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The Use of Immersive Technology in the Visual Artwork Presentation Among Malaysian Teacher Trainees

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ABSTRACT

Learning through personal experience can be achieved with the emergence of the latest technology, such as the Metaverse (AR-VR) application. This is a technology which simulates the virtual world as the real world in three dimensions. This simulated immersive technology is very accessible and also user-friendly. Immersive learning refers to the process where a student is in an interactive learning environment either virtual or face-to-face and he is directly involved in the active learning process. Most literature reviews have discussed how Augmented Reality (AR) and Virtual Reality (VR) integrated in a three-dimensional imaginary world can be used as the main platform for learning. The study focuses on students of the Teaching Institutes in Malaysia, (IPGM) as they form a unique population which has the potential to create such experiences using Immersive Technology. This study aims to examine whether the use of immersive technology in learning experiences based on the presentation of visual artworks affects the level of knowledge about immersive technology itself. The TPACK theory was chosen to identify immersive technology knowledge and more effective presentation aspect knowledge. The theory is also able to identify whether there is use of this method among the current IPGM students. This study uses a more functional and practical survey design to answer the research questions. The application of TPACK theory and the Technology Acceptance Mode' in research will provide a more reasonable answer for it to be applied in learning. Knowledge about immersive technology and the presentation of effective visual artworks among IPGM students can be identified and the level of student acceptance of immersive technology will also be able to be assessed via this study.

Keywords: AR-VR Immersive Technology, Trainee Teachers, Visual Artworks Presentation

1. Introduction

When students enter the gallery to see their Visual Arts Education (PSV) painting exhibition, they see dozens of diverse artworks hanging in front of them. When they are gathered in a gallery full of dozens of abstract paintings, can they understand the written and implied meaning of the paintings? Those who have QR code applications such as MyQR code or QR Barcode Scanner that are already available will continue to scan the QR code of the abstract painting next to the painting. Human objects will appear in immersive media (for example the application;

Zepeto) which can verbally describe what the written and implied meaning of the abstract painting is. Here what the painter wants to convey can be understood by the person who sees and observes the painting.

This is the kind of immersive experience that one can have using augmented reality (AR) and virtual reality (VR) in a painting exhibition space at a Higher Education Institution or at school. Now imagine that the lesson was designed by the trainee teachers themselves as an assignment based on their art exhibition project. Their involvement in creating an AR-VR experience in a project-based setting (art exhibition) will examine the level of knowledge in mastering the basic pedagogical concepts of visual art teachers (trainee teachers), the level of knowledge of aspects of the presentation of visual art works and also facilitate the assessment of works made by lecturers (evaluators). In addition to that, this study will also identify whether there is use of immersive technology (trainee teachers) and how they accept the use of immersive technology in the presentation of visual art works.

1.1. Immersive Technology

Immersive technologies such as augmented reality (AR) and virtual reality (VR) are constantly evolving in the consumer market. This has been the starting point for many of the technologies that are now commonplace in the classroom (Augment, 2016). Immersive technology has entered the world of education in 21st Century Learning (PAK-21) as students become eager to explore and experience learning through the lens of technology. Therefore, trainee teachers must also view and design authentic learning experiences digitally through the same technological lens. Understanding the effects of instructional design, design experiences on motivation and knowledge achievement and retention for trainee teachers can inform curriculum design at the higher education level. A curriculum that helps illustrate complex pedagogical concepts can impact the readiness of prospective teachers in the digital age.

The purpose of this study is to examine the use and acceptance of augmented reality (AR) and virtual reality (VR) Metaverse in the presentation of visual artworks on the utilization of digital technology applications by IPGMKPT (Trainee Teachers Institute) students. It is explained as follows:

- i. Assessing the level of knowledge of Metaverse immersive technology (AR-VR) among PSV option students Intake June 2020, 2021, 2022 and 2023 at IPGMKPT.
- ii. Assessing the level of knowledge about the presentation aspect of visual artwork among PSV option students Intake June 2020, 2021, 2022 and 2023 at IPGMKPT.
- iii. Identifying whether there is the use of Metaverse immersive technology (AR-VR) during the presentation of visual art works among PSV option students Intake June 2020, 2021, 2022 and 2023 at IPGMKPT.
- iv. Identifying the acceptance level of PSV option students Intake June 2020, 2021, 2022 and 2023 option students at IPGMKPT using Metaverse immersive technology (AR-VR) in the presentation of visual artworks.

The purpose of this literature review is to provide background information on immersive technologies and specifically, AR-VR and Metaverse. This study also provides a comprehensive conceptual framework in reviewing

previous studies. It is intended to support this study. This literature review contains three parts: Immersive Technology, Conventional Methods, Augmented Reality (AR), Virtual Reality (VR) and Conceptual Framework (RKK). The first part covers definitions and information about the origins of immersive technology. Additionally, differences between immersive technology and conventional methods are addressed. The second part focuses on AR-VR. This section includes an explanation of AR-VR application design, the history of AR-VR, and its evolution as a learning operational tool in the classroom. The third section includes a discussion of the conceptual framework that supports the use of AR-VR as a technological tool in the current world of education.

Immersive technology is "technology that creates the impression that one is participating in a realistic experience through the use of sensory stimulation, narrative and symbolism" (AECT, 2014, p. 958). Milgram and Kishino (1994) describe this type of experience as being on a continuum between the virtual world into the real world and the real world into the virtual world.

2. Methods

The methodology of this study is integrated through a theoretical framework (TPACK) and a Technology Acceptance Model (TAM) which includes a comprehensive framework and reviews previous studies to support this study, namely Immersive technology, Augmented Reality (AR) Virtual Reality (VR) Metaverse and Framework Conceptual (RKK). It includes definitions and information about the origins of deep immersive technology. Additionally, the distinction between immersive and interactive technologies is refined and more focused on (AR-VR) Metaverse. It includes an explanation of the design of the (AR-VR) Metaverse application, the history of (AR-VR) Metaverse and its evolution as a learning support tool. It also includes a discussion of the conceptual framework that supports the use of (AR-VR) Metaverse as a digital technology tool in the world of education today.

Conventional methods enable two-way information flow through the interface between users and how to interact; the audience usually conveys a request for data or action to the presenter and in that way, the presenter returns the requested data or the result of the action back to the audience (2018)

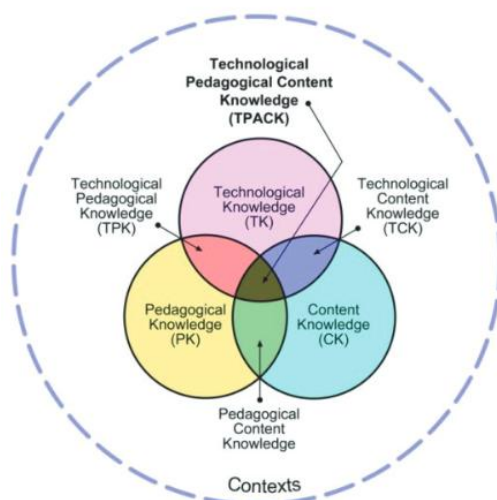


Figure 1: Technology, Pedagogy, and Content Knowledge (TPACK) Model (Mishra and Koehler, 2008)

Figure 1 shows the theoretical framework of TPACK according to Mishra and Koehler (2008), in the writing of Roslaili Anuar and Wan Zamani Wan Zakaria (2015). Technological Pedagogical Content Knowledge (TPACK) refers to Technological (Technology), Pedagogical (Pedagogy) and Content Knowledge (Understanding of Subject Content). According to Roslaili Anuar and Wan Zamani Wan Zakaria (2015), the concept of TPACK is one of the frameworks applied for the purpose of understanding and explaining the type of knowledge required by a teacher in the effective integration of technology throughout the teaching and learning process.

In addition, the TPACK theory includes three types of knowledge, namely knowledge about technology, knowledge about pedagogy and knowledge about the content of the subject being taught. According to Rosenberg and Koehler (2015), these three elements are interrelated with each other and influence the development of TPACK while referring to the results of this main TPACK development. There are three additional elements which are PCK (Pedagogical Content Knowledge) which is Pedagogical Content Knowledge, TCK (Technological Content Knowledge) which is Technological Content Knowledge and TPK (Technological Pedagogical Knowledge) which is Technological Pedagogical Knowledge. In addition, the TPACK concept facilitates IPGM students or prospective teachers in formulating effective learning plans based on technology, pedagogy and the content taught.



Figure 2: Technology Acceptance Model - TAM (Davis et al., 1989).

Figure 2 shows The Davis Technology Acceptance Model - TAM (Davis et al., 1989). This model is presented by Davis (1989) explains the acceptance of the use of information technology systems in life. This model was originally formed based on the development of ideas by Fishbein and Ajzen (1975) which is the Theory of Causal Action (TRA).

Davis introduced the TAM model aimed at looking at the implications of technology use on human desires, attitudes, and behaviour. There are six factors released by Davis in determining the level of the TAM model to predict user acceptance of technology, including external variables, perceived usefulness, perceived ease of use, attitude towards using), behavioural intention (behavioural intention to use) and actual system usage (actual system usage) according to (Nur Hadlan and Fari Katul Fikriah, 2023).

The six constructs mentioned have their own focus and are related to each other. The first construct, the external variable, is the main TAM model because it is a factor that directly influences the other two levels, namely perceived usefulness and perceived ease of use. The construct of perceived usefulness refers to the internal belief of users who believe that the use of a technology system can improve the quality of work performance, while the construct of perceived ease of use refers to the internal belief of users who believe that the technology system is easy to use and provides positive impact in improving one's career.

Based on the studies of Nur Hamizah Hayat and Sern (2020), the results of the study are determined by the method and design of the study, while the design of the study is determined by the purpose of the study. This is supported by Foong (2018) who stated that the research design is a plan for the process of collecting and analyzing data to obtain information in order to answer research questions. In this study, the researcher chose a quantitative study. This study used a survey research design to find out the level of knowledge and use of immersive technology of IPGKPT trainee teachers in the presentation of their visual artworks. This study involved trainee teachers who took the PSV elective option for the June 2020, 2021 and 2022 intakes at IPG Technical Education Campus as respondents. The process of collecting all the required data was conducted using a questionnaire through the google form platform. According to Creswell 2008, in (Kamal and Nor 2020), the advantage of using survey

research is that many questions related to the topic to be studied can be asked to respondents in large numbers. This method is appropriate if the study involves many variables which are analyzed statistically.

In order to ensure that this study is more focused, the researcher will explain the operational definition of each term used in more detail and carefully so as to avoid confusion in the reader's understanding.

In this study, the researcher used a research instrument consisting of a questionnaire through the google form platform that was created to meet the purpose of the study among PSV Elective Option IPGMKPT trainee teachers and answer all research questions. This instrument is in the form of a 5-point Likert scale to give respondents a choice of answers. The use of questionnaires through a study is not something foreign to researchers. This is because this research instrument is relatively easy to implement compared to using other methods. Therefore, it is not impossible that this questionnaire instrument is often used by researchers in carrying out research. The questionnaire instrument gives freedom to respondents to think in an unspecified time. The data for this study was collected through a questionnaire. The researcher distributed questionnaires online through the Google Form platform to identify the level of knowledge, use and acceptance of immersive technology among IPG students in the aspect of presenting visual artworks in higher education institutions such as IPGMKPT.

Sampling is a process that covers a small part of the entire population which is selected. The study population were 124 respondents with 97 sample sizes. The researcher selected the trainee teachers from the PSV elective options of the June 2020, 2021, 2022 and 2023 intakes at IPGMKPT. The selection of this sample is more relevant to the purpose of the study as the researcher wanted to find out the trainee students' level of knowledge and use of Metaverse immersive technology (AR-VR) in the presentation of works visual arts. This sample enabled the researcher to create an overview of the population which had been involved. The sampling also involved researching the study sample to represent the entire study population (Nirwana, Sudirman and Zulkifley Hamid, 2016). Therefore, a sample is a special set selected by the researcher from a population.

This questionnaire was distributed to 124 teacher trainees of the PSV elective options of the June 2020, 2021, 2022 and 2023 intakes at IPGMKPT through the Whatsapp or Telegram application. This questionnaire contains 33 items that include four sections including Section A: Respondent's background, Section B: Level of Knowledge of Immersive Technology, Section C: Level of Knowledge of Presentation Aspects and Section D: Level of Acceptance of the Use of Immersive Technology. The data obtained in this questionnaire will then be collected and compiled in Microsoft Excel software before being analyzed using SPSS Version 22 software to obtain statistical values in the research conducted.

3. Results and Discussion

3.1. Results

A preliminary study conducted through a google form questionnaire found that none of the participants, namely IPGMKPT trainee teachers of PSV elective option of the June 2020, 2021, 2022 and 2023 intakes at

IPGMKPT had made a presentation of the (AR-VR) Metaverse method when presenting their visual artworks. The findings indicated that none of the trainee teachers had done it. The results showed that trainee teachers did not understand the method of presenting visual artworks through the (AR-VR) Metaverse method.

The final findings of the study indicated that using the (AR-VR) Metaverse method in the presentation of visual art works for the subject of Visual Art Education provided a good and positive impact. Some of the shortcomings in the main conventional methods can be improved through this method.

Study respondent profile refers to respondent information. The demographics of the respondents consisted of three questions, namely gender, the year the student enrolled for the subject and the type of presentation of visual artwork for PSV subjects. The researcher used a table to show the frequency and percentage of the characteristics of the data which had been obtained from 97 respondents.

In this study, descriptive analysis was used to answer the research questions. This analysis consists of frequency, mean and standard deviation to identify the level of knowledge of presentation methods for visual artworks and the use of immersive technology during the presentation of PSV elective option for the June 2020, 2021, 2022 and 2023 intakes at IPGMKPT. In this study, the researcher used the interpretation of the mean score by Nunnally and Bernstein (1994) which explains the average mean score in detail.

3.2. Discussion

A detailed discussion is made based on the objectives of the study and aims to answer the research questions. This study has its own limits such as only involving students of IPGMKPT PSV elective option intake in June 2020, 2021, 2022 and 2023 at IPGMKPT only as a population. Therefore, further research is important to develop the research data in detail in order to explain the research variables, namely the level of knowledge of immersive technology (AR-VR) Metaverse, the level of knowledge of aspects of the presentation of visual artworks, the level of use of immersive technology (AR-VR) Metaverse in the presentation of visual artworks and the level of readiness of IPGM students towards the use of immersive technology (AR-VR) Metaverse in the presentation of visual artworks either in the lecture room or in any art gallery.

It is suggested that future researchers could further expand the scope of the study such as using a larger population scale. This current study only involved a small scope, i.e. it only involved IPGMKPT PSV elective option students for the intake of June 2020, 2021, 2022 and 2023 at IPGMKPT as respondents. Future research can be carried out involving various intakes or other subject options such as Bahasa Melayu, English, Mathematics, Science, Technology Design and so on. This is because the knowledge and use of Metaverse immersive technology (AR-VR) for students at IPGMKPT covers a wide scope and is not focused solely on PSV elective option trainee teachers.

The study utilized a survey design using a descriptive quantitative approach. This slightly limits the findings of the study on the knowledge and use of immersive technology of IPGMKPT trainee teachers of PSV elective

option for the June 2020, 2021, 2022 and 2023 intakes because this study was only carried out according to the scope of the survey study. Therefore, it is suggested that this study be further developed by combining two methods of approach, namely quantitative and qualitative approaches. Through this study, a qualitative approach can be added to obtain information with a deeper and more detailed description. Therefore, the results of the research obtained will more comprehensive through the combination of research approaches.

Based on this study, the researcher utilized the questionnaire as the research instrument. The questionnaire was created using the google form platform to collect data and information from the respondents. For further studies, the researcher would like to suggest that other methods of data collection to be used, for example observation and interviews to identify the level of knowledge of immersive technology, the method of presentation of visual artworks as well as the level of use of immersive technology and the level of acceptance of immersive technology (AR-VR) Metaverse in the presentation of the visual artwork of trainee teachers at IPGMKPT. Through the method of data acquisition through observation, it is best to provide an observation form to IPGMKPT trainee teachers when making presentations. Future researchers can also conduct interviews with IPGMKPT trainee teachers when they present their artwork.

4. Conclusion

The researcher found that the level of knowledge of Metaverse immersive technology (AR-VR) and knowledge of presentation aspects among IPGMKPT PSV elective option trainee teachers enrolled in June 2020, 2021, 2022 and 2023 at IPGMKPT was at a low level. The level of use of immersive technology (AR-VR) Metaverse of IPGMKPT trainee teachers in the presentation of visual art works was also at a relatively low level. On the other hand, the level of acceptance of the use of Metaverse immersive technology (AR-VR) in the presentation of visual artworks was at a high level. Although these three aspects were at a low level and one was at a high level, efforts need to be made vigorously considering that the country's education system is moving in tandem with development and digital applications. In addition, the seventh shift in PPPM 2013-2025 states that students and teachers need to take advantage of technology and digital applications in the process of PSV presentation implementation. As such, the use of immersive technology should be continued and improved from time to time so that trainee teachers go through a quality and meaningful learning process with the utilization digital technology.

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