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The Project-based Learning using Design Thinking Model via Metaverse to Enhance Buddhism Innovators

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Abstract

The project-based learning using design thinking model via metaverse to enhance Buddhism innovators is integrating project-based and design thinking processes. Besides, using technology in the virtual world promotes learning activities. The model focused on allowing learners to study independently with instructors as counselors and facilitating learning to encourage learners to Buddhism innovators, to spread Buddhism by organizing learning activities in a virtual environment. This research aims to create and study the results of developing project-based learning model using design thinking via metaverse to enhance Buddhism innovators. The samples were five experts in developing the model from various institutions in higher education, selected by purposive sampling. The results showed that 1) the project-based learning model using design thinking consists of preparation, define topics, create and test, present and evaluate, and 2) evaluating the appropriateness of the proposed model. It was found that (2.1) Project-based learning models using design thinking via metaverse (Integrated elements) are appropriate at the level of highest, (2.2) The project-based learning model using design thinking via metaverse (Individual element) is appropriate at the highest level, (2.3) The learning process with a project-based learning model using design thinking via metaverse is appropriate at the highest level, and (2.4) A project-based learning model based on design thinking via metaverse (Implementation), is appropriate at the highest level. It found that a project-based learning model using design thinking via metaverse can be a guideline for learning to enhance Buddhism innovators.

Keywords: project-based learning, design thinking, metaverse, Buddhism innovators

1. Introduction

The National Education Act B.E. 2562 (No. 4) focuses on the management of education must be based on the principle that all learners have the ability to learn and develop themselves. And it is considered the most important learner. The educational process must encourage students to develop naturally and to their full potential, as well as knowledge, understanding, and experience in the management, maintenance, and utilization of natural resources and the environment in a balanced and sustainable manner. Organize activities for students to learn from real experiences, practice to be able to think, pretend, love to read, and continuously pursue knowledge. Encouraging instructors to set the atmosphere includes providing a learning environment and facilities for students to learn and be well-versed, as well as to use research as part of the learning process (Ministry of Education, 2010).

Project-based learning is a learning management process that focuses on allowing learners to practice practically on their own. Promote learner-centered learning and enhance classroom teaching and learning. Enhance teaching and learning in the classroom to create their own work. The instructor facilitates the organization of learning activities and provides guidance when students have problems during the learning activities. The concept of project-based learning process design is as follows: Include the preparation stage, the topic definition stage, the creation and testing stage, the presentation stage, and the evaluation stage according to the concept of Nilsook et al. (2021).

Design thinking is a systematic process of innovating to solve problems and innovate, helping to work efficiently. By putting the user at the center of the analysis. Explore to test results that benefit users, develop a wide range of knowledge and experience, and develop the technical skills that are essential in today's era (Yedra & Aguilar, 2022). The design thinking process consists of five steps are as follows: (1) Understanding problem stage, (2)

Define problem stage to defining framing a problem, (3) Brainstorming stage, (4) Prototyping stage, and (5) Testing stage. The above five stages can promote creativity and promote the value of teamwork, as well as promote self-development and systematic problem-solving (Dyer et al., 2011).

The Metaverse is a network of virtual worlds that allows you to immerse yourself in a variety of experiences where users can create digital reality and share their experiences through their avatars through a 3D virtual digital platform in the form of social media in a multi-user environment that combines physical reality with digital virtual reality in a simulated location and virtual collaboration. It has four components: environment, interface, interaction, and personal data preservation system (Dwivedi et al., 2022).

Buddhism and propagation are the Buddha's teachings that Buddhists practice benefiting themselves and others, then leading to respect and faith in the Holy Spirit (Department of Religious Affairs, 2014). Buddhism is the state religion of Thailand. Nowadays, the number of Buddhists who have access to Buddhism is decreasing due to the modernization of information technology. Therefore, the propagation of Buddhism in modern times. It must apply information technology and modern innovations to propagate Buddhism to the new generation's access to Buddhism and the traditions of the Thai people continuously (Phrakhrukosolthammanusith et al., 2019).

Buddhism innovators' skills are the skills to create innovations to spread Buddhism. The researchers used the five innovator skills of Dyer et al. (2011) (observation, questioning, networking, experiments, and linkage). To synthesize the concept of Buddhism in modern times, resulting in four aspects of Buddhist innovator skills: (1) Observation and questioning is the ability to ask questions, observing the conditions of the problem or details about the innovative approach to spreading Buddhism to the public, (2) Building a Buddhist network allows learners to express their opinions and discuss innovative ideas for spreading Buddhism with others, (3) Creative Innovation is the ability of learners to properly build a model from the concept of creating innovations for the propagation of Buddhism, and (4) Cognitive Linkage is the ability to seek a variety of new information and ideas to create innovations for the propagation of Buddhism.

From principle, the above ideas led the researchers to develop project-based learning using design thinking model via metaverse to enhance Buddhism innovators who can promote and support learning that focuses on learners studying and practicing on their own with the instructor as a guide and facilitate learning by applying the principles of design thinking. Which is the process of producing innovative, creative media in virtual media via Metaverse. The learners created a new direction to spread Buddhism, allowing interested people to learn anytime, anywhere in the designed virtual space. It also encourages learners to master the four skills of Buddhist innovators by organizing learning activities in a virtual environment via the metaverse to create innovative media for the propagation of Buddhism.

2. Research Objectives and Hypothesis

2.1 Research Objectives

- To analyze and synthesize the conceptual framework of project-based learning using design thinking model via metaverse to enhance Buddhism innovators.
- To develop project-based learning using design thinking model via metaverse to enhance Buddhism innovators.
- To study the appropriateness of developed project-based learning using design thinking model via metaverse to enhance Buddhism innovators.

2.2 Research Hypothesis

The research hypothesis is that the results of assessing the appropriateness of project-based learning using design thinking model via metaverse to enhance Buddhism innovators are high appropriate.

3. Research Methodology

The research is project-based learning using design thinking model via metaverse to enhance Buddhism innovators; the research methodology is as follows.

3.1 Sample Group

The sample group are five experts in developing the model from various institutions in higher education selected by purposive sampling.

3.2 Research Instruments and Statistics used in Data Analysis

To develop project-based learning using design thinking model via metaverse to enhance Buddhism innovators,

the researchers defined the research instruments as follows. 1) Project-based learning using design thinking model via metaverse to enhance Buddhism innovators, and 2) An assessment of the appropriateness of project-based learning using design thinking model via metaverse to enhance Buddhism innovators. Statistics used in data analysis include mean and standard deviation.

3.3 Research Procedures

The study is a research and development conducted in three phases as follows:

Phase 1: Analyse and synthesize a conceptual framework for project-based learning using design thinking model via metaverse to enhance Buddhism innovators.

Phase 2: Develop project-based learning using design thinking model via metaverse to enhance Buddhism innovators.

Phase 3: Assess the appropriateness of project-based learning using design thinking model via metaverse to enhance Buddhism innovators by five experts selected by purposive sampling.

4. Results

The development of project-based learning using design thinking model via metaverse to enhance Buddhism innovators can summarise the study results into three phases.

4.1 Results of Analysis and Synthesise of a Conceptual Framework for Project-based Learning using Design Thinking Model via Metaverse to Enhance Buddhism Innovators

The researchers analyzed and synthesized the relevant theory, documentation, and research into the project-based learning and design thinking processes. To obtain a conceptual framework of project-based learning using design thinking model via metaverse to enhance Buddhism innovators, as shown in Figure 1.

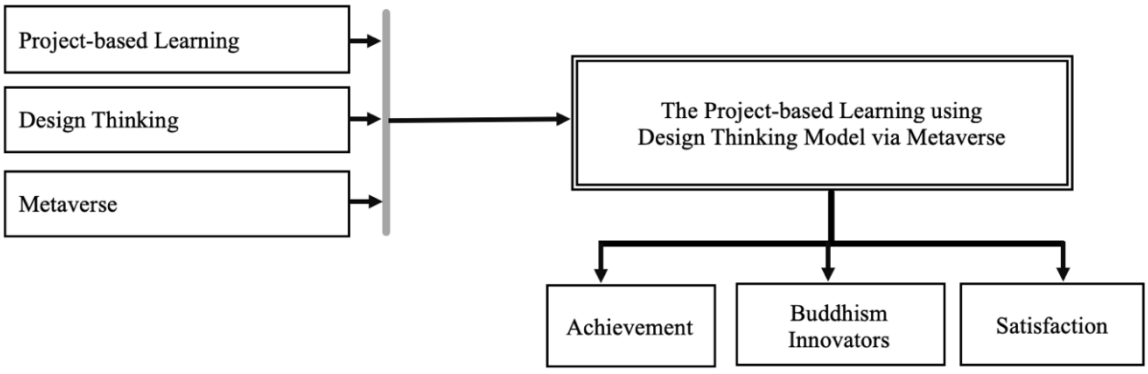

Figure 1. Conceptual research framework.

4.2 Development of Project-based Learning using Design Thinking Model via Metaverse to Enhance Buddhism Innovators

Development of project-based learning using design thinking model via metaverse to enhance Buddhism innovators by applying the results from synthesise the project-based learning and design thinking processes. Then synthesise to develop project-based learning using design thinking model via metaverse to enhance Buddhism innovators, as shown in Figure 2.

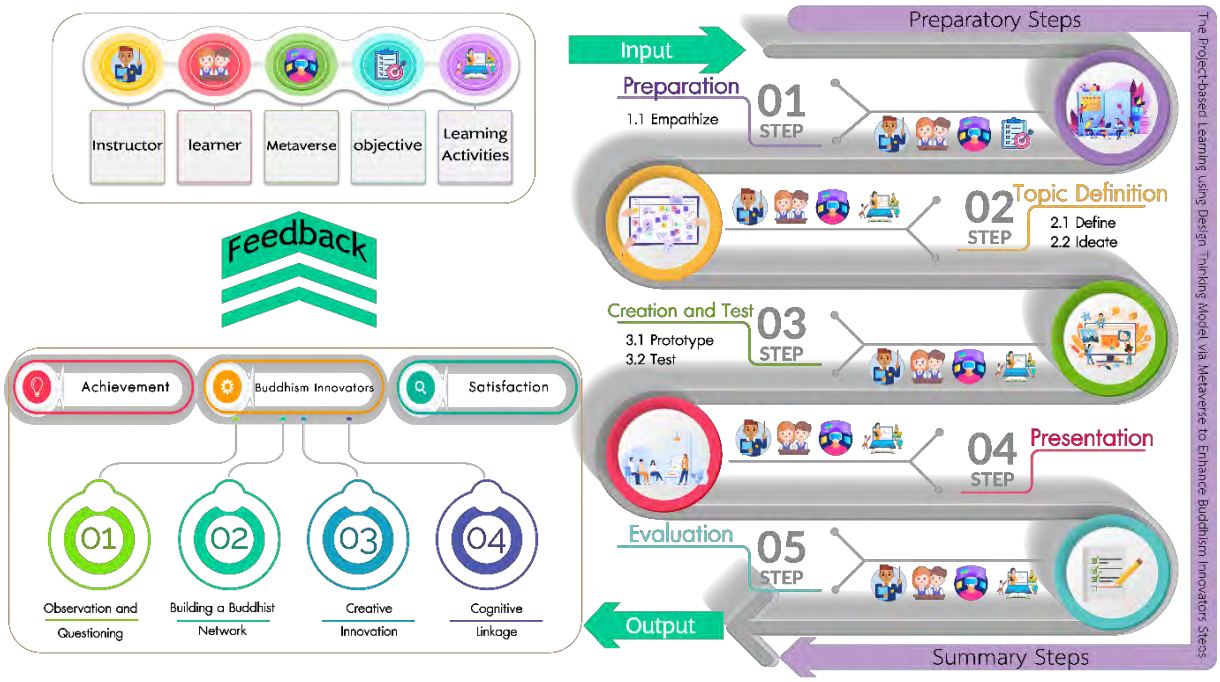

Figure 2. Project-based learning using design thinking model via metaverse

Figure 2 Project-based learning using design thinking model via metaverse to enhance Buddhism innovators consists of four components.

1. Inputs consists of five components: instructor, learner, metaverse, objective, and learning activities.
2. The project-based learning process using design thinking via metaverse consists of three stages.
   2.1 Preparatory steps consists of identifying objective, doing a pre-test, and dividing students into groups.
   2.2 Learning stage using project-based learning using design thinking model via metaverse. At this stage, the researchers applied the principles of project-based learning and design thinking processes as a step to learning through the learning process using project-based learning using design thinking model via metaverse, including five stages following the project-based learning and five stages following the design thinking process as follows.
   - Preparation stage, the learners form a group to conduct a study. Besides, study the feasibility of the problems and summarize the difficulties. By using the metaverse as a virtual classroom in a meeting and discussions. This stage consists of a sub-stage, empathize, which is the study and summary of the feasibility of the problems, where the instructor consults the learners, and learners collaborate to find the issue through a virtual meeting room in the metaverse using the empathy map tool to connect the needs of the user.
   - The topic definition stage is the stage of clearly identifying the problem and brainstorming ideas to obtain the topic of the project with new ideas and methods. This stage consists of sub-steps as follows. (1) Define the problems; learners will collaborate to define the problem and the topic clearly through a virtual conference room in the metaverse. In addition, the instructor will provide recommendations and approve the project topic. (2) Ideate, learners brainstorm ideas, make a plan, and present project topics. Besides, define problems and solutions step-by-step, then present them to the instructor in a virtual conference room in the metaverse.
   - Creation and test stage, the learners will create a piece of the designed project, testing, and problem-solving. The instructors will systematically follow up, examine the project process, and allow the learners to collaborate on their activities through a virtual community to present their work through the metaverse. This stage consists of sub-steps: (1) Creating the selected prototype; students collaborate to create prototypes from a designed project, then make a virtual exhibition

room in the metaverse to present the project results, and (2) Test, where learners test the results of prototyping and solve problems that may arise during the final test; the instructor follows up and examines the learner's project processes.

- In the presentation stage, the learners present through the metaverse. In comparison, the instructors and classmates share and recommend.
- The evaluation stage is a process in which the instructor and learners collaborate in evaluating the project according to real-world conditions through a virtual room developed by the learners. Besides, collect information and suggestions for further prototype development.

2.3 The summary stage measures academic achievement, evaluating Buddhist innovators, and assessing satisfaction after the learner has completed the study of contents according to the specified course and completed all activities as required.

3. Output consists of achievement, Buddhist innovators, and satisfaction.
4. Feedback includes expert opinions and achievement scores, Buddhism innovators, and satisfaction.

4.3 The Assessment Results of the Appropriateness of Developing Project-based Learning using Design Thinking Model via Metaverse to Enhance Buddhism Innovators

The study results of the development of project-based learning using design thinking model via metaverse to enhance Buddhism innovators. The objective is to consider the appropriateness by experts before using it as a guideline for developing a project-based learning system using design thinking. The evaluation and interpretation criteria (Kanasutra, 1995) as shown in Table 1.

Table 1. Mean score range and interpretation of results

Range of average score	Interpretation of appropriateness
4.50 – 5.00	Highest
3.50 – 4.49	High
2.50 – 3.49	Moderate
1.50 – 2.49	Low
0.00 – 1.49	Lowest

4.3.1 Results of the Assessment of the Appropriateness of Developing Project-based Learning using Design Thinking Model via Metaverse (Integrated Elements) as shown in Table 2

Table 2. Results of the assessment of the appropriateness of developing project-based learning using design thinking model via metaverse (Integrated elements)

Assessment issues	Assessment results		Interpretation of results
	Mean	S.D.	
1. The developed model corresponds to the conceptual principles that form the development of the model.	5.00	0.00	Highest
2. The elements of the developed model are comprehensive according to the main elements of the learning model.	5.00	0.00	Highest
3. The sequencing of elements in the developed model is precise and successive.	4.80	0.45	Highest
4. Composition of the sequence of elements in the developed model is appropriate and easy to understand.	4.60	0.55	Highest
5. An overall of the elements of the developed model is completed, comprehensive, and meets the research objectives.	5.00	0.00	Highest
Overall average	4.88	0.27	Highest

Table 2. The results of the assessment of the appropriateness of developing project-based learning using design thinking model via metaverse (Integrated elements) are at the level of highest (Mean = 4.88, S.D. = 0.27).

4.3.2 Results of the Assessment of the Appropriateness of Developing Project-based Learning using Design Thinking Model via Metaverse (Individual Element) as shown in Table 3

Table 3. Results of the assessment of the appropriateness of developing project-based learning using design thinking model via metaverse (Individual element)

Assessment issues	Assessment results		Interpretation of results
	Mean	S.D.	
1. Inputs	4.88	0.27	Highest
2. Learning process	4.60	0.51	Highest
3. Output	4.67	0.51	Highest
4. Feedback	4.80	0.45	Highest
Overall	4.74	0.44	Highest

Table 3. The results of the assessment of the appropriateness of developing project-based learning using design thinking model via metaverse (Individual element) is at the level of highest (Mean = 4.74, S.D. = 0.44).

4.3.3 Assessment of the Appropriateness of the Learning Process with a Project-based Learning Model using Design Thinking via Metaverse as shown in Table 4

Table 4. Results of the assessment of the appropriateness of the learning process with a project-based learning model using design thinking via metaverse

Assessment issues	Assessment Results		Interpretation of results
	Mean	S.D.	
1. Preparatory steps			
1.1 Identifying objectives	4.60	0.55	Highest
1.2 Pre-test	4.80	0.45	Highest
1.3. Segmentation	4.60	0.55	Highest
2. Project-based learning model using design thinking			
2.1 Preparation	4.60	0.55	Highest
2.2 Topic definition	4.60	0.55	Highest
2.3 Creation and test	4.80	0.45	Highest
2.4 Presentation	4.80	0.45	Highest
2.5 Evaluation	4.80	0.45	Highest
3. Summary steps			
3.1 Achievement	4.60	0.55	Highest
3.2 Buddhism innovators	4.80	0.45	Highest
3.3 Satisfaction	4.60	0.55	Highest
Overall	4.69	0.50	Highest

Table 4. The results of the assessment of the appropriateness of the learning process with a project-based learning model using design thinking via metaverse is at the level of highest (Mean = 4.69, S.D. = 0.50).

4.3.4 Results of the Assessment of the Appropriateness of Project-based Learning using Design Thinking Model via Metaverse (Implemented) as shown in Table 5

Table 5. Results of the assessment of the appropriateness of project-based learning using design thinking model via metaverse (Implemented)

Assessment issues	Assessment results		Interpretation of results
	Mean	SD	
1. The appropriateness of the project-based learning model using design thinking via metaverse.	4.80	0.45	Highest
2. The appropriateness of the order and process of project-based learning using design thinking via metaverse.	4.60	0.55	Highest
3. The possibility of a project-based learning model using design thinking via metaverse in practice.	4.80	0.45	Highest
Overall average	4.73	0.48	Highest

Table 5. The results of the assessment of the appropriateness of project-based learning using design thinking model via metaverse (Implemented) is at the level of highest (Mean = 4.73, S.D. = 0.48). In conclusion, the project-based learning model using design thinking via metaverse can use in practical learning classes. project-based learning using design thinking model via metaverse presents the content and the illustrations. As a result, teachers can understand the learning process easier.

5. Conclusions and Discussions

Project-based learning using design thinking model via metaverse to enhance Buddhism innovators following a project-based learning model based on the Nilsook et al. (2021) approach. It consists of five stages, including the preparation stage, the definition stage, the creation and testing stage, the presentation stage, and the evaluation stage. Besides, the five stages of the design thinking process are emphasized, defined, ideating, brainstorming, creation, and testing (Tham, 2022). The project then developed as a project-based learning model using design thinking by organizing learning activities via metaverse, which is a virtual environment in the digital space through their avatar through a 3D virtual digital platform in the form of social media to encourage learners to develop Buddhist innovator skills and apply new information technologies and innovations to spread Buddhism to the new generation, access to Buddhism and carry on the good traditions of the Thai people.

The study results in developing project-based learning using design thinking model via metaverse to enhance Buddhism innovators can summarise as follows. 1) The assessment results of the appropriateness of developing project-based learning using design thinking model via metaverse to enhance Buddhism innovators (Integrated elements) is at the level of highest (Mean = 4.88, S.D. = 0.27). 2) The assessment results of the appropriateness of developing project-based learning using design thinking model via metaverse to enhance Buddhism innovators (Individual element) is at the level of highest (Mean = 4.74, S.D. = 0.44). 3) Results of the assessment of the appropriateness of the learning process with a project-based learning model using design thinking via metaverse is at the level of highest (Mean = 4.69, S.D. = 0.50). 4) Results of the assessment of the appropriateness of the project-based learning model using design thinking via metaverse (implemented) are at the level of highest (Mean = 4.73, S.D. = 0.48).

According to the above four findings, integrating the project-based learning process with a design thinking process with clear, concrete, and reliable steps and processes can guide learning via the metaverse classroom. To enable learners to develop creative media in 3D virtual media in simulated locations and collaborate in the virtual world (Tlili et al., 2022). To spread Buddhism and various Buddhist activities. It is in line with the study of Khumyoung (2020), that project-based learning can enhance electronic professional skills because behavioral objectives will occur to learners. There is a sense of knowledge that produces and proposes concrete results. This aligns with the study by Klinart (2020), which states that design thinking can enable learners to be creative and innovative. In line with the study of Khamthana et al. (2020), design thinking is intended to empower nursing students and develop students with the ability to innovate. By adhering to the principle that all learners can develop themselves. Therefore, the learners have confidence, have an imaginative mindset that creates health innovations that are novel and useful to society, respectively.

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