The Imagineering Learning via Metaverse: ILM Model via Metaverse to Promote Creative Thinking Skills

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Abstract

The ILM model to promote creative thinking skills is concerning the application of the concepts of virtual technology in the instruction management, which is consistent and appropriate for learners in the digital age, so that they are able to learn anywhere and anytime by means of the brand-new teaching innovations. The objectives of this research are (1) to synthesise the conceptual framework of the ILM model, (2) to develop the ILM model, and (3) to study the results of the development of the ILM model. The research tools include (1) the ILM model, and (2) the evaluation form on the suitability of the ILM model. The results show that (1) the overall suitability of the ILM model (overall elements) is at the highest level (Mean = 4.88, SD = 0.14), and (2) the overall suitability of the ILM model is at the highest level (Mean = 4.90, SD = 0.18). This can be summarised that the ILM model is a kind of learning model that was developed by applying the concepts of virtual technology and imagineering learning process that can be used as guidelines to learn anywhere and anytime for the 21st century learners.

Keywords: ILM model, imagineering learning, metaverse, creative thinking skills

1. Introduction

According to the principles of learning management, which are designated to provide learners with knowledge, abilities, and desirable characteristics as to the learning standards specified in the Basic Education Core Curriculum, the utmost importance should be given to learners, focusing on the benefits they will receive, because it is believed that everyone is able to learn and develop himself. The process of learning management must encourage learners to develop themselves naturally and then achieve their full potential. Meanwhile, the individual differences should be taken into account, and, once referring to brain development, the emphasis should be placed on both knowledge and morality (Office of the Basic Education Commission, 2008).

The efficiency of instruction depends on instructors' ability to transfer knowledge, learners' perceptions, suitability of instruction media. Instruction media are considered the materials or tools that help instructors transfer knowledge to learners in an easier and quicker manner. Thereby, the instruction media are categorised into 3 types, i.e., learning media (e.g., print media, technology media), personal media (e.g., teachers, experts), and nature and environment (Office of the National Primary Education Commission, 1992).

Active learning is an instruction process that emphasises learners' participation and engagement in various forms of learning activities, e.g., analysis, synthesis, brainstorming, exchanging opinions, doing case studies, etc. It is advisable that the said learning activities help develop the skills of analytical thinking, critical thinking, communication and presentation, and proper use of information technology. Not only should learners participate in the activities mentioned above, but they should also interact with both instructors and other learners. While conveying knowledge to learners, instructors ought to reduce their role in giving lectures; instead, they should stimulate learners' enthusiasm to do activities and provide them with appropriate learning environments (Khemmani, 2010).

In addition to the skills mentioned above, active learning also helps learners develop creative thinking skills, which are essential for learners in the 21st century. The creative thinking skills encourage learners to be self-reliant, creative, and eager to learn while enabling them to learn on their own, practice thinking, deal with different situations, and apply their knowledge to prevent and solve problems. These skills are said to equip

learners with desirable characteristics in terms of thinking, i.e., problem-solving and creativity, which shall help learners cope with any problems in various situations in their daily life (Phunaploy, Chatwattana, & Piriyasurawong, 2021).

Imagineering learning is a thinking or learning process that combines the use of imagination with engineering techniques. Imagineering learning is employed to change conceptual images and abstract imaginations or concepts into concrete inventions and innovations. Such kind of learning is also used to find out solutions and create practical works, which is regarded as a new concept of learning management for the 21st century learners. It is expected that imagineering learning will encourage learners to learn on their own, develop creativity, and create innovations (Chatwattana & Nilsook, 2017; Sreejun & Chatwattana, 2023). Once implementing education activities based on imagineering learning, human imagination will be used in order to bring ideas into reality. This process will transform the abstract concepts into concrete understandings, which can eventually be applied in a practical manner (Nilsook, 2013).

Nilsook et al. (2014) summarised the imagineering learning process into six steps as follows: imagine, design, develop, present, improve, and evaluate. These aspects allow students to learn by themselves, encouraging them to bring their imagination into reality, which will finally lead to concrete inventions, works, or innovations.

Metaverse is a virtual reality in which several individuals can interact with one another via 3D images in a real-time virtual environment. Many people can show up in the same virtual space in the form of avatars. Avatars can be personalised in order to represent specific expressions of each person, which is believed to increase learners' interest and engagement (Mystakidis, 2022). Thus, the metaverse is a virtual environment in the digital space that is fabricated to allow people to interact and do activities together through their avatars (Chatwattana et al., 2023). The said activities may include conferences, meetings, talks, contacts, traveling, entertainment, etc., all of which can be performed through the virtual community with the aid of some technologies and accessories (Suzuki et al., 2020).

Creative thinking skills refer to the abilities of the brain related to divergent thinking, which will lead to the discovery of new things. This includes ways of thinking with adaptation, modification, and integration with the aim of creating new things (Wanglang & Chatwattana, 2023). It may also refer to the successful invention of theoretical principles based on accumulated knowledge and experiences, leading to the creation of new or extended concepts, theories, tools, inventions, and innovations that can be used to solve problems (Nittayathammakul et al., 2023).

In reference to the aforementioned principles and theories, the researchers have had an idea to develop the ILM model for use as a guideline to promote creative thinking skills in the digital age. In this learning model, the learners had participated in the imagineering learning activities and then presented their works via the metaverse. This process is regarded as a new concept of learning management corresponding to the development of characteristics of the 21st century learners, which encourages learners to learn on their own, develop creativity, and create innovations.

2. Research Objectives and Hypothesis

- To synthesise the conceptual framework of the ILM model to promote creative thinking skills.
- To develop the ILM model to promote creative thinking skills.
- To study the results of the development of the ILM model to promote creative thinking skills.

The hypothesis is that the overall suitability of the development of the ILM model to promote creative thinking skills is at a high level.

3. Research Methodology

This research is related to the design and development of the ILM model to promote creative thinking skills, and the research methodology is as follows:

3.1 Sample Groups

The sample groups are seven experts from different institutions in higher education.

3.2 Research Instruments

The tools employed in this research consist of (1) the ILM model to promote creative thinking skills, and (2) the evaluation form on the suitability of the ILM model to promote creative thinking skills.

3.3 Research Methodology

The research methodology designated to design and develop this model is based on the system approach of Khemmani (2010) and Utranan (1982), which can be divided into three stages as shown in Figure 1.
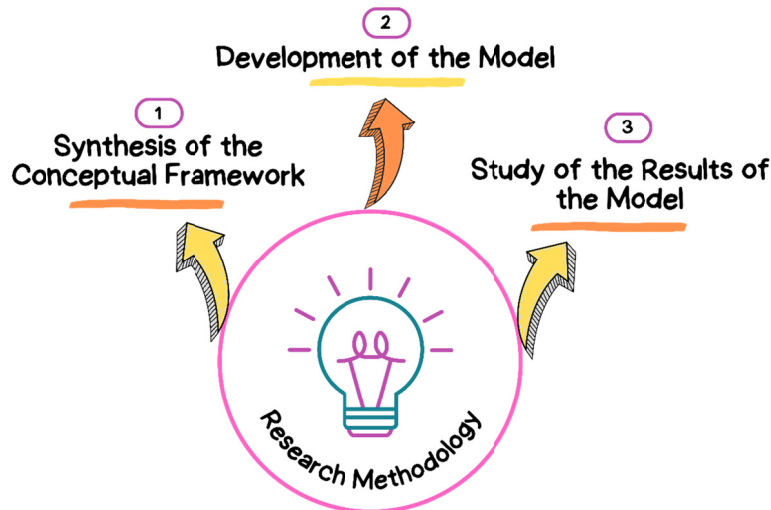

Figure 1. Research methodology

Stage 1: Synthesis of the documents and the researches relevant to the ILM model. In order to establish the conceptual framework of this research, the researchers had studied and analysed the documents and the researches, which are concerning instruction system (Khemmani, 2010), imagineering learning process (Nilsook, 2014), metaverse (Mystakidis, 2022; Suzuki et al., 2020), active learning (Khemmani, 2010), and creative thinking skills (Wanglang & Chatwattana, 2023; Nittayathammakul et al., 2023).

Stage 2: Development of the ILM model. In this stage, the researchers based the design and development of this model on the principles of the system approach.

Stage 3: Study the results of the ILM model. The researchers employed the research tools to find out the results after having the experts use the said model.

4. Results

The results of the development of the ILM model to promote creative thinking skills can be summarised as follows:

4.1 Results of the Conceptual Framework of the ILM Model

After the synthesis of the documents and the researches relevant to the ILM model, especially in terms of the instruction system, imagineering learning, metaverse, active learning, and creative thinking skills, the researchers obtained the conceptual framework of this research as shown in Figure 2.
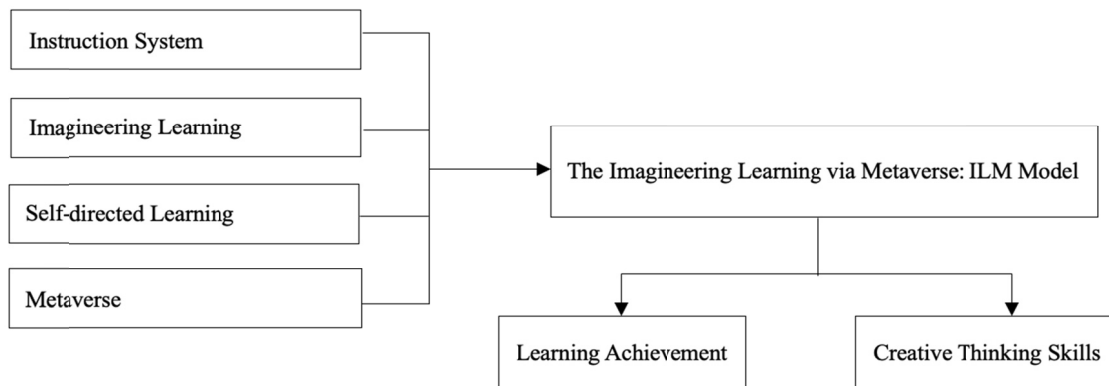
Figure 2. Conceptual research framework

4.2 Results of the Development of the ILM Model

In the development of the ILM model for use as a guideline to further design and develop the imagineering learning system via metaverse intended to promote creative thinking skills, the imagineering learning process combined with metaverse technology was employed to facilitate the instruction management, in which learners could do activities together via virtual community. The ILM model to promote creative thinking skills, as seen in Figure 3.
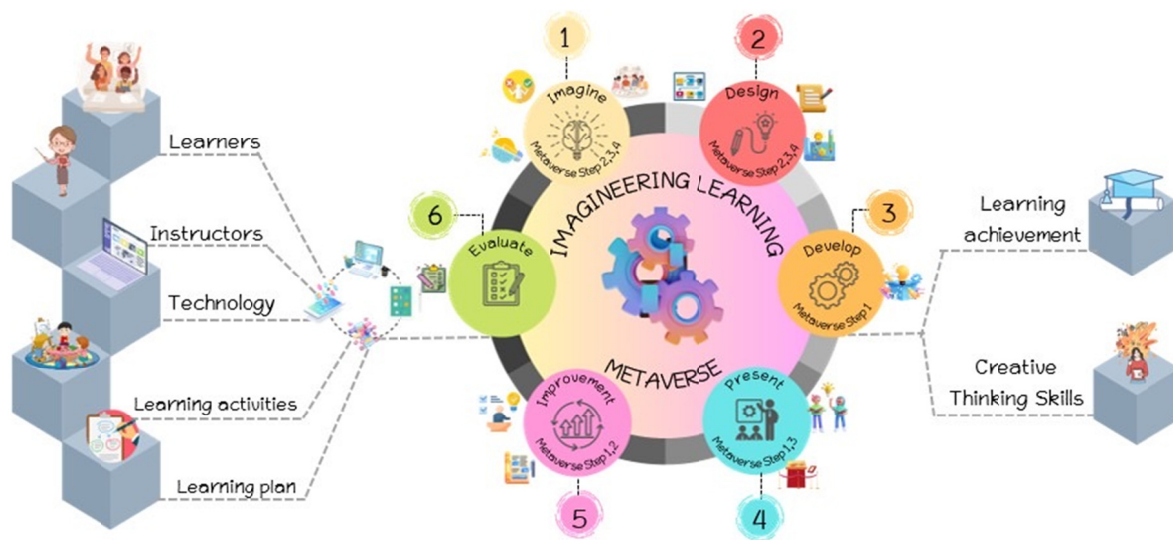

Figure 3. ILM model to promote creative thinking skills

Figure 3 represents the ILM model, which is composed of four main elements as below:

1) The input factor refers to the elements involved in the design and development of the ILM model. The said elements are the following five sub-steps: (1) learners, (2) instructors, (3) technologies, (4) learning activities, and (5) learning management plan.

2) The imagineering learning process via metaverse consists of six steps, i.e., (1) imagine, (2) design, (3) develop, (4) present, (5) improve, and (6) evaluate. In this research, the imagineering learning process involves the management of activities via metaverse technology. The instructors organise learning activities for the learners in the form of a virtual environment, and the learners are able to interact with the said learning activities. Each of the six steps in the imagineering learning process includes its own sub-steps as follows.

(1) Imagine: identify problem, brainstorm, discuss, and analyze feasibility

(2) Design: draft, storyboard, script, and prototype

(3) Develop: create and test

(4) Present: show, contest, and suggestion

(5) Improve: revise and conclusion

(6) Evaluate: process evaluation and product evaluation

3) Output includes (1) learning achievement, and (2) creative thinking skills.

4) Feedback refers to (1) results of evaluation on creative thinking skills, and (2) results of evaluation on learning achievement.

The study results of the development of the ILM model with seven experts in this research who were derived by means of purposive sampling are shown in Tables 1 and Table 2.

Table 1. Results of evaluation on the suitability of the development of the ILM model (overall elements)

Items for evaluation	Assessment results		Interpretation of results
	Mean	SD	
1. The design of the ILM model contains principles and concepts that can be used as the basis for developing the instruction systems.	4.85	0.37	Highest
2. The elements of the ILM model are as comprehensive as the main elements of the instruction systems.	4.87	0.33	Highest
3. The design of the ILM model has appropriate, which can be used to design the conceptual framework.	4.85	0.37	Highest
4. The sequence of elements in the design of the ILM model is clear and consistent.	4.87	0.33	Highest
5. The ordering of elements in the design of the ILM model is suitable and easy to understand.	4.87	0.33	Highest
6. The overall elements of the design of the ILM model is complete and it can be used as a guideline to develop the design of imagineering learning via metaverse to promote creative thinking skills in the future.	5.00	0.00	Highest
Overall average	4.88	0.14	Highest

In reference to Table 1, it is found that the overall suitability of the development of the ILM model (overall elements) is at the highest level (Mean = 4.88, SD = 0.14). This can be concluded that the ILM model has complete elements and it can be used as a guideline to develop the imagineering learning system via metaverse. Thereby, this kind of learning is believed to encourage learners to develop creative thinking skills, the essential skills for learners in the 21st century, through virtual learning that uses metaverse technology to promote learning in the digital world.

Table 2. Results of evaluation on the suitability of the development of the ILM model

Items for evaluation	Assessment Results		Interpretation of results
	Mean	SD	
1. Input factor			
1.1 Learners	4.85	0.37	Highest
1.2 Instructors	4.87	0.35	Highest
1.3 Technologies	5.00	0.00	Highest
1.4 Learning activities	5.00	0.00	Highest
1.5 Learning management plan	5.00	0.00	Highest
2. Imagineering learning process via metaverse			
2.1 Imagine	4.85	0.37	Highest
2.2 Design	4.85	0.37	Highest
2.3 Develop	4.85	0.37	Highest
2.4 Present	4.85	0.37	Highest
2.5 Improve	4.85	0.37	Highest
2.6 Evaluate	5.00	0.00	Highest
3. Output			
3.1 Creative thinking skills	4.57	0.53	Highest
3.2 Learning achievement	4.85	0.37	Highest
4. Feedback			
4.1 Results of evaluation on creative thinking skills	4.85	0.37	Highest
4.2 Results of evaluation on learning achievement	4.85	0.37	Highest
Overall	4.90	0.18	Highest

According to Table 2, it can be clearly seen that the overall suitability of the development of the ILM model is at the highest level (Mean = 4.90, SD = 0.18). This can be summarized that the ILM model contains the elements that can be used as guidelines to develop the imagineering learning system via metaverse. Thereby, it is expected that this kind of learning system can encourage learners to develop creative thinking skills, which are essential for learners in the 21st century.

5. Conclusions and Discussions

The ILM model is a kind of learning model that was developed by applying the concepts of virtual technology in the instruction management, which is consistent and appropriate for learners in the digital age, so that they are able to learn anywhere and anytime by means of the brand-new teaching innovations.

The ILM model consists of four main elements, i.e., 1. input factor, which includes five sub-steps: (1) learners, (2) instructors, (3) technologies, (4) learning activities, and (5) learning management plan; 2. imagineering learning process via metaverse, which consists of six steps, i.e., (1) imagine, (2) design, (3) develop, (4) present, (5) improve, and (6) evaluate; 3. output, which refers to (1) learning achievement, and (2) creative thinking skills; and 4. feedback, which includes (1) results of evaluation on creative thinking skills, and (2) results of evaluation on learning achievement.

According to the results of evaluation, it is found that (1) the overall suitability of the development of the ILM model (overall elements) is at the highest level (Mean = 4.88, SD = 0.14), and (2) the overall suitability of the development of the ILM model is at the highest level (Mean = 4.90, SD = 0.18). Referring to the evaluation above, it can be concluded that the ILM model contains the suitable elements that can be used as guidelines to further develop the imagineering learning system via metaverse. It is believed that such kind of learning system can encourage learners to develop creative thinking skills, which are essential for learners in the 21st century. This is in line with the research of Nilsook, Chatwattana, & Seechaliao (2021), who stated that the project-based learning management based on the concepts of imagineering learning is considered an instruction method that is corresponding to the development of vocational students in Thailand. The instruction management of this kind is aimed to provide these students with the skills needed to create inventions and innovations. At the meantime, the students are encouraged to develop the characteristics that enable them to know how to present their works, discuss and communicate with others, become more creative with good judgment, and collaborate well with others. Furthermore, it is in compliance to the research of Sapliyan, Chatwattana, & Nilsook (2023), who mentioned that the application of virtual world technologies and platforms along with the new normal teaching platforms can facilitate the continuous learning, which can be conducted anytime and anywhere by making use of technologies and applying them in educational management in Thailand. Also, this is considered an optimal way to promote young innovators in the digital age.

Authors' contributions

Mr. Atthaphon Wongla develops the main idea of this research, wrote and compose the manuscript, developing the model and studied the results. The research methodology was developed by Dr. Pinanta Chatwattana and review the manuscript. The two authors have approved the final version of this manuscript for publication.

Competing interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Informed consent

Obtained.

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The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Data sharing statement

No additional data are available.

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