



# A Model Design for a Web-based Learning System using Project-based Learning of Imagineering to Enhance Creative Construction of Multimedia Skills and Cooperative Skills

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## Abstract

The objectives of this research are to 1) design the model for a Web-based Learning System using Project-based Learning of Imagineering to Enhance Creative Construction of Multimedia Skills and Cooperative Skills (Web PjBL-Multimedia), and 2) evaluate the suitability of the model design for a Web-based Learning System using Project-based Learning of Imagineering to Enhance Creative Construction of Multimedia Skills and Cooperative Skills. The research is divided into three phases which consist of 1) the study and the synthesis of conceptual framework for a Web PjBL-Multimedia, 2) the design of the model for a Web PjBL-Multimedia, and 3) the suitability evaluation on the design the model for a Web PjBL-Multimedia. The sample group includes 5 experts in the fields of education technology, computer, and information & communication technology for education. The research tools herein include the model for a Web PjBL-Multimedia and suitability evaluation form. The data were analyzed by arithmetic mean and standard deviation. The results of the research show that the suitability in terms of overall suitability of elements was at high level; and the suitability in terms of element components in the model for a Web PjBL-Multimedia was at very high level.

**Keywords:** Web-based Learning System using Project-based Learning of Imagineering (Web PjBL-Multimedia), Creative Construction of Multimedia Skills, Cooperative Skills.

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## 1. Introduction

The objective of the recent education is to equip the learners with learning skills in the 21st century. According to the learning skills in the 21st century, the emphasis is placed on creativity of learners since the world in this century is dynamic and subject to sudden changes all the time. Those who can live consistently to such new society have to refine their creativity and innovation skills. These skills already exist in humans, and with decent learning and practice, the learners will be more intelligent, active, and patient. Those who possess high level of creativity skill are likely to have better jobs, more progress, and more contribution to the world [1]. This is corresponding to National Education Act BE 2542 and Amendments (Second National Education Act) BE 2545, which encourages the learners to rely on themselves, have creativity, and learn by themselves in a sustainable manner. Especially, section 24 therein indicates that the education institutes should have the practice on thinking process, situation confrontation process, and the application of knowledge to prevent and solve problems. Also, the objective of this section is to encourage learners to have desirable thinking characteristics, i.e. problem-solving skill and creativity, so that they can solve any problems in different situations of their daily life [2].

According to the fact that the learning skills in the 21st century is necessary for learners, the researcher has an idea to apply the said skills to the instructional models and



instructional activities in order to enhance learning skills of the learners and make them corresponding to the learning in the 21st century and National Education Act BE 2542 and Amendments (Second National Education Act) BE 2545. Thus, the creation of creativity is an important point to gain acceptance of ideas as well as admiration of invention and innovation generated from creative thinking in the developed to enhance learning skills of the learners and make them corresponding to the learning in the 21st century.

Project-based Learning is a kind of instructional method in which the learners are able to study and practice anything by their own as to their capability, skills, and interest by means of scientific process or others that can lead to the solutions. Projects can be conducted in any levels of education, individually or in group, depending on the difficulty of different projects. Regarding the group projects, the learners are encouraged to help one another in thinking and finding out the solutions [3] in order to achieve the goal of the project. In addition, this method can promote the learners' creative thinking process which is very important in the 21st century learning because this process assists the learners to find out solutions based on brainstorming, thinking out of the box, imagining with sound reasons, etc.

Imagineering is a new concept of instructional management that focuses on the development of learners' characteristics in the 21st century by encouraging the learners to study by themselves, to have creativity, and to be able to make innovation [4]. The imagineering is a synthesis of imagineering process including imagine, design, develop, present, improvement, and evaluate [5].

Regarding the significance and the concepts above, the researcher has an idea to design the model for a Web-based Learning System using Project-based Learning of Imagineering to Enhance Creative Construction of Multimedia Skills and Cooperative Skills by integrating the above concepts and theories, so that the learning system model could satisfy the needs of learners in the 21st century. The developed system is expected to be applied as a

development model of web-based learning system to enhance the learners' creative construction of multimedia skills and cooperative skills which are necessary in the 21st century.

### **Objectives**

1.1 To design the model for a Web-based Learning System using Project-based Learning of Imagineering to Enhance Creative Construction of Multimedia Skills and Cooperative Skills.

1.2 To evaluate the suitability of the model design for a Web-based Learning System using Project-based Learning of Imagineering to Enhance Creative Construction of Multimedia Skills and Cooperative Skills.

## **2. Literature Review**

### **2.1 Project-based Learning (PjBL)**

Project-based Learning (PjBL) is a learning method that encourages the learners to participate in either individual or group activity as to their capability, skill, and interest by means of creative thinking process. The process is under the supervision of instructors and it consists of the following 6 steps: 1) thinking and select topic, 2) studying the literature, 3) planning, 4) practice, 5) present, and 6) evaluate [6], [3]. The projects can be conducted in any levels of education, individually or in group, depending on the difficulty of different projects.

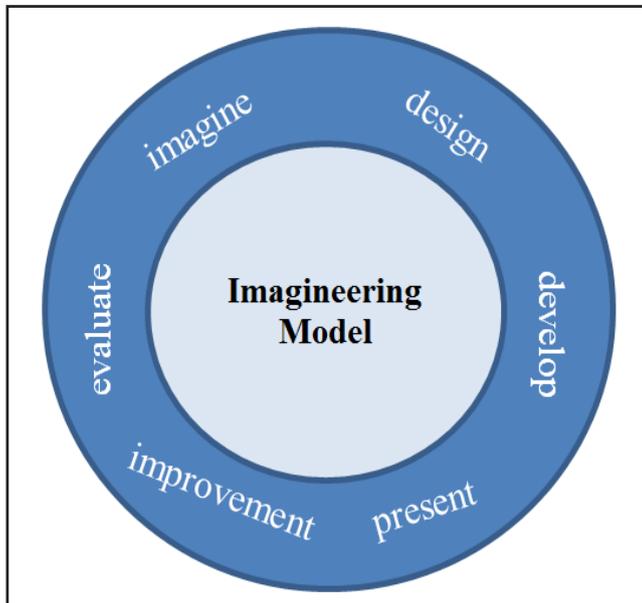
### **2.2 Imagineering Learning**

Imagineering Learning is a new concept of instructional management that focuses on the development of learners' characteristics in the 21st century by encouraging the learners to study by themselves, to have creativity, and to be able to make innovation. Imagineering learning consists of 6 aspects and 17 steps. The aspects include imagine, design, develop, present, improvement, and evaluate [5].

### **2.3 Cooperative Learning**

Cooperative Learning is a kind of instructional management for a small group of members who have different capability. All members must be responsible both for themselves and for the other members, work together, exchange knowledge,

and help one another so as to achieve the mutual goal. Cooperative learning includes main 5 elements, i.e. 1) positive interdependence, 2) face-to-face promotion interaction, 3) individual and group accountability, 4) interpersonal and small group skills, and 5) group processing [7], [8].



*Figure 1. Imagineering Model. [5]*

## 2.4 Instruction System

Instruction System is an application of system approach to the instruction based on the concept of organizing everything in such an orderly manner that it can lead to the desired target. The system requires an ability to distinguish the main elements of any issues while managing their relationship in a way that they can support one another. The system consists of 5 main sections, i.e. input, process, output, control, and feedback [9], [10], [11].

## 2.5 Creative Multimedia

Creative multimedia refers to any work pieces produced by the collaboration of learners after learning in the web-based learning system. The elements of creative multimedia consists of creativity, surprise, value, design, elaboration, and unity.

## 2.6 Creative Construction of Multimedia Skills

Creative construction of multimedia skills refer to the capability generated from the creation of multimedia corresponding to the 6 aspects and 17 steps of imagineering. Whereby the 6 aspects herein are different skills of using and

sharing resources, design and joint decision, teamwork, presentation and joint interaction, improvement and joint conclusion, and joint evaluation.

## 2.7 Cooperative Skills

Cooperative Skills refer to the competence derived from cooperation with others, leading to the achievement of goals or targets. In this case, the researcher has done a synthesis based on imagineering which is in compliance with the elements of cooperative skills of Johnson & Johnson [7], [8].

## 3. Methodology

The methodology of this research is divided into 3 phases.

**Phase 1** : Study and synthesize the conceptual framework from the literature review and researches. According to the conceptual framework, the researcher has focused on the development of learning skills in the 21st century, including creativity and creative construction of multimedia skills. Different theories and instruction models in figure 2 are integrated to produce a conceptual framework that can be applied to develop the learning skills of learners. Furthermore, the researcher relies on in-depth interviews with the specialists who have experiences in instructional system design, and applies the results thereof to establish a conceptual framework of the design for web-based learning system model. Conduct in-depth interviews with the experts and the experienced ones in the field of instructional design, and use the data to define the framework of the design of web-based learning system model.

The researcher has designed a model for a Web-based Learning System using Project-based Learning of Imagineering to Enhance Creative Construction of Multimedia Skills and Cooperative Skills by integrating the following relevant theories, i.e. Instruction System, Web-based Instruction, Project-based Learning (PjBL), Imagineering Learning, Cooperative Learning, Creative Multimedia, Creative Construction of Multimedia Skills, Cooperative Skills, and Achievement. The summary thereof is shown in figure 2.

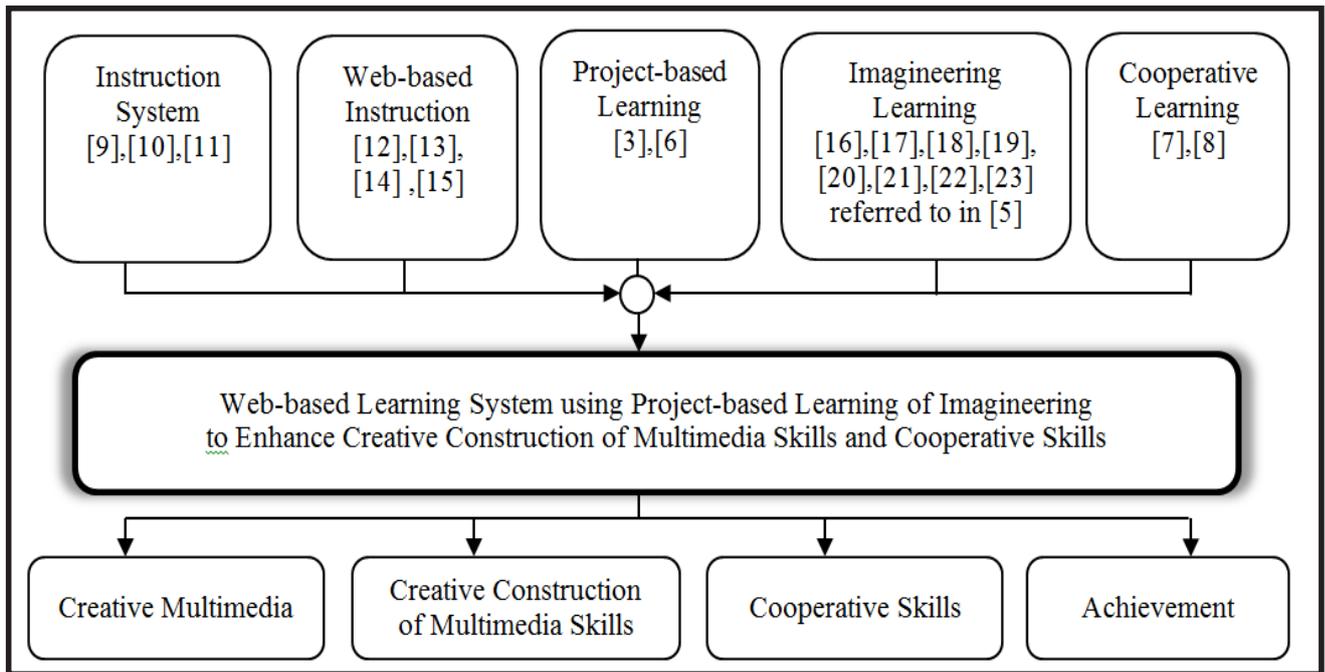


Figure 2. Conceptual Framework

**Phase 2 :** Design the model for a Web-based Learning System using Project-based Learning of Imagineering to Enhance Creative Construction of Multimedia Skills and Cooperative Skills.

1) Define the conceptual framework for a Web-based Learning System using Project-based Learning of Imagineering to Enhance Creative Construction of Multimedia Skills and Cooperative Skills.

2) Design the model for a Web-based Learning System using Project-based Learning of Imagineering to Enhance Creative Construction of Multimedia Skills and Cooperative Skills.

3) Present the model of the system to the experts for consideration by means of in-depth interview.

4) Create evaluation tools, e.g. an suitability evaluation form for the experts to evaluate the suitability of the system model.

**Phase3 :** Conduct evaluation on the suitability of the model for a Web-based Learning System using Project-based Learning of Imagineering to Enhance Creative Construction of Multimedia Skills and Cooperative Skills by 5 experts in the fields of education technology, computer, and information & communication technology for education.

## 4. Results and Discussion

### 4.1 Result of the research

**Phase 1 :** The model for a Web-based Learning System using Project-based Learning of Imagineering to Enhance Creative Construction of Multimedia Skills and Cooperative Skills consists of the following 4 main elements:

1) Input Factors consists of the following:

1.1) Learning Objective : The objective here is to see whether the learning behavior of the learners at the end of the courses is the same as that expected by the instructors.

Thereby, the results herein are derived from measurement and evaluation.

1.2) Learner Analysis is an analysis of learners' basic information so that the instructional system could be designed appropriately in compliance with the learners.

1.3) Activity Define that is designed and used as to tool to promote and develop learning process for the learners.

2) The learning process consists of 3 steps: (1) preparation, (2) web-based learning using project-based learning of imagineering, and (3) posttest. The details thereof are as follow:

2.1) The preparation includes 5 steps. i.e. orientation, registration for lessons, introduction to the web-based

learning system, grouping of learners, and pretest for learning achievement.

2.2) In the step of Web-based Learning using Project-based Learning of Imagineering, the researcher combines the principles of project-based learning theory with the imagineering learning theory, which includes 6 steps of (1) imagine, (2) design, (3) develop, (4) present, (5) improvement, and (6) evaluate, so that the learners could initiate cooperative learning and creative construction of multimedia skills.

Thereby, the 6 aspects of imagineering process herein consist of different activities that promote the skills of using and sharing resources, design and joint decision, teamwork, presentation and joint interaction, improvement and joint conclusion, and joint evaluation.

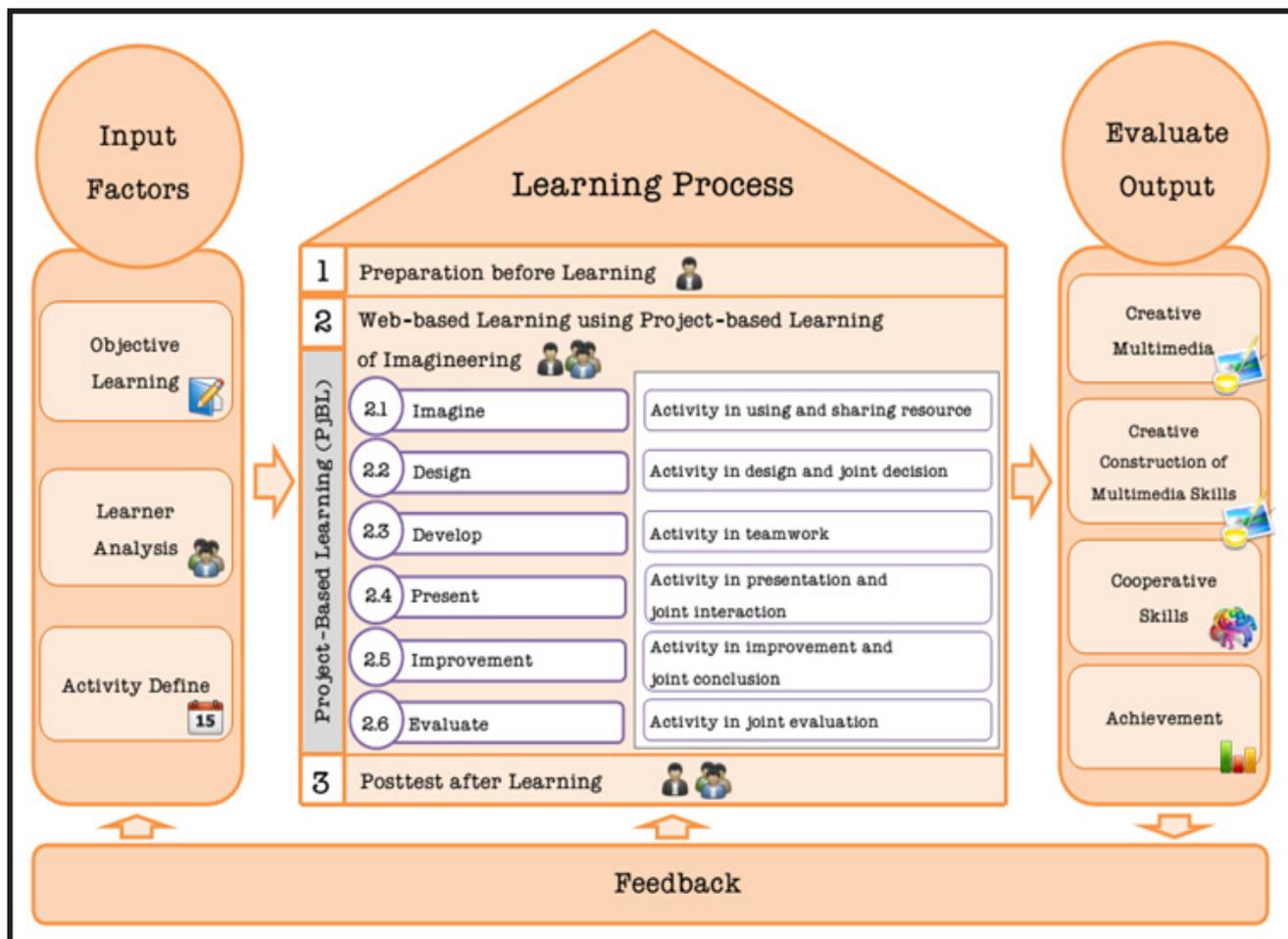
2.3) In the posttest step, the following will be tested:

- (1) creative multimedia, (2) construction of multimedia skills, (3) cooperative skills, and (4) posttest for learning achievement.

Thereby, the first three issues are tested by means of authentic assessment throughout the period of instructional activity.

- 3) The evaluate output includes: (1) creative multimedia, (2) construction of multimedia skills, (3) cooperative skills, and (4) learning achievement.

4) Feedback is derived from the data in the step of output evaluation for further use in the improvement of learning process and input factors. The feedback here includes opinions of experts in creative multimedia, results of cooperative skills, and scores of learning achievement. All of these feedback results are analyzed in order to improve and make learning process and input factors more appropriate and complete in each step.



**Figure 3.** A Model Design for a Web-based Learning System using Project-based Learning of Imagineering to Enhance Creative Construction of Multimedia Skills and Cooperative Skills



**Table 1.** Results of the synthesis of characteristics for project-based learning process and imagineering learning process.

Project-based learning process	Imagineering learning process	Characteristics
1. Thinking and Select Topic	1. Imagine	Ability to find out the most interesting topic of project by means of brainstorming and imagination
2. Studying the Literature 3. Planning	2. Design	Ability to search for the data from literatures or the experienced ones, and then plan and design the project by drafting or making a story board, etc., in order to derive the project model.
4. Practice	3. Develop	Ability to take step-by-step action corresponding to the fundamental design, with obvious division of work in order to achieve the expected outcome.
5. Present	4. Present	Ability to prove the project before the public by means of presentation.
6. Evaluate	5. Improvement 6. Evaluate	Ability to improve and evaluate the results by considering the outcome of individual and of the group to see whether the quality is satisfactory or not. This includes the suggestions from the group members, which will be beneficial for further improvement in the next project.

**Phase 2 :** Results of the suitability evaluation on the model design for a Web-based Learning System using Project-based Learning of Imagineering to Enhance Creative Construction of Multimedia Skills and Cooperative Skills.

The suitability evaluation on the model design for a Web-based Learning System using Project-based Learning of Imagineering to Enhance Creative Construction of Multimedia Skills and Cooperative Skills was conducted by

the 5 experts, and the results thereof are shown in Table 2 and Table 3.

**Table 2.** Results of suitability evaluation (overall elements) on the model design for a web-based learning system using project-based learning of imagineering.

Descriptions	Results		Level of suitability
	$\bar{X}$	S.D.	
1. The model of web-based learning complies with fundamental concepts and principles of instructional development.	4.40	0.89	High
2. The system model covers main elements of instructional system.	4.60	0.54	Very high
3. The prioritization of elements on the system model design is obvious and in good consequence.	4.40	0.89	High
4. The organization of elements on the system model design is appropriate and easy to understand.	4.40	0.89	High
5. The overall picture of web-based learning is complete, covers all requirements, and corresponds to the objectives of this research.	4.40	0.89	High
<b>Overall suitability of elements</b>	<b>4.44</b>	<b>0.77</b>	<b>High</b>

According to Table 2: Results of suitability evaluation (overall elements) on the model design for a web-based learning system using project-based learning of imagineering, the overall suitability is at high level ( $\bar{X} = 4.44$ , S.D. = 0.77). Once considering separately, the system model covers main elements of instructional system has the very high suitability ( $\bar{X} = 4.60$ , S.D. = 0.54).

**Table 3.** Results of suitability evaluation (separately elements in model of Web PjBL-Multimedia) on the model design for a web-based learning system using project-based learning of imagineering.

Descriptions	Results		Level of suitability
	$\bar{X}$	S.D.	
1. Overall suitability of input factors	5.00	0.00	Very high
2. Overall suitability of learning process	4.63	0.51	Very high
3. Overall suitability of evaluate output	4.20	0.77	High
4. Overall suitability of feedback	4.05	0.69	High
<b>Overall suitability of elements</b>	<b>4.51</b>	<b>0.63</b>	<b>Very high</b>

According to Table 3: Results of suitability evaluation (separately elements in model of Web PjBL-Multimedia) on the model design for a web-based learning system using project-based learning of imagineering, the overall



suitability is at very high level ( $\bar{X} = 4.51$ , S.D. = 0.63). Once considering separately, the overall suitability of input factors has the very high suitability ( $\bar{X} = 5.00$ , S.D. = 0.00), followed by the overall suitability of learning process, the overall suitability of evaluate output, and the overall suitability of feedback, respectively.

#### 4.2 Discussion

According to the results of suitability evaluation on the model design for a web-based learning system, it is found that the design of learning system model (overall elements) has suitability in the high level ( $\bar{X} = 4.44$ , S.D. = 0.77). Upon consideration on separated elements, it is found that input factors and learning process have the very high suitability level, ( $\bar{X} = 5.00$ , S.D.=0.00) and ( $\bar{X} = 4.63$ , S.D. = 0.51), respectively. This shows that the combination of project-based learning theory and that of imagineering can enhance creative construction of multimedia skills. This is corresponding to the concept of Partnership for 21st century skills (2009, referred to in Prachyanun & Panita) [24] saying that imagineering process is a guideline to develop learners in the 21st century, focusing on self-learning, creativity, and ability to create innovation. Also, it complies with Suwat [25], who found that the development of a blended vocational instruction model using project-based learning in the workplace could develop the performance and problem-solving skills of the learners better than general vocational instruction model. In addition, the results are in compliance with Chalit [26], who found that the development of instructional model via cloud technology based on the concepts of arts evolution could enhance creative thinking skill and imagineering skill. This could lead to a variety of creative processes that could also develop the new innovations and knowledge for the creation of much more creative production.

#### 5. Summary and Suggestions

The model for a Web-based Learning System using Project-based Learning of Imagineering to Enhance Creative

Construction of Multimedia Skills and Cooperative Skills was designed based on the elements of instructional system of Chaiyong[9], Tisana[10], and Sagud [11]. Regarding the instructional process, the researcher combined the concepts, principles and theories of project-based learning, consisting of 6 steps, of which the theories can enhance learning skills by encouraging the learners to study, research, and practice by themselves according to their ability and interest, with Imagineering learning process, consisting of 6 aspects, which focuses on the self-learning of learners in the 21st century to enhance creative construction of multimedia skills and cooperative skills. Referring to the web-based learning model, it can be summarized as below:

5.1 The synthesis results of the developed web-based learning model consists of the following 4 parts, i.e. 1.1) input factors: learning objective, learner analysis, and activity define, 1.2) learning process: preparation, web-based learning using project-based learning of imagineering, and posttest, 1.3) evaluate output: creative multimedia, construction of multimedia skills, cooperative skills, and learning achievement, and 1.4) feedback: opinions of experts in creative multimedia, results of cooperative skills, and scores of learning achievement.

5.2 According to the results of suitability evaluation on the design of learning system by the experts in the fields of computer and information and communication technology for education, it is found that the suitability of the learning system design, in terms of overall elements and separated element, is at the level of high and very high, respectively. Thereby, the researcher shall improve and test the developed learning system model based on the suggestions herein.

In the future, there should be more detailed information in each step of instructional process and the instructional activities to enhance creative construction of multimedia skills and cooperative skills should be varied and can obviously promote specific skills.



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