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## Development of collaborative learning using case-based learning via cloud technology and social media for enhancing problem-solving skills and ICT literacy within undergraduate students

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### Abstract

This study is conducted in terms of research and development aiming for developing collaborative learning using case-based learning via cloud technology and social media. The research process is divided into 2 phases: 1) the development of collaborative learning using case-based learning via cloud technology and social media, and 2) the affirmation of collaborative learning using case-based learning via cloud technology and social media. The research samples are five experts selected by purposive sampling. The research instruments are the model of collaborative learning using case-based learning via cloud technology and social media, and the evaluation of the model's appropriateness analyzed by means and standardized deviations statistically. The research result shows that: 1. There are four components consisted in the model which are 1) the principles of instruction model, 2) the objective of instruction model, 3) the instruction process which is divided into 2 stages: 3.1) the preparation process before actual instruction, and 3.2) the operation of instruction, and 4) evaluation and examination of data collection. 2. The five experts assessed the instruction model, and pointed out that the developed instruction model is highly appropriate. This shows that the developed instruction model can be used for enhancing problem-solving skills and ICT literacy, and improve the instruction as a whole effectively.

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*Keywords:* collaborative learning; case-based learning; cloud technology; social media

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## 1. Introduction

Thailand's ICT Policy Framework 2020 identifies e-Education strategies by supporting and encouraging ICT as an educational instrument in order to enhance the general class-based instruction. This creates a variety of instruction models (B.E. 2554-2563 (ICT 2020)) including "Collaborative Learning" which is based on constructivism, a theory that promotes group participation among learners. The students will be divided into small groups in which students with distinct skills cooperate with each other. By exchanging ideas and sharing learning resources, each member has to be responsible both in terms of collective studying and individual assignments while communicating with other members. It (Taylor, 2000) states that collaborative learning is the heart of collaborative working. In order to solve the existing problems, collaborative learning is considered as an effective approach for supporting students to solve problems (Chu et al., 2009)

Case-based learning is an instruction approach aiming for students' training based on actual participation or problem-based simulation which reflects ideas from the experiences embedded in the identified case studies (Choi & Lee, 2008) By having objectives for developing learning and problem-solving skills within learners, learners will be able to train their critical thinking and problem-solving skills. This, hence, becomes an instructional strategy that promotes systematically critical thinking process for students. Students will gain knowledge from active learning by having instructors as educational supporters and facilitators in order to enhance problem-solving skills relevant to assignment. It (Dyer et al., 2013) states that case-based learning helps learners to enhance problem-solving skills.

Cloud computing model is a computing model for massive IT structure which can be transferred to internet users (Gartner, 2008) via cloud technology. This works on cloud computing system built upon the model of web browser or application as an instrument supporting learning activities. This influences the learners directly in terms of perspectives and new learning models, and becomes a communication medium between learners and instructors.

Online social media is another tool for social communication using in learning. Social media means online social media that utilizes online tool existed in internet network by selecting social media in internet network as a medium for supporting communication between learners and instructors as well as collective data collection, information sharing, and idea exchanging from wherever via the network system. It (Gerlich et al., 2010) states that social media can be used as a learning tool effectively in relevance. with ICT literacy which is a basic ICT skill for studying, learning, working, and surviving in this ICT age. The appropriate utilization of ICT should enhance the learners' skills in association with 21st century educational system.

Therefore, the researcher had an idea to develop the collaborative learning using case-based learning via cloud technology and social media in order to enhance problem-solving skills and ICT literacy within undergraduate students as a beneficial guideline for effective educational management in the future.

## 2. Purpose of the study

2.1 To develop the collaborative learning model using case-based learning via cloud technology and social media in order to enhance problem-solving skills and ICT literacy within undergraduate students.

2.2 To evaluation the appropriateness of the collaborative learning model using case-based learning via cloud technology and social media in order to enhance problem-solving skills and ICT literacy within undergraduate students.

## 3. Scope of the study

### 3.1 Population:

The study population was experts in instructional design, information and communication technology (ICT), and undergraduate-level instruction.

### 3.2. *Samples Groups:*

The samples are 5 experts in instructional design, information and communication technology (ICT), and undergraduate-level instruction selected by purposive sampling who have more than 3-year experiences in the related fields.

### 3.3. *Variables of the study:*

3.3.1 An independent variable is the collaborative learning model using case-based learning via cloud technology and social media in order to enhance problem-solving skills and ICT literacy within undergraduate students.

3.3.2 A dependent variable is the evaluation result of the model's appropriateness.

## 4. Methodology

### 4.1 *The first phase*

The first phase was to develop collaborative learning model using case-based learning via cloud technology and social media in order to enhance problem-solving skills and ICT literacy within undergraduate students with the following method:

4.1.1 Development of the model of collaborative learning model using case-based learning via cloud technology and social media in order to enhance problem-solving skills and ICT literacy within undergraduate students by using data collected from studies and analyses of relevant documents and researches.

4.1.2 Propose the collaborative learning model to advisor for considering and revising in accordance with recommendations.

4.1.3 Propose the model to the experts through in-depth interviews.

4.1.4 Create an evaluation tool to evaluate the appropriateness of the model.

### 4.2 *The second phase*

The second phase of the project was an evaluation of the collaborative learning model using case-based learning via cloud technology and social media in order to enhance problem-solving skills and ICT literacy within undergraduate students. The process is as below:

4.2.1 Propose the developed model to 5 experts in the field of curriculum design, information and communication technology (ICT), and undergraduate-level instruction. The experts will consider and assess the appropriateness of the model, and then the researchers will modify the model in accordance with the experts' suggestions.

4.2.2 Analyze the results from the evaluation of the model's appropriateness by using means and standardized deviations statistically. The evaluation form is built upon 5-point Likert Scale; that is, very good, good, moderate, bad and very bad.

## 5. Result

The result of this research is divided into 2 parts.

*Part 1 The collaborative learning model using case-based learning via cloud technology and social media in order to enhance problem-solving skills and ICT literacy within undergraduate students is illustrated in Fig. 1.*

5.1 The Components of collaborative learning model using case-based learning via cloud technology and social media consisted of four components as follows: 1. The principles of instruction model, 2. The objective of instruction model, 3. The instruction process, and 4. Assessment and examination.

5.1.1 The principles of instruction model are collaborative learning via electronic media, case-based learning, integration of cloud technology and social media for collective learning, problem-solving skills building, and ICT literacy.

5.1.2 The objective of instruction model is to develop problem-solving skills and ICT literacy.

5.1.3 The instruction process is collective learning by using cloud technology and social media in order to develop problem-solving skills and ICT literacy. This is consisted of 1) The preparation process before actual instruction, and 2) the operation of instruction.

5.1.4 Assessment and examination of data collection: 1. the examination and assessment of problem-solving skills by using MEQ-style evaluation form which is consisted of four stages: 1.1 problem identification, 1.2 root-cause analysis, 1.3 solution finding, and 1.4 solution assessment and 2. the examination and assessment of ICT utilization consisted of six components as follows: 2.1 access, 2.2 management, 2.3 integration, 2.4 evaluation, 2.5 creation, and 2.6 communication.

5.2 The collective learning process using case-based learning via cloud technology and social media in order to enhance problem-solving skills and ICT literacy within undergraduate students is divided into 2 stages:

5.2.1 Preparation process before actual instruction is the preparation for learners by using case-based collective activities via cloud technology and social media.

5.2.2 Collective learning instruction’s operation process by using case-based learning via cloud technology and social media is consisted of five stages: 1. problem understanding, 2. problem analysis, 3. solution proposal, 4. solution choosing, and 5. solution summarization.

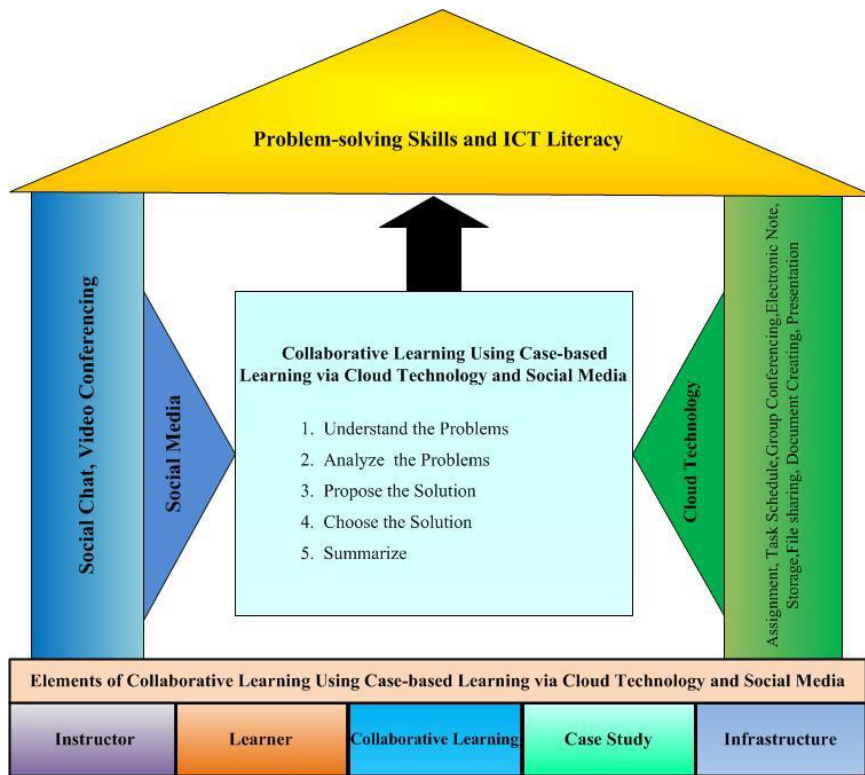


Fig. 1. The model of collaborative learning using case-based learning via cloud technology and social media

*Part 2 The evaluation results of the appropriateness of the collaborative learning model using case-based learning via cloud technology and social media in order to enhance problem-solving skills and ICT literacy within undergraduate students*

Table 1. The Evaluation Result of the Developed Instruction Model

Evaluation Lists	$\bar{X}$	S.D.	Level of Quality
1. Components of the model are appropriate for problem-solving skills development.	4.00	0.00	Good
2. Components of the model are appropriate for ICT Literacy development.	4.40	0.55	Good
3. The model's activities and process are appropriate for problem-solving skills development.	3.80	0.45	Good
4. The model's activities and process are appropriate for ICT Literacy development.	4.00	0.71	Good
5. The collaborative learning model using case-based learning via cloud technology and social media is appropriate for real-life utilization.	4.60	0.55	Very Good
Summary	4.16	0.45	Good

According to Table 1. in terms of the whole image of the model, the experts rated the model as Good appropriate ( $\bar{X} = 4.16$ , S.D. = 0.45). The elements in the list that are rated as first three highest are “the collaborative learning model using case-based learning via cloud technology and social media is appropriate for real-life utilization” ( $\bar{X} = 4.60$ , S.D. = 0.55), “components of the model are appropriate for ICT Literacy development” ( $\bar{X} = 4.40$ , S.D. = 0.55), “components of the model are appropriate for problem-solving skills development” ( $\bar{X} = 4.00$ , S.D. = 0.00), and “the model's activities and process are appropriate for problem-solving skills development” ( $\bar{X} = 4.00$ , S.D. = 0.71), respectively.

## 6. Discussion of results

The evaluation result of the collaborative learning model using case-based learning via cloud technology and social media in order to enhance problem-solving skills and ICT literacy within undergraduate students is relevant with the research written by (Yoo & Park, 2013) which states that case-based learning is beneficial and effective for enhancing problem-solving skills at bachelor's degree level as well as another research written by (Craig Van Dyke et al., 2005) which states that case-based learning on web browser is an effective approach for accessing information and presenting interaction and participation. The result is also relevant with a research written by (Pheeraphan, 2013) which states that the grouping of ICT, including ICT literacy that is applied to instruction process helps the learners to learn effectively.

## 7. Recommendations

### 7.1 Recommendations for research result's application

Educational institutions where are using the developed model should prepare the infrastructure for necessary network system in order to connect to the internet for using cloud technology and online social media that will enhance the ICT literacy.

### 7.2 Recommendations for further research

The further research should apply the output from this study in order to test the outcome and examine the instruction according to the developed instruction model, and then apply the outcome to further learners' development in different contexts.

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