



Blended Instruction using E-learning with A problem-based Learning Approach for Developing Academic achievement and creative skills Under Graduate Diploma Program in Teaching Profession Students College of Asian Scholars

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Abstract

By blended instruction using e-learning with a problem-based learning approach, the purposes of this research were to study 1) the effectiveness, 2) the effectiveness index, 3) to compare the achievement of students of pre- and post-study, 4) to study the creative skills of students 5) to assess the satisfaction of the students, and 6) to assess the professional ethics of teacher taught teaching and learning for developing academic achievement and creative skills under Graduate Diploma Program in Teaching Profession Students College of Asian Scholars.

The target group of this research consisted of 60 students who learned by teaching and learning blended instruction using e-learning with a problem-based learning approach of the Learning Measurement and Evaluation Course, Graduate Diploma Program in Teaching Profession Students College of Asian Scholars in the Semester 2 of the academic year 2022. The purposive sampling tools were used in the research including of 1) Learning management plan, 2) Academic achievement test, 3) Creativity Skills Assessment Form, 4) Student satisfaction assessment form, and 5) the professional ethics of teacher assessment form. The descriptive statistics namely Percentage (%), Mean (μ), Standard Deviation (σ) and t-test (t-test for dependent sample) were used to analyze the quantitative data.

The results of the study revealed that:

With the teaching and learning by blended instruction using e-learning with a problem-based learning approach;

1) The effectiveness of Learning Measurement and Evaluation Course, Graduate Diploma Program in Teaching Profession Students College of Asian Scholars showed the process efficiency (E1) at 81.72 and the resultant efficiency (E2) at 86.85, or E1/E2 of 81.72 / 86.85 which was higher than the standard criteria set at 80/80.

2) The effectiveness index was 0.7021 or 70.21 percent higher than the specified criteria.

3) The comparison results revealed that the academic achievement after learning was higher than before learning (significantly increased at the .01 level). The average score before learning was at the average level ($\mu = 35.08$, $\sigma = 3.14$), while the average score after learning was higher ($\mu = 53.72$, $\sigma = 2.94$).

4) The creative skills of students were at the highest level ($\mu = 4.72$, $\sigma = 0.45$)

- 5) The student satisfaction was also at the highest level ($\mu = 4.67$, $\sigma = 0.48$)
- 6) The professional ethics of teacher was at the highest level ($\mu = 4.71$, $\sigma = 0.45$)

Keywords: blended instruction using e-learning, e-learning and problem-based learning.

1. Introduction

The rapid change of today's world with the advancement of information technology (ITs) impacts the economic, social, political, and governance systems in the country level expanding to the global level. Also, teaching and learning to equip children (learners) in the 21st century with the knowledge, competence, and essential skills in various fields is the challenge. To achieve this, teachers must design activities for the learner to learn from real experiences. Practicing must allow the learner to be able to think, to do, to love to read, and to have a constant curiosity for knowledge (Vijarn Panich, 2012). Modern teachers have to be the facilitators for the learners to learn which the teaching profession plays the important role of in this process. There is a production process and development system for teachers, faculty members, and educational personnel with quality standards suitable for high-level professions. Therefore, the problem has been solved by changing the format from normal teaching to a teaching style that is blended (Blended Learning), which is a flexible learning model. Respond to individual differences, thinking styles, interests, and abilities of individual learners (Bonk & Graham, 2004). And from the study of teaching techniques, it was found that e-Learning is a systematic teaching which have a clear objectives and could create a ready-made lesson using Internet network transmission (Krutus , 2000) and problem-based learning is a learning that arises from building knowledge that is connected, helping to remember and recall information, prior knowledge is linked to learning new things (Gijsselaers ,1996). In the 21st century, there is a teaching approach to develop individuals with creative skills (Creativity), skills in systematic thinking (Critical Thinking), communication skills and working with others (Communication and Collaboration), Information Literacy, Media Literacy, and ICT Literacy.

From the above, the researcher is interested in bringing blended Instruction using E-learning with a problem-based learning approach for developing academic achievement and creative skills under Graduate Diploma Program in Teaching Profession Students College of Asian Scholars for the daily life with efficiency and effectiveness.

2. Purpose

Under Graduate Diploma Program in Teaching Profession Students College of Asian Scholars, the purpose of this study is:

2.1 To study the effectiveness of teaching and learning blended Instruction using E-learning with a problem-based learning approach for developing academic achievement and creative skills.

2.2 To study the effectiveness index of teaching and learning of teaching and learning blended Instruction using E-learning with a problem-based learning approach for developing academic achievement and creative skills.

2.3 To compare the achievement of students for pre- and post-study by teaching and learning blended Instruction using E-learning with a problem-based learning approach for developing academic achievement and creative skills.



2.4 To assess creative skills of students by teaching and learning blended Instruction using E-learning with a problem-based learning approach for developing academic achievement and creative skills.

2.5 To assess the satisfaction of the students who studied by teaching and learning blended Instruction using E-learning with a problem-based learning approach for developing academic achievement and creative skills.

2.6 To assess the professional ethics of teacher taught teaching and learning blended Instruction using E-learning with a problem-based learning approach for developing academic achievement and creative skills.

3. Theoretical concepts and related research

3.1 Blended learning has been mentioned as follows.

Valiathan. (2002) states that blended learning management What it means is that different teaching methods come together to help solve problems.

3.2 E-learning management has been mentioned as follows.

Krutus (2000) said, “e-Learning is a form of content that creates ready-made lessons. It can be a transmission medium or can be used for transmission within the Internet network.”

3.3 Problem-based learning management (Problem-based Learning, PBL) has been mentioned as follows:

Gijsselaers (1996) discussed the principles of problem-based learning, which can be summarized as follows: (1) Learning is a process of building knowledge, (2) Metacognition (Metacognition) is a component of skills necessary for learning, and (3) Social and environmental factors enable learners to use cognitive knowledge to solve problems.

4. Procedure

To study the teaching and learning blended Instruction using E-learning with a problem-based learning approach for developing academic achievement and creative skills of Learning Measurement and Evaluation Course under Graduate Diploma Program in Teaching Profession Students, College of Asian Scholars. The research has been conducted as follows.

4.1 Study theories and research which related to blended learning management by using e-learning together with problem-based learning.

4.2 Proceed to create tools, including learning management plan, achievement test, Creativity, and satisfaction and professional ethics of teacher’s assessment form.

4.3 Take the tools that have already been done and presented to research collaborators and experts.

4.4 Take an achievement test before class and conduct the teaching according to the learning plan. The assessment during class and learning achievement after study are also evaluated with creative skills, student satisfaction and professional ethics of teachers.

5. Results

Table 1 The process efficiency (E1) and resultant efficiency (E2) of blended Instruction using E-learning with a problem-based learning approach.

No.	Score during class						total score during study (process: E ₁)	Total score after school (result: E ₂)
	Plan 1	Plan 2	Plan 3	Plan 4	Plan 5	Plan 6		
1-60	895	921	1025	1004	1017	1022	5884	6253
sum	895	921	1025	1004	1017	1022	5884	6253
E	74.58	76.75	85.42	83.67	84.75	85.17	81.72	86.85

5.1 From Table 1, it was found that the process efficiency (E1) was 81.72 percent, and the resultant efficiency (E2) was 86.85 percent or E1/E2 was 81.72 / 86.85, which was higher than the standard criteria. 80/80

Table 2 The effectiveness of blended Instruction using E-learning with a problem-based learning approach.

No	pre-test score / post-test score						pre-test score	post-test score
	plan 1	plan 2	plan 3	plan 4	plan 5	plan 6		
1- 60	666/1057	675/1043	670/1044	672/1036	669/1045	669/1028	4021/6253	
sum	666/1057	675/1043	670/1044	672/1036	669/1045	669/1028	4021/6253	
Ei	0.73	0.70	0.71	0.69	0.71	0.68	0.70	

5.2 From Table 2, it was found that the overall effectiveness index was 0.7021 or the learning progress was 70.21% higher than the specified criteria.

Table 3 Pre- and post-learning achievement of students that learn by blended Instruction using E-learning with a problem-based learning approach.

NO 1 - 60	pre-test score (60)	post-test score (60)	Score difference (D)	difference of number squared (D ²)
Sum	2105	3223	1118	21976
Mean	35.08	53.72	18.63	366.27
S.D.	3.14	2.94	4.40	

test	N	μ	σ	$\sum D$	$\sum D^2$	t	P value
pre-test	60	35.08	3.14	1118	21976	32.78**	0.00
post-test	60	53.72	2.94				

** Statistically significant at the .01 level

5.3 From Table 3, the result showed that the mean of pre-learning achievement score was $\mu = 35.08$ with $\sigma = 3.14$, and the mean of post-learning $\mu = 53.72$ with $\sigma = 2.94$. Mean of post-learning was higher than pre-learning, the difference was statistically significant at the .01 level.

Table 4 Student creativity assessment results of blended Instruction using E-learning with a problem-based learning approach.

Item	list	Assessment level		
		μ	σ	interpret
1	Fluency	4.77	0.42	The most
2	Flexible thinking	4.74	0.43	The most
3	Creativity	4.69	0.47	The most
4	Detailed thinking	4.66	0.48	The most
Total		4.72	0.45	The most

5.4 From Table 4, it was found that the assessment of students' creative skills of blended Instruction using E-learning with a problem-based learning approach was at highest level ($\mu = 4.72$, $\sigma = 0.45$).

Table 5 Student satisfaction assessment results of blended Instruction using E-learning with a problem-based learning approach.

List	Assessment level			number
	μ	σ	interpret	
1. Skills and teaching techniques of teachers	4.70	0.46	The most	1
2. Content	4.65	0.48	The most	5
3. Teaching and learning activities	4.67	0.48	The most	3
4. Learning media	4.63	0.49	The most	4
5. Measurement and evaluation	4.68	0.47	The most	2
Total	4.67	0.48	The most	

From Table 5, it was found that the mean student satisfaction ($\mu = 4.67$, $\sigma = 0.48$) was at the highest level.

Table 6 Teacher Professional Ethics Assessment Results of blended Instruction using E-learning with a problem-based learning approach

List	Assessment level			number
	μ	σ	interpret	
1. Ethics towards oneself	4.77	0.42	The most	1
2. Professional ethics	4.73	0.44	The most	3
3. Ethics towards service recipients	4.75	0.42	The most	2
4. Ethics towards Professional co-workers	4.67	0.48	The most	4
5. Ethics towards society	4.63	0.49	The most	5
Total	4.71	0.45		

From Table 5.6, it was found that the evaluation of professional ethics of teachers which is taught by blended Instruction using E-learning with a problem-based learning approach was at the highest level ($\mu = 4.71$, $\sigma = 0.45$).

6. Discussion and Conclusions

6.1 The effectiveness of teaching and learning of blended Instruction using E-learning with a problem-based learning approach was high. The process efficiency (E1) was 81.72 and the resultant efficiency (E2) was 86.85, or E1/E2 of 81.72 / 86.85. This number is higher than the standard criteria set at 80/80, which agrees well with the learning objectives. The results correspond to the study of Kanarak Srisomboon, (2020), which develops the e-learning courses on humans and the environment for Graduated students, Faculty of Information Technology, North Bangkok University. The efficiency of this study was 84.52/86.04, higher than the 80/80 criteria set. Plus, this results also align well with the study of Phakamon Taub (2016), which develop the e-learning lessons in the course of innovation and information technology in education, Faculty of Education, bachelor's degree Kamphaeng Phet Rajabhat University with the efficiency of 80.80/85.90, also higher than the 80/80 criteria set.

6.2 The effectiveness index of teaching and learning of blended Instruction using E-learning with a problem-based learning approach was 0.7021 or 70.21 percent, which is higher than the specified criteria because the instructor has studied the preparation of the plan in accordance with the course objectives. This result is consistent with the study of Woravit Tantanatewin (2022), which manages the problem-based learning and cooperates the learning STAD techniques for Graduate Diploma Program in Teaching Profession Students College of Asian Scholars. It was found that the overall effectiveness index was 0.6668 or 66.68 percent progress, higher than the specified criteria.

6.3 The comparison the academic achievement of teaching and learning of blended Instruction using E-learning with a problem-based learning approach showed that the academic achievement of post-learning was higher. The average score of pre-learning was at the average level ($\mu = 35.08$, $\sigma = 3.14$), while the academic achievement of post-learning was higher ($\mu = 53.72$, $\sigma = 2.94$), significantly increased at the .01 level because designing achievement tests for the pre- and post-study has met the quality criteria. This corresponds to the study of Kanarak Srisomboon (2020). The development of e-learning courses on humans and the environment for graduate students Faculty of Information Technology North Bangkok University which found that the academic achievement of post-learning was higher than pre-learning at the statistical significance level of .05. This also aligns with the study of Kitipong Luenam (2016) which developed the learning outcomes and research process skills from learning management by applying the problem as a base in conjunction with research of students in the Bachelor of Education program. The results of this study also showed higher academic achievement of post-learning than pre-learning with the statistical significance at the .01 level.

6.4 The mean of student's creative skills that learned by teaching and learning of blended Instruction using E-learning with a problem-based learning approach was at the highest level ($\mu = 4.72$, $\sigma = 0.45$) since the teachers also promote problem-solving thinking, helping to promote creative skills. These results correspond to the study of Siripol Sanboonsong (2015), which used the blended teaching and learning management by using the project-based learning process to foster creativity and teamwork skills, Faculty of Education, Department of Computer Education ($\bar{x} = 4.19$, S.D. = 0.74).

6.5 The mean of student satisfaction that learned by teaching and learning of blended Instruction using E-learning was at the highest level ($\mu = 4.67$, $\sigma = 0.48$). This is because the organization of teaching and learning activities allows students with different proficiency levels to work together as a group. Centered on the student makes the learner has fun without being bored which corresponds to the study of Kanarak Srisomboon (2020) which developed the e-learning courses of humans and the environment for Graduated

students, Faculty of Information Technology, North Bangkok University. In overall, the mean was at a high level ($\bar{x} = 4.38$, S.D. = 0.75). In addition, this result also agrees well with Phakamon Taub (2016) which developed the e-learning lessons in the course of innovation and information technology in education, Faculty of Education, bachelor's degree Kamphaeng Phet Rajabhat University having the mean at high level ($\bar{x} = 3.77$, S.D. = 0.82)

6.6 The mean of teacher professional ethics taught by teaching and learning of blended Instruction using E-learning was at the highest level ($\mu = 4.71$, $\sigma = 0.45$) because teachers have the intention to pay attention to students. This outcome corresponds to study of In Chanchaon (2017) about the factors affecting self-development according to teacher professional ethics of students, Graduate Diploma Program Teacher profession, Chiang Rai College, showing mean at a high level ($\bar{x} = 4.24$, S.D. = 0.42). Also, the result of Wirat Wannarat (2012) about Ethical Leadership Characteristics and Teacher Professional Ethics of faculty at the higher education level, Benjamit Academic Network and the Prachachuen Research Network was found that they were related in a positive direction and at a high level ($r = 0.698$)

7. Suggestions

7.1 Proposal for applying research results

7.1.1 Teachers should consider teaching and learning management to suit the abilities of the learners by continuously monitoring and evaluating the interest of the learner.

7.1.2 Problem situations should be interesting and relevant to daily life for students to participate in problem solving based on prior knowledge linking in learning new things or new solving problems.

7.2 Recommendations for use

7.2.1 In order to prepare, the instructor must try teaching and reviewing the teaching process to ensure that all techniques are consistent and skillfully combined.

7.2.2 Before implementing the learning management plan, teachers should study the learning management plan, course description teaching objectives, content, teaching activities, media use, measurement, and evaluation methods.

7.3. Recommendations for further studies

7.3.1 Study should be done using different teaching techniques, and interspersed with the prescribed teaching.

7.3.2 Other dependent variables should be adjusted to examine teaching effectiveness this time.

8. References

- Curtis J. Bonk and Charles R. Graham. (2004). **Handbook of Blended Learning: Global Perspectives, Local Designs**. Pfeiffer Publishing.
- Gijselaers, W.H. (1996). **Connecting Problem-Based Practices with Educational Theory**. San Francisco: Jossey-Bass.
- In Chanchaon. (2017). Factors affecting self-development according to teacher professional ethics of Graduate Diploma Program Students Teacher Professional Program, Chiang Rai College. **Journal of Humanities, Social Sciences and Arts**, (September-December).

- Kanarak Srisomboon. (2020). **The Development of Electronic Lessons in the Human and Environment Course.** For graduate students undergraduate students Faculty of Information Technology North Bangkok University.
- Kitipong Luenam. (2016). Development of learning outcomes. and research process skills from learning management by applying the problem as a base in conjunction with research practice of students in the Bachelor of Education program. **Ratchaphruek Journal**, 14(2), (May - August).
- Krutus, B. (2000). **E-learning.** Retrieve from <http://www.nectec.or.th/courseware/cai/0018.html>.
- Pakamon Taub. (2016). Development of e-learning lessons for innovation subjects. and educational information technology, Faculty of Education, undergraduate students in Music Education. **Journal of Education, Faculty of Education, Kamphaeng Phet Rajabhat University**, 1(2), July – December.
- Siripol Saenboonsong. (2015). **Results of blended learning management.** using the learning process the project is the base to promote creative works and team working skills of Students of the Faculty of Education, Department of Computer Education.
- Wijarn Panich. (2012). **Ways of creating learning for students in the 21st century.** Bangkok: Sodsri Foundation Saritwong
- Wirat Wannarat. (2012). **Khun Laksana, the ethical leader and teacher professional ethics of the faculty.** Higher Education Benjamit Academic Network and the Prachachuen. Research Network Ratchaphruek University.
- Woravit Tantanatewin. (2022). **Management of problem-based learning and cooperative learning STAD techniques to develop academic achievement and creative skills Educational Quality Assurance Course.** Graduate Diploma Program in Teaching Profession Students College of Asian Scholars.
- Valiathan, Purnima. (2002). **Blended Learning Models.** Learning Circuits www.learningcircuits.org/2002/aug2002/valiathan.html.