Development of Blended Learning Management to Improve 21st Century Learning Skills of Students in Computer and Educational Technology Program at Nakhon Sawan Rajabhat University

Duangjai Puttasem

Abstract: *The objectives of this research are to enhance the capability of blended learning model used in Methodology in Teaching Computer course to develop 21st century learning skills, to compare students' 21st Century learning skill score before and after attending the course, which was for third-year students in Computer Education Department, and to study the students' level of satisfaction in the blended learning course. The Addie Model was used in this research. In this study, 30 third-year Computer Education students in the first semester of the academic year 2019 were selected as samples using the purposive sampling method. The tools used in this research were teaching management plan stating models and methods for managing science learning areas, 21st Century learning skill assessment for students and satisfaction survey for students attending the blended learning course. The statistical tools used were average, standard deviation and t-Test.*

The research of this result revealed that blended learning process consist of three stages, which were 1) introduction 2) teaching and 3) conclusion. The result of expert evaluation showed that the teaching management plan which employed blended learning approach was highly suitable ($\bar{x}$ = 4.70). After attending the Methodology in Teaching Computer course which employed blended learning, the students' 21st Century learning skills improved significantly at the 0.05 level. The students' satisfaction in the blended learning activities was high.

Keywords: *Blended Learning, 21st Century learning skills*

I. INTRODUCTION

Blended learning is a diverse teaching approach and it is widely used now. Its objectives are to help students achieve the learning goal while developing the students' 21st Century learning skills [4]. The combination of face-to-face classroom learning and learning outside classroom through activities and websites, which is flexible, should respond to the differences of students in terms of learning style, thinking preference, interests and abilities. The instructor may adopt at least two learning methods, for example,

the instructor could present the content by using technology in combination with face-to-face classes and put the content on a website and monitor learning activities using e-learning, learning management system (LMS) or a computer. Students could then summarize the lesson during the discussion with the teacher in classroom environment [1].

Therefore, blended learning method should be one of the approaches that help develop the 21st century learning skills which will lead to life-long learning. It adheres to the 3R x 7C learning principle: 3R consists of reading, (w)riting and (a)rithemetics. 7C consists of critical thinking and problem solving skills, creativity and innovation, cross-cultural understanding, collaboration, teamwork and leadership skills, communications, information and media literacy, computing and ICT literacy, career and learning skills [4]. Blended learning has various learning approaches that can develop different learning skills, for example, having students to study case study and/or situation allows them to learn while using communications, information and media literacy, reading skill. Furthermore, it develops critical thinking and problem solving skills as students need to understand the context of the case study, learn and understand cultural and paradigm differences. Moreover, students must gather information and analysis, then compile them into a report. As it is a group assignment, students will develop collaboration, teamwork and leadership skills. Students use communications, information and media literacy when presenting their work.

Furthermore, the use of blended learning through other media such as web-based learning, CAI, online and offline e-book, as well as using communication platforms (e.g. Facebook and LINE group) as a social learning tool to collaborate, would considerably develop communications, information and media literacy; computing and ICT literacy. In the past 3 years (academic year 2015 – 2017), the achievement of students in Methodology in Teaching Computer course was unsatisfactory both for the teacher and the students. Especially in 2017, it was found that the score of exit exam was relatively low. The students commented in course evaluation form that the difficulty of this course lay in lesson plan writing. Further inquiries with the students revealed that most of the content of this course was difficult to comprehend and the students had never had any experience in this subject before.

Duangjai Puttasem∗, Computer and Educational Technology Department, Nakhon Sawan Rajabhat University, Nakhon Sawan, Thailand. Email: woodiefamous@gmail.com

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Therefore, students needed learning process with focus on practice and creativity. The teacher then looked for various methods of teaching to help students access the content anytime and anywhere.

II. RESEARCH OBJECTIVE

The objectives of this research are to enhance the capability of Blended learning model used in Methodology in Teaching Computer course to develop 21st Century learning skills, to compare students' 21st Century learning skill score before and after attending the course, which was for third-year students in Computer Education Department, and to study the students' level of satisfaction in the Blended learning course.

III. RESEARCH METHODOLOGY

The research procedure is as follows:

Phase 1: Analysis

Documents, theories and research papers relating to the management of blended learning for Methodology in Teaching Computer course were studied.

1. The researcher studied and analyzed students' learning from their learning outcome in the previous academic year and from conducting interviews with teachers of other subjects.

2. Before starting Methodology in Teaching Computer course, the teacher interviewed students about learning problems they faced, their expectation and what they want in this course by using an interview form.

3. The result of the interview form was considered when designing the blended learning Methodology in Teacher Computer course.

Phase 2: Design

1. The course syllabus was designed considering learning process and impact on students, as well as its compatibility with the students' level of knowledge and capacity. The researcher chose blended learning approach which focused primarily on students. Blended learning focuses on flexible learning activities. It combines various learning strategies by using different media, learning activities and instructional models, including online and face-to-face learning, to correspond to individual needs of the students.

2. The design of blended learning consisted of learning activities for each topic, delivery model of blended learning and support for blended learning. The design of activities for each topic consisted of definition of the outcome of students' action, activities for each objective, categorization of all activities and assessment for each learning unit. Designing and developing learning media consisted of selecting content and developing case study, e-learning lessons, computer-assisted instruction (CAI) and e-Book. The design outcome was presented and the assessment of learning outcome was developed while taking into account the 21st Century learning skills, which are reading, writing, computing, critical thinking and problem solving, creativity and innovation, cross-cultural understanding, collaboration, teamwork and leadership, communications, information and media literacy, computing and ICT literacy, career and learning skills.

3. The blended learning was divided into three types according to the skills that the student should develop as follows:

3.1 Skill-driven blended learning is a combination of self-paced learning and facilitated learning with the teacher as facilitator and supporter

3.2 Attitude-driven blended learning uses a combination of learning media for each situation. The media is used as a tool to transmit knowledge in order to develop specific behaviors of students.

3.3 Competency-driven learning is a combination of tools used to support knowledge building and management, with the teacher acting as the advisor when the students develop their competencies. Skill-driven learning, attitude-driven learning and competency-driven learning are based on the idea of Valiathan (2002, quoted in [6])

Phase 3: Development

The tools generated from the design phase, which are blended learning course, learning management plan, 21st Century skill assessment, course satisfaction evaluation form, were tested for quality by experts.

Phase 4: Implementation

The samples of this research were 30 third-year Computer Education majored students who were studying in the first semester of the 2019 academic year. They were selected by using purposive sampling method.

Phase 5: Evaluation

1. Data analysis

For this evaluation, the researcher specified the level of significance at 0.05 for the purpose of answering the questions in the research objective. The researcher analyzed the data gathered in the implementation phase. The learning data of the samples before attending the blended learning course were compared to their scores after attending the blended learning Methodology in Teaching Computer course. The researcher followed this procedure.

1.1 The average of pre-test and post-test scores of the samples who attended the blended learning Teaching Computer course was calculated. The difference of the average pre-test and post-test scores were statistically tested using Independent Samples T-Test.

1.2 The average of post-test score of students who were taught using the blended learning approach and that of students who were taught using normal teaching methods were calculated to determine the average score of 21st Century learning skills. Dependent T-Test was used.

IV. CONCLUSIONS

The learning procedure of blended learning model consisted of 1) introduction 2) teaching and 3) conclusion. Expert evaluation result showed that the experts unanimously agreed that the teaching management plan with blended-learning was highly suitable. The students' 21st century skills improved significantly at the 0.05 level after taking the course. The average of their scores of satisfaction with class atmosphere, learning activities and benefits from the blended learning Methodology in Teaching Computer course was high.

Data analysis on learning outcome is follows:

Table I compares the scores of samples' skills before and after taking the blended learning course.

	N	X̄	S.D.	t	df	Sig. (2-tailed)
Pretest	30	33.73	7.75	-22.21*	29	.000
Posttest	30	63.03	2.37			

P < 0.001

According to Table I, the 21st Century learning skills of the third year Computer Education majored students who attended the blended learning Methodology in Teaching Computer course improved significantly at the .05 level after taking the course.

V. DISCUSSIONS

1. The 21st Century skills of the students who attended the blended learning course improved significantly at the .05 level after taking the course because the blended learning model focused on creating suitable environment and atmosphere for learning activities, teacher's teaching methods, student's learning style, learning media, communication channels and style of interaction between teacher-student, student-student, student-content in various contexts. The learning activities arranged were flexible in order to respond to students' individual difference and give each student the best outcome from the course. Web-based blended learning can develop better and deeper understanding of knowledge comparing to pure online learning or pure classroom learning as the model combined the best advantages of classroom and electronic learning. The students can do practical work in laboratory while reviewing the content online and using the content to solve learning problems freely. This finding was also in line with [2]. Blended learning allowed students to learn in a way that was challenging and responsive to individual differences and competencies, allowing students to better develop their learning competencies [3]. It could also develop their learning achievement as blended learning allowed students to have more role in learning and thus meaningful learning occurs.

2. The average satisfaction scores in three aspects, namely atmosphere, learning activities and benefits, of students who attended Methodology in Teaching Computer course with blended learning model were high. This is because online resources were used in conjunction with traditional lecture in classroom instead of face-to-face learning. Online resources included content, assignments, collaboration tools, online evaluation. Online content should cover all content in traditional classroom to replace face-to-face learning. The design of the system must make the online platform as close to traditional classroom as possible, for example, asking questions, giving assignments and giving advice. These factors contributed to the students' high satisfaction in blended learning.

For the recommendations,

1. Other learning techniques such as collaborative learning, cooperative learning, project-based learning and brain-based learning should be studied while being used in blended learning model.

2. Learning achievement or the measurement of skill level should be studied so that it is in line with higher education learning, for example, the Higher Education Standards Framework.

3. The impact of Blended learning on the development of other competencies, such as problem solving, creativity, creative problem solving, critical thinking, reflective thinking, information and communication technology competencies, should be studied.

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AUTHORS PROFILE
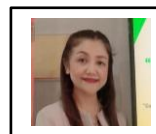
Duangjai Puttasem, Ed.D. is assistant professor at Nakhon Sawan Rajabhat University in the Faculty of Education. She also the chairman of Master of Education in Computer Education program. Her research focus areas are teaching computer, computer learning management, infographic design and creative thinking.