The Development of Online Active Learning Management with Application for Pre-service Teachers

Tubtimthong Korbuakaew, Intira Robroo, and Somkiat Korbuakaew

***Abstract*—The technological breakthrough grows rapidly and plays an important role in our daily life. It is allowed people to communicate with teachers, instructors, students, and friends. Thus, learning management between teachers and students should be adjusted by using a variety of technical materials to support their learning ability. The purposes of this study were to develop online active learning management with application for pre-service teacher. The participants were 30 Early Childhood students, Suan Sunundha Rajabhat University. The findings revealed that the online learning efficiency was 88.06/85.67. The experimental outcome reveals that learning achievement is significantly different from before the use of online learning, at the statistical level of 0.05. After applying the online learning in the classroom, learning retention dropped down not less than 20%. The results can be concluded that the participants have learning retention after the use of the online learning.**

***Index Terms*—Online learning, active learning, learning management, learning retention.**

I. Introduction

Active learning is an instructional approach which promotes students' learning by doing. When learning by doing, students can gain the knowledge through their experience. The students are offered the opportunities to join the activities rather than lecture by teachers. As a teacher, teachers play an important role to develop students' multi skills including literacy, interactive, and critical thinking skills through cooperative learning activities. During the activities, teachers should not serve as a monitor, but they should become a facilitator who encourages student's learning process. In other words, traditional teaching method, which students are required to listen to teachers to read and write, is reduced. Apart from this, these learning activities can induce them to be enthusiastic to learn and improve their skills. As a result, active learning enables students to maintain their retention and exists longer than passive learning. This is relevant to working memory – when students participate in doing activities or interact with one another (friends, teachers, environments). This promotes students' authentic practices, and it becomes long term memory [1].

At present, school administration is insufficient to learning requirement of people who are interested in gaining further knowledge for their future jobs. Nowadays, the technological breakthrough grows rapidly and plays an important role in our daily life. It is allowed people to communicate with teachers, instructors, students, and friends. Thus, learning management between teachers and students should be adjusted by using a variety of technological materials to support their learning ability.

The materials are useful for learning management since they enable students understand what they learn obviously. However, students are required to select appropriate technology related to what they learn. If do so, they can access learning process easily – they can learn anywhere or anytime. Furthermore, students can access their knowledge in many content subjects, evaluate their capabilities or learning breakthrough. They also interact with other people and search for additional information relevant to what teachers assign. Hence, traditional teaching method, which teachers are as a monitor, should be gradually shifted [2]. Nowadays, technological media influence on learning management, particularly E-learning. There are many reasons why E-learning impacts on changes in higher education. Firstly, the university stands as higher rankings. Secondly, education is considered as a valuable source of knowledge. And finally, it is virtualization process. Apart from this, E-learning is an essential tool for teachers who can use it to motivate students' interests [3]. And e-learning for enhancing active learning could be used for increased the leaners' achievements [4]. Therefore, learning management through online learnings is attractive, and helps students develop their critical thinking skills better than learn the following topics which teachers monitor. It can be concluded that online learning can be a tool to develop Thai students' learning acquisition and their critical thinking skills.

In addition, electronic media influence on all generations. Technological breakthrough in education is based on web technology. Web technology is a key drive to manage E-learning system through websites, which help teachers and students use online learnings. The benefits of online learnings include unlimited time and places to access, developing communicative system through internet. There are many ways to exchange or share information, which teachers can apply in the classroom, including chat room, web blog, youtube, and etc. These media can activate students' learning acquisition. Importantly, this is a channel encouraging students to learn autonomously and enhance their lifelong learning [5]. Computers and technologies are the tools employed to share knowledge in the classroom. They are also classroom support that helps learners and teachers to access the information. Importantly, there are various benefits of classroom support as follows; 1) to

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facilitate students to gain access to distance learning (excluding higher education), 2) to enable them to perceive integrated learning process (face-to-face and technology), 3) to employ technology to encourage students' learning activities [6]. Application is one of technological media which can motivate students' learning and improve lively classroom environment. Moreover, application can enable students to enjoy questioning, self-evaluation, discussion, or surveying opinions. During the activities, students use their devices to access such as computers, mobile phones, or tablets, etc. It can reflect that application's outcome is not boring as doing assignments or traditional tests [7]. Kahoot.com, Quizizz.com, and Google form are the well-known examples of application programs. Padlet is another example program of sharing opinions on online board, which is beneficial to exchange information or knowledge relevant to the interesting topics. It also gives some comments and notifies us when there is something new. These can help students participate in discussion and see other students' comments. It is recommended to apply in large size of classroom. If any students do not dare to ask questions or answer, they can use Padlet program to answer privately. Apart from this, Padlet can enhance teachers to summarize the contents. It also adds pictures, graphs, other tools in presentation, or share these tools to students before examination or discussion. Significantly, teachers can raise questions or issues which students can reply or share their opinions simultaneously. There are 6 majors of pre-service teachers in the faculty of Education, Suan Sunundha Rajabhat University, including Early Childhood, Thai, Social Studies, Mathematics, English, and Science majors. Each of the pre-service teachers in the majors is required to enrolled in Innovative and Information Technology for Education Course. In learning management for future teachers, the course design is focused on learning concepts and theories of innovative and information technology for education which involves with the development of teacher education quality. In order to achieve the goals in classroom management, it is necessary to use computer programs related to education in term of designs, constructions, application, assessment, and innovative improvement.

Based on the significance and the reasons, researchers are interested in developing online active learning management with application for pre-service teacher'. The researchers intend to conduct this study to use this online learning encouraging students to be active learners through application for pre-service teachers. Hopefully, pre-service teachers can apply what they learn to develop their learning management effectively.

II. Objectives of the Research

This paper is aimed:

1) To develop online learnings - 'Online Active Learning Management with Application for Pre-Service Teacher' in order to meet the efficiency of criterion standard (80/80)
2) To investigate the posttest results of learners' achievement through online learning can be higher than that of the pretest after the use of the treatment
3) To investigate participants' retention after the treatment (online learnings), when one week passes, the retention cannot lower less than 10%. Then four weeks passes, the retention cannot lower less than 20%.

III. Research Method

This experimental research involves one-group pretest and posttest design. The online learnings were designed to conduct the experiment and explore the online learning efficiency. The score results gathered from participants' practices during the experiment and post-test were later compared to the effectiveness of online learning (80/80). After implementing online learning in the classroom, the participants gained the learning achievement of pretest and posttest differently. Apart from the difference of pretest and posttest scores, students had retention after the use of online learning.

A. Population and Participants

The population of the study was 6 majors of 180 pre-service teachers in the faculty of Education, Suan Sunundha Rajabhat University including Early Childhood, Thai, Social Studies, Mathematics, English, and Science majors. The population studying in the second year were required to enroll in Innovative and Information Technology for Education Course (EDC2103). The participants of the study selected by purposive sampling were 30 pre-service teachers in Early Childhood major, who were studying in the second year in the faculty of Education, Suan Sunundha Rajabhat University, and enrolled in Innovative and Information Technology for Education Course (EDC2103).

B. Variables

1) Independent variable: online learning 'Online Active Learning Management with Application for Pre-Service Teacher'
2) Dependent variable: learning achievement after the use of online learning - 'Online Active Learning Management with Application for Pre-Service Teacher', and retention after the use of online learning

C. Research Instruments

The research instruments consist of 1) online learning 'Online Active Learning Management with Application for Pre-Service Teacher', 2) Active Learning lesson plans, 3) the assessment form of online learning, and 4) assessment tests (pretest and posttest).

D. Data Collection

Researchers carried out learning management related to the lesson plans, which were developed and adopted with the participants. The data collection was as follows:

1) Participants were informed the details relevant to learning activity management through online learning.
2) Participants were required to take the pre-test in 1 period (60 minutes) and the score results were later checked and recorded.
3) Researchers followed the Active Learning lesson plans and participants were asked to access self-learning through online learning. Each topic of the online learning

was lasted for two hours. During the learning process, learners were required to evaluate the score of activity practices, and the scores were recorded. Active learning management through online learning was shown in the Fig. 1.

4) After the participants finished online learning, they were asked to take the post-test, which was similar to the pre-test paper, in 1 period (60 minutes) and the score results were later checked and recorded.
5) After finishing the online learning for 1 week, participants were required to take the post-test again. And the score results were later checked and recorded.
6) The score results gathered from the last 3 practices and posttest paper (Item 4 and Item 5) were analyzed to investigate the online learning efficiency, learners' achievement, and retention.

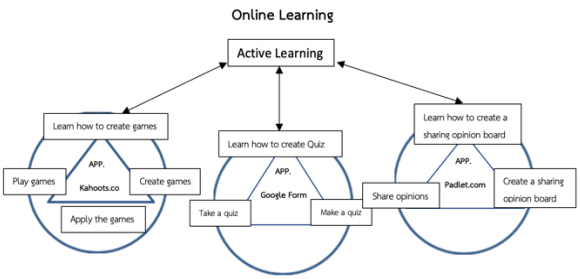

Fig. 1. Online active learning management with application process.

E. Statistics for Data Analysis

Researchers investigated the accuracy of language use and content related to online learning, lesson plans, and assessment tests (pretest and posttest). The sets of these tools were also evaluated by using IOC to investigate whether the content and instruction were appropriate to apply in the real classroom. Moreover, the tests were evaluated by using IOC technique for reliability and validity to find out the level of difficulty (P) and discrimination (R). Furthermore, online learning was analyzed by Mean ($\bar{x}$) and Standard Deviation (SD). The online learning efficiency was also analyzed by E1/E2. Additionally, comparing learning achievement scores (pretest and posttest) was analyzed by t-test. And finally, retention was analyzed by percentage.

IV. Research Result

Online learning presented in term of multi-media consisted of multi options in online learning, texts, pictures, and demo videos through active learning. The online learning was published through the internet, which learners were able to access the website-https://sites.google.com/ ssru.ac.th/ tubtimthongonline/home. After accessing to the website, students could learn the online learning autonomously. The results of the study can be summarized as follows:

The online learning efficiency E1/E2 was 88.06/85.67 which was above 80/80 set criterion. It can be assumed that the online learning efficiency was reliable. It was presented in Table I.

As presented in Table I, it showed that the mean score of efficiency from the practice during learning process (E1) was 88.06, and the mean score of efficiency from posttest score (E2) was 85.67. Based on the results, online learning efficiency (E1/E2) was 88.06/85.67 which was above 80/80 set criterion. Since researchers conducted the study of 'The Development of Online Active Learning Management with Application for Pre-Service Teacher' in the process of the study. Moreover, researcher promoted and clarified demo videos of application. This could help learners understand and follow the instructions. Apart from this, students were provided a manual of online learning use. Therefore, they could access the knowledge and further information as well as repeat watching the videos whenever they prefer. If students were engaged with positive atmosphere, they would enjoy learning and doing activities.

TABLE I. Online Learning Efficiency

Practice score results during learning Process			Posttest score results			Online learning efficiency
N	$\bar{x}$	E1	N	$\bar{x}$	E2	E1/E2
30	52.83	88.06	30	51.40	85.67	88.06/85.67

Learning Achievement after the use of online learning was higher than that of the pretest which was a significance level of 0.05 as shown in Table II.

TABLE II: Online Learning Achievement between Pretest and Posttest

Test	N	$\bar{x}$	SD	t-test	P-value
Posttest	30	51.40	3.73	10.303*	0.00
Pretest	30	37.60	6.43		

*P-value < 0.05.

As presented in Table II, the difference of learning achievement was a significance level of 0.05. The posttest mean score is higher than that of the pretest. The mean score of posttest score is 51.40 while the pretest score is 37.60 with a t-test of 10.303 which t-value is α =.05 and df=30-1 with a t-value of 1.6991. P-value is .00 which is less than α =.05. As a result, it can be assumed that learning achievement of posttest score is higher that of the pretest with a significance level of 0.05. Online learning also provided students to have the opportunities to discuss with friends or their teachers. In addition to discussion, they could enjoy playing games, taking online tests, or sharing opinions on the online boards. These could motivate students' acquisition through devices, and they could interact with their teachers in spite of distance learning [8]. This is consistent with research of Brian Hollenbeck and Qiang Shi [9] they research the developing effective and sustainable distance education programs and courses, the study found that the greater the use of e-learning materials and tools within an educational context, the higher the performance of the students and the efficiency of teaching practices.

Web board and Message were examples of online communicative programs which learners could interact with one another. Online learning offered a variety of benefits - doing online activities could also better motivate students than watching video without activities. Students could be excited and interested in it since they enjoyed learning online learning. This is consistent with research by Juraj Datko [10] Outcomes of Homework on Facebook: A Case Study from an English for Academic Purposes Course. The findings show that students prefer collaborative tasks. The social media

(Facebook) homework is viewed as more convenient than traditional paper-based homework due to time-space independence, familiarity of the platform, and the ability to save time. Additionally, online learning enabled students to access and review their lessons and practices conveniently – anytime or anywhere, which was relevant to the study of Daniels [11]. According to Daniels (2009), he studied the comparison between motivation levels of academic achievement and learning atmosphere management which was compared between teaching strategies in normal classroom and teaching methods through online learning. Based on the result, it revealed that the participants, who were studied through online learning, had the score result of self-efficiency and time management above a significance level. When compared the online learning results between pretest and posttest, it showed that the posttest score was higher than that of the pretest with a significance level 0.05. Moreover, this was relevant to the study of Dechasetsiri [12] who conducted the study of Learning Achievement of Leadership and Modern Management through E-learning. Based on the result, the posttest score results of Leadership and Modern Management through E-learning was a significance level .05. Furthermore, it showed that the participants had retention when compared the posttest score result and achievement test which students finished studying it for 1 week. After the use of online learning, it showed that the participants gained the posttest score – 51.40 ($\bar{x}$= 51.40), 85.67%. When one week passed, the posttest mean score was 48.97 ($\bar{x}$= 48.97), 81.61. After one week passed, students' retention slowed down 4.06% which was not less than 10%. When four weeks passed, the posttest mean score was 46.63 ($\bar{x}$=46.63), 77.72%. After 4 weeks passed, the retention dropped down 7.94% which was not less than 20%. From the results, it can be assumed that students who were treated through online learning had retention.

The result of retention after the use of online learning revealed that learners' retention of the first session lowers 4.06% which does not lower than 10%. In the second session, it drops down 7.94% which does not lower than 20%. From the results, it can be assumed that participants have retention after the use of the treatment. You can see the result of retention as presented in Fig. 2.

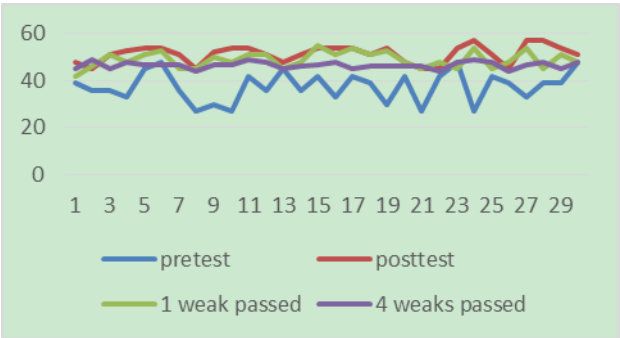

Fig. 2. The test score comparison of each participants from week 1 to week 4.

As shown in Fig. 2, this chart showed the comparison of test scores which was the same test. The participants were required to take the tests for 4 times. The achievement test included 5 choices with 60 items. The total score of the test was 60. Based on the test results, it shows that the mean score of pretest is 37.60 while the posttest score is 51.40. When one week passed, the mean score of posttest is 48.97. And 4 weeks passed, that of the posttest is 46.63. When the posttest score result of retention was compared and analyzed, it revealed that when 1 week passed, the mean score lowers than 4.06% which is not less than 10%. And when 4 weeks passed, the mean score drops down 7.94 which was not less than 20%. As a result, it can be assumed that participants have retention after the use of online learning. This was related to the statement of Arreerard [13] that mentioned the efficiency criterion of learners' retention through online learning. The criterion was that after finishing posttest for 1 week, learners' retention should not lower than 10%. And then 4 weeks passed, the retention should not drop down less than 20%. If do so, it can be assumed that learners have retention since online learning was demonstrated how to use the programs. When students accessed self-learning and learning by doing, they could recognize what they learn, and they could engage with the skills. This was relevant to Sukkaew [14] who conducted the study of Retention in Memory Vocabulary Learning of English, Prathomsuksa 6 (Grade 6). It showed that when one week passed, students' retention slowed down 3.08%. After four weeks passed, the retention slowed down 6.77%. This was relevant to the study of Wilaiprasert and Kanperm [15], who studied the comparison of learning achievement and retention through social communities - 'The Use of Computer Creating an Assignment, Mathayomsuksa 3 (Grade 9)'. Based on the result, it showed that the results of retention after the use of social communities and the achievement test after two weeks passed were not different.

V. Conclusion

The Development of Online Active Learning Management with Application for Pre-Service Teacher The purposes of the study were 1) to develop online lessons - 'Online Active Learning Management with Application for Pre-Service Teacher' to meet the efficiency of criterion standard (80/80), 2) to investigate learning achievement before and after the use of online lesson, and 3) to investigate participants' retention after the treatment (online lessons) from week 1 to week 4. The population of the study was 6 majors of 180 pre-service teachers in the faculty of Education, Suan Sunundha Rajabhat University. The participants of the study selected by purposive sampling were 30 pre-service teachers in Early Childhood major who were studying in the second year and enrolled in Innovative and Information Technology for Education Course. The data were analyzed by using percentage, mean, standard deviation (SD), and t-test. The findings revealed that online learning efficiency (E1/E2) was 88.06/85.67 which was above 80/80 which was higher than the criterion standard. The learning achievement after the use of online learning was higher than that of the pretest which was a significance level of 0.05. Moreover, after applying the online lesson in the classroom from week 1 to week 4, it showed that the learners' retention after the use of online learning revealed that learners' retention of the first session lowers 4.06% which does not lower than 10%. In the second session, it drops down 7.94% which does not lower than 20%.

from the results, it can be assumed that participants have retention after the use of the online active learning management with application. In conclusion the online active learning management with application for pre-service teacher increased the leaners' achievements.

CONFLICT OF INTEREST

The authors declare no conflict of interests.

AUTHOR CONTRIBUTIONS

Study concept, design, and critical revision of the manuscript for important intellectual content was developed by the authors who participated in all the research process stages.

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