The Virtual Interactive Learning Model using Imagineering Process via Metaverse

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Abstract

The virtual interactive learning model using imagineering process as a tool to promote happy learning for digital age learners. The concept is based on the combination of virtual learning environment and metaverse in order to create learning experience via virtual community. The objectives of this research are (1) to study and synthesise the conceptual framework of the virtual interactive learning model using imagineering process via metaverse, (2) to develop the virtual interactive learning model using imagineering process via metaverse, and (3) to study the results after using the virtual interactive learning model using imagineering process via metaverse. The participants in this research include seven experts from various institutions, all of whom are specialised in the design and development of instruction models and instruction systems. The research tools consist of (1) the virtual interactive learning model using imagineering process via metaverse, and (2) the evaluation form on the suitability of the virtual interactive learning model using imagineering process via metaverse. The results, which are in consistence with the expectation of the researchers, show that (1) this research can be used as a guideline to develop the virtual interactive learning system using imagineering process via metaverse, which can promote happy learning, and it consists of six steps of imagineering process integrated with learning through virtual environments via metaverse; thereby, users can interact in the virtual world and exchange knowledge with one other through virtual reality technology, (2) the overall suitability of the development of the virtual interactive learning model using imagineering process via metaverse (overall elements) is at the very high level, and (3) the overall suitability of the development of the virtual interactive learning model using imagineering process via metaverse is at the very high level.

Keywords: virtual interactive learning, imagineering process, metaverse, happy learning

1. Introduction

The situation of the COVID-19 has had a great impact on the daily life of the world's population, in terms of both working styles and instruction management. As a consequence, a new way of life called the New Normal was initiated, which is mostly related to working through digital platforms. The instruction management has turned to focus mainly on online learning via a variety of platforms, such as Zoom, Google Meet, Microsoft Teams, etc. Nonetheless, the above crisis has also been considered an opportunity to change the instruction management and encourage learners as well as instructors to know how to use digital systems and get used to online learning. It is also high time to promote the earnest use of information media for education and freedom of learning based on one's own interest. However, just learning online may result in the lack of practice skills and motivation to learn, which shall also affect the development of critical thinking and problem-solving skills.

Wannapiroon et al. (2021) said "Interactive learning is an approach to teaching and learning that focuses on various ways in which learning activities can "interact" with learners. One of the key components of interactive learning is "information" and the design of teaching materials to attract learners, creating a greater desire to learn. Students can prepare for class by interacting with provided resources to reduce lecture time and allow more engagement in class." Interactive learning is advantageous as it helps establish a friendly atmosphere among the participants and have them connect with each other, helps boost learner self-reliance and self-assurance, and has participants making active and continual use of the knowledge and experience gained earlier (Abykanova et al., 2016; Sousthaboualy et al., 2022; Sessoms, 2008).

Virtual reality is a group of computer technologies that construct and work on a control system in the virtual

environment with a computer system to makes users feel like they are using their life in an environment created and be like seeing with their eyes and have accessories for touch such as masks, touch gloves, etc. (Chunpungsuk et al., 2021).

Virtual interactive learning is a method of learning based on the combination of virtual reality technology and interactive learning management through virtual learning environment in such a way that learners can have virtual experiences by their own via their senses, e.g., sight, sound, body, etc.

Metaverse is a virtual environment in the digital space that allows people to interact and do activities together. The said activities include conference, meeting, talking, communication, traveling, entertainment, or shopping. Thereby, users are able to do these activities in metaverse as in the physical world through avatars, which are in the form of 3D graphic, with the aid of some technology and accessories, which seems like learning through virtual community (Suzuki et al., 2020). Binance Academy (2022) said that many technology companies have been attempting to make use of cutting-edge technologies to gear up the development of 3D world in order to provide immersive virtual reality experiences in metaverse. The said technologies are blockchain, augmented reality, virtual reality, 3D reconstruction, artificial intelligence, internet of things, etc.

Metaverse technology is a new technology that will focus on working, studying and entertainment in the future. In sociology, the existence of this technology will change the culture of society. Metaverse gives their user a virtual world in the form of 3D where all activities can be done with the help of Augmented Reality (AR) and Virtual Reality (VR) technology. With these two tools and other supporting tools, the metaverse world is as real as the real world, even more so than the real world, because with this technology, their user are free to be whatever they want (Buana, 2023). Kim (2021) summarized the common features of many definitions of the metaverse as follows; Persistence of identity and objects, a shared environment, use of avatars (embodied self), synchronization, three-dimensional (or virtual), interoperability, an interactive, immersive and social user experience.

Imagineering learning is a learning process related to the organization of ideas and inspiration, which can generate strategies and creative frameworks further leading to the unprecedented initiatives, imagination, and dreams, which are then made to become reality for daily use in real life, for both individuals and communities, by means of practices or inventions (Nilsook et al., 2014). Imagineering learning is also a new concept of instruction management that corresponds to the development of characteristics of learners in the 21st century, focusing on self-learning, creativity, and ability to create innovations (Chatwattana & Nilsook, 2017).

Nilsook et al. (2014) explained that imagineering learning consists of 6 steps, i.e., imagine, design, develop, present, improve, and evaluate, all of which encourage self-learning, placing an emphasis on turning imagination into concrete inventions, work pieces, or innovations.

In reference to the aforementioned principles and theories, the researchers have had an idea to develop the virtual interactive learning model using imagineering process via metaverse with an intention to use it as a guideline for instruction management for learners in the 21st century. This is to promote happy learning among learners by means of imagineering learning process, which is a new concept of instruction management that corresponds to the development of characteristics of learners in the 21st century, focusing on self-learning, creativity, and ability to create innovations.

2. Research Objectives and Hypothesis

2.1 Research Objectives

1) To study and synthesise the conceptual framework of the virtual interactive learning model using imagineering process via metaverse.
2) To develop the virtual interactive learning model using imagineering process via metaverse.
3) To study the suitability of the virtual interactive learning model using imagineering process via metaverse.

2.2 Research Hypothesis

The suitability of the virtual interactive learning model using imagineering process via metaverse is at the high level.

3. Methodology

This research is related to the design and the development of the virtual interactive learning model using imagineering process via metaverse, and the research methodology includes the following.

3.1 Research Participants

Seven experts from various institutions specialised in the design and development of instruction models and instruction systems.

3.2 Research Tools and Statistics Used for Data Analysis

To develop the virtual interactive learning model using imagineering process via metaverse, the researchers employed the following research tools, i.e., (1) the virtual interactive learning model using imagineering process via metaverse, and (2) the evaluation form on the suitability of the virtual interactive learning model using imagineering process via metaverse. The statistics used for data analysis are mean and standard deviation.

3.3 Research Methodology

The researchers designed the methodology based on the concepts and the theories of the system approach (Khemmani, 2010; Utranan, 1982) and based the design and the development of this model on SDLC technique (Robert et al., 2013). The methodology can be summarised into three steps as below.

Step 1 is related to the study, the analysis, and the synthesis of the literature works and research studies relevant to the development of the virtual interactive learning model using imagineering process via metaverse in order to find out the guidelines needed to establish the conceptual framework of this research, i.e., instruction system (Khemmani, 2010; Utranan, 1982), interactive learning (Abykanova et al., 2016; Soutthaboualy et al., 2022; Wannapiroon et al., 2021), virtual interactive learning, virtual reality technology (Chunpungsuk et al., 2021), metaverse (Suzuki et al., 2020), and imagineering learning (Chatwattana & Nilsook, 2017; Nilsook et al., 2014).

Step 2 is about the development of the virtual interactive learning model using imagineering process via metaverse. In this step, the researchers adopted the principles of system approach in the design and the development, which consist of four factors, i.e., input factor, learning process, output, and feedback.

Step 3 is concerning the study on the suitability of the virtual interactive learning model using imagineering process via metaverse. The researchers used the research tools to study the results after this model had been used by seven participants derived by means of purposive sampling. These participants come from various institutions and all of them are all experts specialised in the design and development of instruction models and instruction systems. The mean score range and interpretation of results (Kanasutra, 1995) are listed in Table 1.

Table 1. Mean score range and interpretation of results

Average score range	Meaning of interpretation
4.50 – 5.00	The suitability is at the very high level.
3.50 – 4.49	The suitability is at the high level.
2.50 – 3.49	The suitability is at the moderate level.
1.50 – 2.49	The suitability is at the low level.
1.00 – 1.49	The suitability is at the lowest level.

4. Results and Discussion

The results of the development of the virtual interactive learning model using imagineering process via metaverse can be summarised as below.

4.1 Results of the Synthesis of the Conceptual Framework of the Virtual Interactive Learning Model Using Imagineering Process via Metaverse

According to the study, the analysis, and the synthesis of the literature works and research studies relevant to the development of the virtual interactive learning model using imagineering process via metaverse, the researchers found out the guidelines needed to establish the conceptual framework of this research, i.e., instruction system, interactive learning, virtual interactive learning, virtual reality technology, metaverse, and imagineering learning. The conceptual framework herein is illustrated in Figure 1.
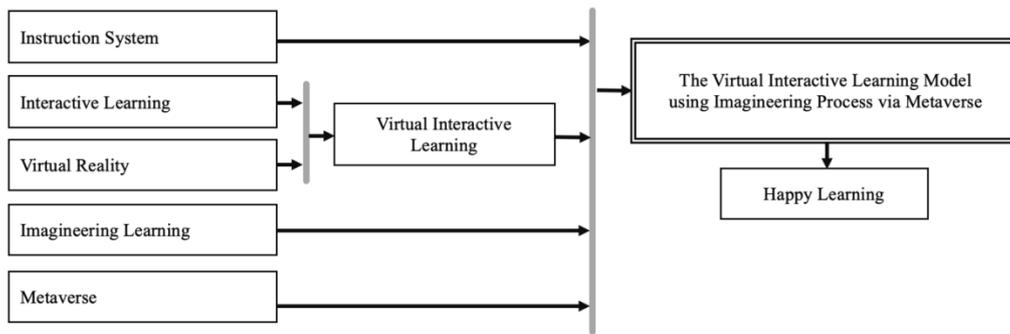
Figure 1. Conceptual framework

4.2 Results of the Development of the Virtual Interactive Learning Model Using Imagineering Process via Metaverse

The development of the virtual interactive learning model using imagineering process via metaverse is intended to be used as a guideline to design and develop the virtual interactive learning system using imagineering process. In this system, the current emerging technologies shall be used to support the instruction process, which is thought to encourage learners, using 3D avatars, to learn through metaverse. The design and the development of this learning model are based on the system approach, which includes four elements, i.e., input factor, learning process, output, and feedback, as shown in Figure 2.
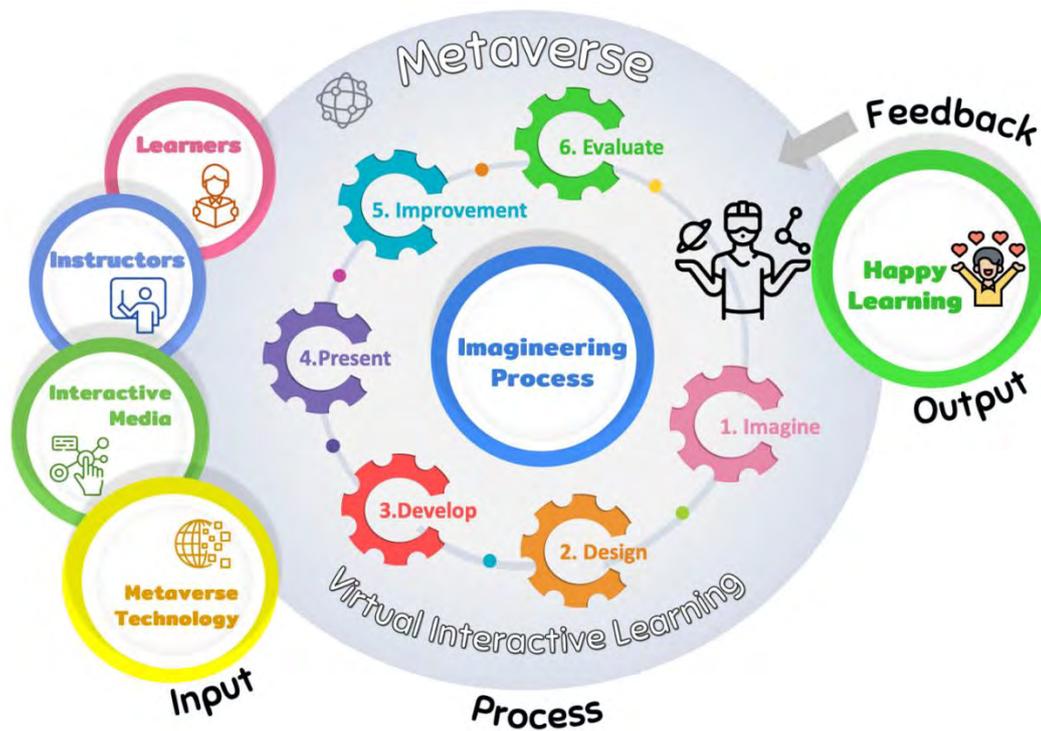

Figure 2. Virtual interactive learning model using imagineering process via metaverse

Figure 2 represents the virtual interactive learning model using imagineering process via metaverse, which consists of four main elements as follows.

1. Input factor: It refers to the elements relevant to the design and the development of the virtual interactive learning model using imagineering process via metaverse, which includes analysis of characteristics of learners and instructors, interactive learning media, and metaverse technology.
2. Learning process: The researchers had synthesised the six steps of the imagineering learning process,

including imagine, design, develop, present, improvement, and evaluate, and then employed the synthesis results to develop the learning process within the virtual interactive learning model. Meanwhile, the instructors prepared the tools needed to promote learning in virtual learning environment, in which learners could interact with learning activities through 3D metaverse.

3. Output: It refers to the outcome generated from the learning process, which is happy learning. In other words, it is the satisfaction towards learning activities.

4. Feedback: This refers to the information derived from the output, which is then used to enhance the learning process and the input factor. The feedback herein is the results of the satisfaction towards happy learning.

4.3 Results of the Study on the Suitability of the Virtual Interactive Learning Model Using Imagineering Process via Metaverse

In reference to the development of the virtual interactive learning model using imagineering process via metaverse, the results can be concluded as seen in Tables 2 and 3.

Table 2. Results of evaluation on the suitability of the virtual interactive learning model using imagineering process via metaverse (overall elements)

Items for evaluation	Assessment results		Interpretation
	Mean	SD.	
1. The principles and concepts of the virtual interactive learning model using imagineering process via metaverse can be applied to develop the instruction system.	4.71	0.49	Very high
2. The elements of the virtual interactive learning model using imagineering process via metaverse cover all main elements required in the instruction system.	4.57	0.53	Very high
3. The theories of the virtual interactive learning model using imagineering process via metaverse are comprehensive and appropriate for designing the conceptual framework.	4.57	0.53	Very high
4. The sequence of elements in the design of the virtual interactive learning model using imagineering process via metaverse is clear and consistent.	4.71	0.49	Very high
5. The ordering of the elements in the virtual interactive learning model using imagineering process via metaverse is appropriate and easy to understand.	4.71	0.49	Very high
6. The overall elements in the virtual interactive learning model using imagineering process via metaverse are complete and can be used as a guideline to further develop the virtual interactive learning system using imagineering process via metaverse in the future.	4.57	0.53	Very high
Overall average	4.64	0.48	Very high

According to Table 2, it is found that the overall suitability of the development of the virtual interactive learning model using imagineering process via metaverse (overall elements) is at the very high level (Mean = 4.64, SD. = 0.48). It can be concluded that the virtual interactive learning model using imagineering process via metaverse has all complete elements that can be used as a guideline to further develop the virtual interactive learning system using imagineering process. The said system is expected to enable learners to achieve happy learning by doing activities through virtual interactive learning process, assisted by metaverse and virtual reality technologies, which are used as the tools to promote digital learning. This is compliant to the research of Chatwattana et al. (2020), who said the integration of new technology concepts and teaching methods to create new ideas and innovations in order to promote learning among modern learners can directly respond to the learning experiences of learners. Whereby, instructors are required to prepare the virtual learning environments suitable for learners, which can be done by making use of current technologies. This can lead to a learning society which can be easily accessed all the time with immediate interaction and instant feedback.

Table 3. Results of evaluation on the suitability of the virtual interactive learning model using imagineering process via metaverse

Items for evaluation	Assessment results		Interpretation
	Mean	SD.	
1. Input factor			
1.1 Analysis of characteristics of learners	4.71	0.49	Very high
1.2 Analysis of characteristics of instructors	4.86	0.38	Very high
1.3 Interactive learning media	4.86	0.38	Very high
1.4 Metaverse technology	4.86	0.38	Very high
2. Learning process			
2.1 Imagineering learning process	4.86	0.38	Very high
2.2 Activities through 3D metaverse	4.86	0.38	Very high
3. Output			
Happy learning	4.86	0.38	Very high
4. Feedback			
Satisfaction towards happy learning	4.86	0.38	Very high
Overall average	4.84	0.37	Very high

Table 3 shows that the overall suitability of the development of the virtual interactive learning model using imagineering process via metaverse is at the very high level (Mean = 4.84, SD. = 0.37). This can be summarised that the virtual interactive learning model using imagineering process via metaverse contains the elements that are appropriate to be used as a guideline to further develop the virtual interactive learning system using imagineering process. This can be conducted by organizing learning activities in metaverse, which shall motivate learners to learn and achieve happy learning. This is compliant to the research of Demir et al. (2023), who said the metaverse is a new technology can promote interactive experience in the virtual and real world. This can lead to an active learning through media and information technology in order to encourage learners to engage in self-directed learning experiences.

5. Conclusion

It is necessary to have learning methods that integrate bodies of knowledge from everywhere in a creative manner in order to develop innovations that can satisfy the needs of society. At the meantime, the instructors in such learning are responsible for arranging the environments and creating the suitable instruction media for learners so as to prepare them for entering the modern era of education. Once considering the guidelines to create educational innovations for further practical use, it is optimal to encourage learners to take action, practice learning from real experiences, practice thinking process skills, and face with the real situations by using current technological advances as the tools for instruction management that enables them to learn anywhere and anytime. Metaverse is an emerging technology that promotes learning and collaborative activities through virtual learning environment, in which learners are able to respond and interact instantly with learning and activities in the form of 3D technology, using 3D rendering input devices and output devices as the tools to promote learning. The conceptual framework of this research, i.e., instruction system, interactive learning, virtual interactive learning, virtual reality technology, metaverse, and imagineering learning. According to the summary above, it is consistent with objective 1.

The virtual interactive learning model using imagineering process via metaverse consists of four main elements: (1) Input factor refers to the analysis on characteristics of learners and instructors, interactive learning media, and metaverse technology. (2) Learning process is developed from the synthesis of six steps of the imagineering learning process, including imagine, design, develop, present, improvement, and evaluate, and then the results thereof are employed to develop the learning process within this learning model. Meanwhile, the instructors are required to prepare the tools needed to promote learning in virtual learning environment through 3D metaverse. (3) Output refers to the satisfaction towards happy learning. (4) Feedback herein refers to the results of the satisfaction towards happy learning. According to the summary above, it is consistent with objective 2.

Regarding the results of evaluation on the suitability of the virtual interactive learning model using imagineering process via metaverse, it is found that (1) the overall suitability of the development of the virtual interactive learning model using imagineering process via metaverse (overall elements) is at the very high level (Mean = 4.64, SD. = 0.48), and (2) the overall suitability of the development of the virtual interactive learning model using imagineering process via metaverse is at the very high level (Mean = 4.84, SD. = 0.37). According to the

summary above, it is consistent with objective 3.

This research can be applied as a guideline to design and develop virtual interactive learning system using imagineering process via metaverse that can promote happy learning for learners in the 21st century, which the concept is based on the combination of virtual learning environment and metaverse to enhance learning experience via virtual community, focusing on self-learning, creativity, and ability to create innovations.

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