model as described in details below.

1. The logical conceptual framework of the learning model is the framework used to design an application according to the learning model as shown below.

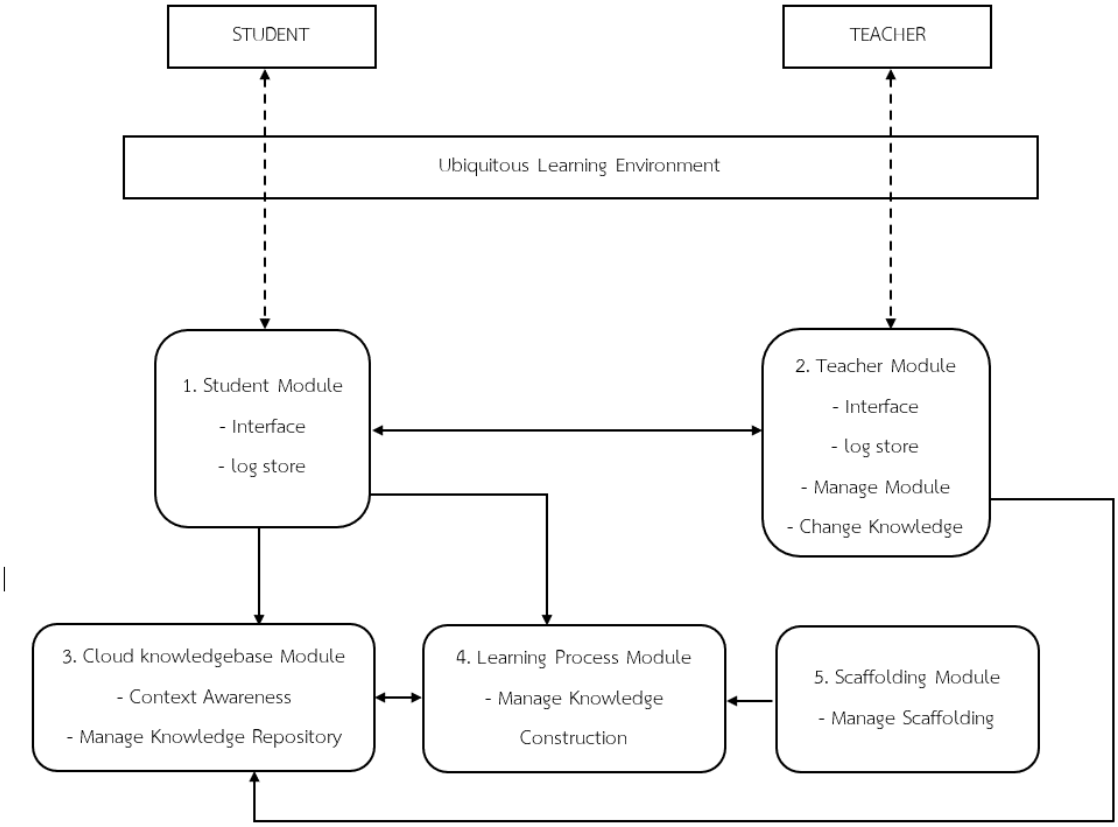

Figure 2: Logical Conceptual Framework of the Learning Model

From Figure 2 shows the factors of the Logical conceptual framework of the learning model which are used for an application design as described below.

1) Student Module: This module keeps the basic data of the learner, data of use, data of the aid the learner brings into the system, and the data of the learner's activities, which consists of two minor modules, namely:

1.1) Interface Module: This module contacts or connects the learner who comes to use the system

1.2) Log store Module: This module stores the data of the learner, the aids the learner uses and the activities he does.

2) Teacher Module: This a module that stores basic information of the teacher, the information that gives suggestions, helps the learners and the information on an evaluation of knowledge derived from learners' activities (Student Module) consisting of five minor modules, namely:

2.1) Interface Module: This module contacts or connects the instructor who comes to use the system.

2.2) Log store Module: This module stores the data of use of the instructor, the data on suggestions and assistance, the data on an evaluation of knowledge received from learners' doing a activities.

2.3) Managing Module: This module manages the data about the learners, students' groups in running the activities, and bringing the knowledge to the expert module.

2.4) Interface Module: This module contacts or connects with the experts who come to use the system.

2.5) Change Knowledge: This module evaluates and takes into consideration if it is necessary to transform the Dynamic Cloud knowledge based into a Static Cloud knowledge base module.

3) Cloud Knowledgebase Module: This module manages the data resources that collect information or the sources where the learners can find knowledge that helps or supports them to learn from electronic media having the information and form of knowledge presentation in their context and the learning aid they use, consisting of two minor modules.

3.1) Context Awareness Module This module checks what kind of aid or equipment used for learning (Student Module) and in what environment position.

3.2) Manage Cloud Knowledgebase Module: This module manages the information knowledge coming into the Static Cloud knowledgebase system which is managed by the Teacher Module.

4) The Learning Process Module: This a module that controls the operation to align with the P-K-S learning process of the learners. Its main function is to manage data following the knowledge construction process. This includes handling problem data and information related to providing assistance in various problems, all facilitated through the Scaffolding Module. The management of these processes is carried out through the use of the Student Module and Teacher Module.

5) Scaffolding Module: This functions as an assistant while students are doing their activities as to assist them to achieve their learning objectives, consisting of minor module, namely Manage Scaffolding Module which manages the information assisting the learners in different problematic situations in Student Module and also manages the data and assists the learners through Teacher Module.

2. Learning model on U-Learning environment in the New Normal Covid-19 situation to enhance students' learning achievement is composed of five major factors: 1) Teacher, 2) Learners, 3) Learning Process, 4) Cloud Knowledgebase, and 5) Scaffolding System.

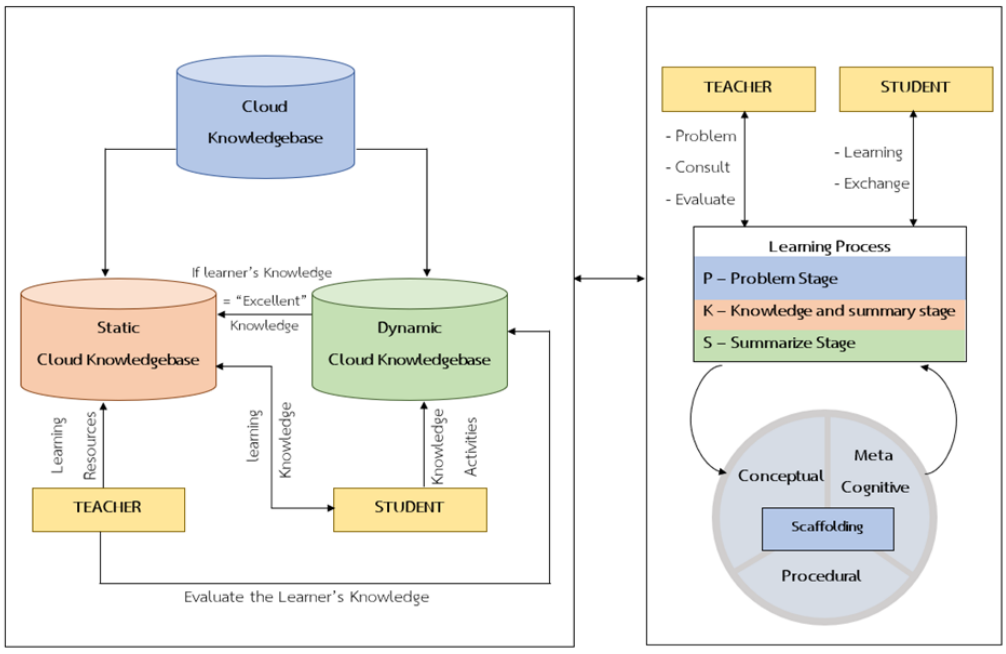

Figure 3: Learning model

From Figure 3 shows four factors of the learning model which are related as detailed below.

1) Teacher

1.1) Allocate learning resources or digital learning media through Cloud Knowledgebase

1.2) Specify problems for the learners so that they can make use of their prior knowledge to develop to be new knowledge.

1.3) Facilitate, give consultation and suggestions, and guide the students the way to solve the problems.

1.4) Evaluate the learners' knowledge from their outcome, follow up and report their learning progress.

2) Learner

2.1) Search for and collect the information through Cloud Knowledgebase for a synthesis by interpreting and finding the relationship.

2.2) Exchanging opinions, suggestions, guidelines from the teacher and the learners.

2.3) Make a conclusion and organize the knowledge.

3) Learning Process

3.1) P: Problem Stage At this stage understanding and readiness must be made to the students and the questions made must cover the objectives/goals of the problems.

3.2) K: knowledge and Summary Stage This stage investigates the information or data from the Static Cloud Knowledgebase, the source where all learning media in electronic forms are collected, will help solve the problems by the learners. They would make a conclusion of body of the knowledge received from their problem solving.

3.3) S: Summarize Stage is the presentation of the knowledge which is the answer to the question the learners present the answer or new knowledge received from the problem topic through the Dynamic Cloud Knowledgebase to other learners, and the instructor joins in expressing his ideas and gives additional suggestions.

4) Cloud Knowledgebase

The Cloud Knowledgebase is a design of a resource of information as a source for collecting the information or knowledge of the learners that will help them learn in digital forms in the internet networking system. It has a number of forms of presentation and knowledge that can be presented following the learners' needs and wants or learners' context in the real existing environment. The Cloud Knowledge base is classified into two types.

4.1) Static Cloud Knowledgebase This knowledgebase is used as a source of information from documents and textbooks which are reliable forms of learning media and available in various forms in line with the learners' needs and context in the real existing environment of the learners. The Static Cloud Knowledgebase is a n equipment that helps seeking for knowledge to adjust prior knowledge of the learners and being the place of knowledge that tops up the learners' original knowledge. The roles of the Static Cloud Knowledgebase are as follows:

4.1.1) The source of information based on the problem situations functions as a place for keeping the contents, theories and kinds of knowledge which cover problem situations encountered by the learners, a source of information and knowledge for them to study and search for the information in order to find the answer to the problem occurring in different situations.

4.1.2) The source of the information for exchanging and learning, a place of knowledge information established by the learners' needs and wants in the form of inquiring and requesting for suggestions, exchanging of learning or expressing opinions under the topic

of interest, among learners and learners, instructor and learners, or being knowledge received from experts in particular fields.

4.1.3) It is the place that collects learning media, a source of knowledge clearly classified into categories for convenient access for the learners in digital forms such as pictures, video and electronic lessons with appropriate presentation for various instruments.

4.1.4) Acknowledgement of learners' context is management of the environment that can be adjusted to match the learners' context in using learning instrument by adapting the way of content presentation to suit the existing learners' context.

4.1.5) Contacting experts is management of storing the information on channel of contacting the experts available in the Static Cloud Knowledgebase for the learners to be aware of ways and duration of time of contacting the experts.

4.1.6) The relationship link makes a link of knowledge from different parts together for the learners to be able to get access to that knowledge rapidly such as when the learner reaches the information section or searches for the information in line with the problem situation, the Knowledgebase will be prepared to link to related knowledge media which will enable the learners who use the Cloud Knowledgebase conveniently and rapidly and be able to use it for their benefits in decision making.

4.2) Dynamic Cloud Knowledge base This is a source that collects the knowledge occurring from the learners' activities or from the learners and the instructor. The knowledge that occurs will be in line with the process of building knowledge following the learning model. The Dynamic Cloud Knowledge base has the following roles.

4.2.1) Being a source of information in presenting new knowledge occurring from students' activities following a process of building knowledge of the learners.

4.2.2) Being a source of information in presenting new knowledge occurring from students' activities following a process of building knowledge of the learners in order to pass over to the experts for an evaluation. If the knowledge has passed the checking criteria by the experts, that knowledge will be adapted and stored in the Static Cloud Knowledge base and used as a source of information for the learners' learning and searching.

4.2.3) The learners' knowledge from doing activities for creating knowledge will be recorded in the system of the Dynamic Cloud Knowledge base and the learners' information of knowledge will be evaluated by the teacher. In case the knowledge evaluated by the teacher is at a very high level, the teacher may send it to the experts to be evaluated. If it is passed, the experts will change it into the Static Cloud Knowledgebase and use it as a source of information for the learners' learning and searching.

5) Scaffolding System: It is a system that helps the learners in encouraging them and tell a guideline, give suggestions on source of solving the problem for the learners so as to help the learners to create and have skills in thinking by themselves. There are three ways of helping the learners, namely:

5.1) Conceptual Scaffolding: This is a way of giving suggestions to the learners to consider using intellectual reasoning, setting a structure of problems for the learners to see the problems clearly.

5.2) Metacognitive Scaffolding: This refers to helping the learners in managing learning, giving suggestions on the way of thinking while learning, a way of warning them to consider the problem or guide them to link a source of information with knowledge base or link prior knowledge with new knowledge.

5.3) Procedural Scaffolding: This is a suggestion to use a source of information available and the instrument to lead the learners to the position they want to be.

Objective 2 Result of Evaluation of the Learning Model. The result of evaluation of the learning model using Cloud Knowledgebase on U-Learning environment in the New Normal Covid-19 situation to enhance the students' learning achievement is an evaluation for appropriateness of the learning model from five experts by dividing the evaluation into five sides, namely: 1) Roles of the teacher, 2) Roles of the learner, 3) Learning Process, 4) Cloud Knowledgebase, and 5) System of helping the learners. The results of evaluation were as follows:

Table 1 Result of Evaluation on Appropriateness of the Factors of Learning Model

Description	**Evaluation Result**		**Appropriateness Level**
	$\overline{X}$	**S.D.**	
1. Roles of the teacher	4.40	0.45	High
2. Roles of the learner	4.30	0.55	High
3. Learning Process	4.29	0.42	High
4. Cloud Knowledgebase	4.36	0.45	High
5. System of helping the Learners.	4.42	0.41	High
Over All	**4.35**	**0.45**	**High**

Table 1 The result of an evaluation showed that the System of helping the Learners was appropriate at a high level ($\overline{X}$ = 4.42, S.D. = 0.55), Teacher was appropriate at the highest level ($\overline{X}$ = 4.40, S.D. = 0.45), Cloud Knowledgebase was appropriate at a high level ($\overline{X}$ = 4.36, S.D. = 0.45), Learners were appropriate at the highest level ($\overline{X}$ = 4.30, S.D. = 0.55), Learning Process was appropriate at a high level ($\overline{X}$ = 4.29, S.D. = 0.42), Overall the five factors, the developed learning model was at a high level ($\overline{X}$ = 4.35, S.D. = 0.45).

Objective 3 Result of Using the Learning Model**.**

Table 2 A Comparison of Learning Achievement before and after Teaching Using Learning Model by Cloud-based on U-Learning Environment in the New Normal Covid-19 Situation to Enhance Learners' Learning Achievement.

Learning Model	**N**	**df**	$\overline{X}$	**S.D**	**t**	**p**
Before Learning	48	47	16.69	3.63	34.13	.000**
After Learning	48	47	33.33	2.64		

****** Significant at level .01

Table 2 shows the result of data analysis that the learners learning achievement by using learning model by Cloud-based on U-Learning environment in the New Normal Covid-19 situation to enhance learners learning after learning was higher than before learning at the level .01

Discussion

The study for the development of the learning model using Cloud-based on U-Learning environment in the new Normal Covid-19 situation to enhance the students' learning achievement constituted a learning model as a master of teaching-learning activities that could enhance learners' learning achievement in the New Normal Covid-19. The components of the learning model using Cloud-based consisted of 1) Teacher, 2) Learners, 3) Learning Process, 4) Cloud Knowledgebase, and 5) Scaffolding System. Upon considering of the details of each components, it was in line with the studies by Yueh-Min, Po-Sheng, Tzu-Chien and Tzu-Chien (2011) and Saadiah, Erny and Kamarularifin (2010) who studied U-Learning environment in order to define the qualification of U-Learning and guidelines for evaluation of its efficiency. It was found that an evaluation of U-Learning environment had to have speed, reliability, building knowledge from learning resource by oneself, and be able to know the learners' context. It was also in congruence of the studies by Chanin Thitipetchakul, Narong Sompong and Nattaphon Rampai (2020) who conducted a study on Development of Learning Management Model on Cloud Computing System Based on Connectivism to Enhance Information and Communication Technology Literacy for Undergraduate Students. It was found that Learning Management Model on Cloud Computing System Based on Connectivism to Enhance Information and Communication Technology Literacy for Undergraduate Students had four Main factors, namely: 1) Scaffolding System, 2) U-Learning Environment, 3) Cloud Computing or Cloud Service, 4) Learners, Teacher and System Manager.

This have been evaluated by the experts and its result was at highest level. Based on the studies which were in congruence, it was found that the learning model using Cloud-based or learning online had to have appropriate technological learning environment, whether it be computer networking environment, or computers of users, specifying the roles of the teacher and the learners in online learning, and the place for learning online, especially on Cloud. The teacher has to prepare various electronic learning aids in the Cloud because it is necessary for learning and creating knowledge for self-study learners.

Suggestion

1. On the system of Knowledgebase, there should be a development of model of retrieval of the Knowledgebase system to be Ontology system in order to make the retrieval system accurate and rapid by nature of Semantic Web retrieval.

2. This learning model should be adapted to use for developing the learning model which can support the learners' high level of thinking, may it be the students at lower and higher secondary school, vocational level, and bachelor's degree level.

References

Benjawan and others (2021). Teaching and learning management in the New Normal Covid-19 using an on-site teaching and learning model. *Journal of Human Society Nakhon Si Thammarat Rajabhat University*, *11*(2), 29-45.

Chanin Thitipetchakul, Narong Sompong and Nattaphon Rampai. (2020). Development of Learning Management Model on Cloud Computing System Based on Connectivism to Enhance Information and Communication Technology Literacy for Undergraduate Students, *Ratchaphruek Journal*, *18*(1). 38-48.

Isha DeCoito and and Estaiteyeh. (2022). Online teaching during the COVID-19 pandemic: exploring science/STEM teachers' curriculum and assessment practices in Canada. *Disciplinary and Interdisciplinary Science Education Research Journal*, 8(4). 1-18.

Jaithip Na Songkhla. (2018). *Digital learning design*. Bangkok: Chulalongkorn University Printing House.

Jiraporn Nusawat. (2011). *The development of an integrated teaching and learning model through the web according to the theory of expand ideas to promote academic achievement Problem-solving abilities and transferring learning of higher education learners.* Doctor of Philosophy Thesis, Department of Educational Technology. King Mongkut's University of Technology North Bangkok.

NazimeTuncay and Huseyin Uzunbotylu. (2012). Designing a U-Learning Course Platform for the IdentifiedTeacher Training Needs. *The European Conference on e-Learning is the property of Academic Conferences.*

Pacharaporn Duangcheun. (2020). The New Normal In Educational Administration After The Covid-19 Crisis. *Journal of Arts Management*, *4*(3), 783-795.

Saadiah Yahya, Erny Arniza Ahmad and Kamarularifin Abd Jalil. (2010). The definition and characteristics of ubiquitous learning: A discussion. *International Journal of Education and Development using Information and Communication Technology, IJEDICT*, *6*(1). 117-127.

Suchitra Kheawsri. (2007). *The development of an inquiry-based teaching and learning model on a science web subject by using potential enhancement to develop problem-solving skills of junior high school students.* Doctor of Education Thesis, Educational Technology and Communication. Chulalongkorn University.

Yueh-Min Huanga, Po-Sheng Chiu, Tzu-Chien and Liub, Tzung-Shi Chen. (2011). The design and implementation of a meaningful learning-based evaluation method for ubiquitous learning. *Computers and Education, 57*(4). 2291-2302.

Vivolo, J. (2019). Overview of online learning and an (un) official history. In Managing online learning: *The lifecycle of successful programs*, 7-17.