Development Of Research-Based Blended Learning Model To Enhance Graduate Students’ Research Competency And Critical Thinking Skills

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Abstract

This paper is a report on the findings of a Research and Development (R&D) aiming to develop the model of Research-Based Blended Learning (RBBL) to enhance graduate students’ research competency and critical thinking skills, to study the result of using such model, and to purpose the RBBL model. The sample consisted of 10 experts in the fields during the model developing stage, while there were 28 graduate students of KMUTNB for the model try out stage. The research procedures included 4 phases: 1) literature review, 2) model development, 3) model experiment, and 4) model revision and confirmation. The research results were divided into 3 parts according to the procedures as described in the following session. First, the data gathering from the literature review were reported as a draft model; followed by the research finding from the experts’ interviews indicated that the model should be included 8 components and 9 procedures to develop research competency and critical thinking skills. The 8 components were 1) Virtual Learning Environment (VLE), 2) Cloud Learning Management System (CLMS), 3) learning courseware, 4) learning resources, 5) scaffolding, 6) communication, 7) learning assessment, and 8) RBBL activity; while the procedures included: 1) Introduction, 2) Storyboards, 3) Keynote lectures, 4) Resources for Information and Communication Technologies, 5) Faculty Consultants, 6) Reflective Blog, 7) Assessment, 8) Presentation of Storyboard work, 9) Examination. Second, the research finding from the experimental stage found that there were statistically significant difference of the research competency and critical thinking skills posttest scores over the pretest scores at the .05 level. The students agreed that learning with the RBBL model was at a high level of satisfaction. Third, according to the finding from the experimental stage and the comments from the experts, the developed model was revised and proposed in the report for further implication and references.

Keywords: Research-Based Learning, Blended Learning, Research Competency, Critical Thinking Skills, Cloud Learning Management System;
1. Introduction

In an information and communication technology era, new educational methods are being introduced to support the complex learning environment and the development of professional competencies. There are also emphasis on collaborative construction of knowledge through active learning and on the importance of higher-order skill such as critical thinking, problem solving, and self-regulation. The important factor to improve students’ critical thinking is learning and teaching method such as Research-based Learning. The Technology-Enhanced Learning in Research Institutions sought to explore and develop the relationship between teaching, learning and research through the use of technology. A major Challenge in higher education is providing research opportunities to an increasing number of students in the absence of a major expansion of faculty resources. (Firmage, Tietenberg, and Cole (2005). Research-based Learning (RBL) is a system of instruction which used an authentic learning, problem – solving, cooperative learning, hands on, and inquiry discovery approach, guided by a constructivist philosophy. Research-based learning is based on using the research process as a tool for knowledge acquisition, the advantage of research-based learning is that students have the chance not only to learn concepts but also to practice research-related skills, such as constructing and testing a hypothesis and collecting and analyzing data. (Phithiyanuwat, and Bunterm 1998). Moreover, flexibility is increased when education is less dependent on time and place by making personalized learning routes available for individual students (Jochems, Merriënboer, and Koper, 2004). Many educational technologies are used to serve the way that curriculum changes. Particularly information and communication technology (ICT) in the sense of the Internet and its applications such as the WWW., e-mail, teleconference, groupware for computer supported collaborative learning (CSCL), learning management system (LMS), web-based learning (WBL) are growing rapidly among higher education in Thailand. However, all of these terms imply that the learners are of distance from the teachers, and computers are used to access learning resources, or to interact with the lessons provided, the teachers or their peers. In practice, many of these terms are used interchangeably. The options for web-based learning ranges from the use of applications in traditional classrooms to comprehensive online courses in which there is no face to face contact. A blended course utilizes a combination of teaching methods in traditional classrooms and distance learning format via the Web. A blended approach may improve the efficiency of classroom management, especially for large classes, which would also increase the degree of student-led learning and student achievement. (Johnson, McHugo and Hall, 2006). According to the above reasons, it would be found that the development of research-based blended learning model to enhance graduate students’ research competency and critical thinking skills.

2. Objectives

2.1. To develop the framework of Research-based Blended Learning (RBBL) model to enhance research competency and critical thinking skills for graduate students.

2.2. To develop the Research-based Blended Learning model to enhance research competency and critical thinking skills for graduate students.

2.3. To study the result of using the Research-based Blended Learning model to enhance research competency and critical thinking skills for graduate students.

2.4. To purpose the verified Research-based Blended Learning model to enhance research competency and critical thinking skills for graduate students.

3. The research study and the findings

The research objectives of this study were: (1) to develop Research-based Blended Learning (RBBL) model to enhance graduate students’ research competency and critical thinking skills, (2) to examine result from the using of the Research-based Blended Learning model to enhance graduate students’ research competency and critical thinking skills, and (3) to propose the Research-based Blended Learning model to enhance graduate students’
research competency and critical thinking skills. Accordingly, the research methods used in this study comprised of 4 phases: Phase 1 Literature review of model components and procedures, Phase 2 development of RBBL model, Phase 3 Try out RBBL model, and Phase 4 Propose Research-based Blended Learning model. The details are described as follows:

3.1. Phase 1: Literature review

In this phase, researcher analyzed and synthesized the concepts, principles, theories, and research study concerning existing instructional design, research-based learning, blended learning, research competency, and critical thinking skills. The instruments used in this phase is the content analysis form. The process in this phase is the data gathering from the literature review and content analysis using the content analysis form were reported as a conceptual framework of the research-based blended learning model to enhance research competency and critical thinking skills for graduate students. The 3 components were used for creating RBBL model which theoretically affected blended learning, Research-based Learning, and instructional system design and development. The conceptual framework developed from this phase is as shown in figure 1.

![Conceptual framework of the Research-based Blended Learning model to enhance research competency and critical thinking skills for graduate students](image)

3.2. Phase 2: Model development

In this phase, the researcher used information obtained from the literature review of model components and procedures to develop the RBBL model. The sample group in this phase consisted of 5 experts in the field of instructional design, research-based learning, blended learning, research competency, and critical thinking skills. The instruments used in this phase is the experts’ in-depth interviewing form. The process in this phase included: (1) the data gathering from the literature review and content analysis using the content analysis form were reported as a draft model and (2) researcher in-depth interview the 5 experts in the field of instructional design, research-based learning, blended learning, research competency, and critical thinking skills using the experts’ in-depth interviewing form experts’ in-depth interviewing form. The former result from the review of totaled 40 related literatures, which included 8 Thai literatures and 32 international literatures, found that the model should include of 8 components and 4 procedures to effective enhance graduate students research competency and critical thinking skills. The 8 components were (1) Virtual Learning Environment (VLE), (2) Cloud Learning Management System (CLMS), (3) learning courseware, (4) learning resources, (5) scaffolding, (6) communication, (7) learning assessment, and (8) RBBL activity; while the 4 procedures included: (1) framing and analyzing problems step, (2) designing and planning research step, (3) interpreting and evaluating research results, and (4) presenting research findings. The
model developed from this phase is as shown in figure 2 and the instructional process of PBBL to enhance research competency and critical thinking skills is as shown in figure 3.

![Figure 2. The Research-based Blended Learning model to enhance research competency and critical thinking skills for graduate students](image)

![Figure 3. The instructional process of PBBL model to enhance research competency and critical thinking skills for graduate students](image)

### 3.3. Phase 3: Model try out

The sample in this phase included 28 graduate students registered in the Information and Communication Technology in Education courses in the second semester of an academic year 2011. The samples was studied via web with the RBBL model for 10 weeks, followed with a critical thinking test and then asked for their opinions. There were 5 instruments used in this phase including: blended Learning with research-based learning lesson plan, Cloud Learning Management System, research competency test, critical thinking skills test, and students’ satisfaction towards the RBBL model test; while the process in this phase were described as follows. First, the pre-test research competency and critical thinking skills. Then instructions were initiated for 10 weeks followed blended
Learning with research-based learning lesson plan. After that the post-test research competency, critical thinking skills, and students’ satisfaction towards the RBBL model. Data were analyzed using frequency, percentage, arithmetic mean, standard deviation and t-test dependent. The research results indicated as follows.

3.3.1. Learners’ research competency

Graduate students’ posttest score in research competency ($\bar{x} = 37.00$, $S.D. = 2.50$) were significantly higher than pretest score in research competency ($\bar{x} = 24.50$, $S.D. = 5.25$) at .01 level.

3.3.2. Learners’ critical thinking skills

Graduate students’ posttest score in critical thinking skills ($\bar{x} = 43.20$, $S.D. = 5.40$) were significantly higher than pretest score in critical thinking skills ($\bar{x} = 32.35$, $S.D. = 7.75$) at .01 level.

3.3.3. Learners’ satisfaction towards the RBBL model

Undergraduate students had the opinion that the RBBL model was appropriate in the high level and that the RBBL process would help graduate students to develop research competency, body of knowledge, critical thinking skills, problem solving skills, information skills, media skills, and technology skills.

3.4. Phase 4: Model revision and confirmation

The 5 experts considered that instructional design, research-based learning, blended learning, research competency, and critical thinking skills had the highest level of appropriateness towards the enhancement of research competency and critical thinking skills

4. Conclusions

The research-based blended learning model to enhance graduate students’ research competency and critical thinking skills consisted of principle, objective, instructional process and evaluation. The instructional process of the RBBL model is divided into two main stages: the preparation stage and the learning stage. The findings from this study appear to provide strong support for the premise that a research-based learning and teaching approach delivered using blended learning involving web based instruction and face to face instruction could provide strong supports for develop graduate students’ research competency and critical thinking skills, RBBL processes would help graduate student to develop knowledge and skills in information and communication technology.

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References


