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Research Articles

Developing Public Relations Media on the Metaverse Platform for Enhancing Engagement by Using Virtual Learning

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Abstract

Purpose: This research aims to design and develop effective media on the Metaverse platform, evaluate its quality, and study user engagement within this virtual learning environment. It utilizes modern media technology to create a new experience for learners in the Digital Business Computer Program at the Faculty of Management Science, Loei Rajabhat University.

Methodology: This study employed the ADDIE Model for the development process. The tools used included Spatial Metaverse for creating virtual spaces, infographics, animations, videos, and 3D models. Quality assessment was conducted by five experts, focusing on content, design, implementation and engagement. The sample group consisted of 400 students and undergraduates selected through random sampling. User engagement was assessed using a survey with a Likert scale.

Findings: The development of public relations media on the Metaverse platform for the Digital Business Computing program included the creation of infographics, animations, videos, and 3D models divided into three spaces: General Information, Activities, and Career Guidance and Alumni. Quality assessment by five experts rated all aspects at the highest quality level with the content receiving particular praise. User engagement feedback indicated that interactive content delivery, especially videos, significantly enhanced comprehension, while multimedia integration for critical thinking received the highest score. The platform effectively facilitated engagement and learning acquisition, with its easy-to-navigate interface and real-time interaction tools score of 4.67 and 4.55, respectively. Overall, the Metaverse platform

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demonstrated exceptional capability in supporting high levels of learners participation and engagement.

Applications of this study: This study demonstrates the Metaverse platform's potential to enhance engagement and learning across education, corporate training, public relations, and healthcare by creating immersive and interactive environments. These environments improve comprehension, participation, and skill development through the use of advanced digital media and virtual simulations.

Keywords: Metaverse platform, Virtual learning, Public relations media, User engagement, Educational technology, Information communication

1. Introduction

Public relations is a strategic approach to building positive relationships between an organization and its audience. It focuses on creating a favorable image, sharing information, and gaining public support. Key elements include analyzing, planning, communicating, and evaluating, as well as using various tools and channels to meet organizational goals (Jenifer et al., 2023; López-Belmonte et al., 2023).

The integration of promotional media within the Metaverse can significantly enhance engagement in virtual learning environments by leveraging the immersive and interactive nature of the platform. The Metaverse, which encompasses a blend of virtual reality (VR), augmented reality (AR), and mixed reality (MR) technologies, offers a unique space for innovative social transformation. Marketing activities within the Metaverse are proving influential, demonstrating its potential to boost user engagement and interaction. Moreover, the Metaverse provides a virtual environment where users can socialize, shop, and learn, presenting a new dimension of engagement and digital habitation. By integrating public relations strategies into the Metaverse, educational institutions can create captivating and immersive learning experiences, fostering engagement and interaction among learners in virtual settings (Mohamed & Bukhari, 2023); Jenifer et al., 2023; Muthmainnah et al., 2023).

Currently, the application of Metaverse technology spans various fields: 1) Healthcare: The Metaverse can be utilized for remote surgeries and enhances surgical training through virtual simulations, improving proficiency. 2) Education: It increases equitable access to diverse educational opportunities, transforming learning experiences such as language and cultural studies. 3) Work: The Metaverse introduces new working methods, services, and job roles,

enhancing real-life interactions in professional environments. 4) Lifestyle: It enables new experiences like virtual tourism, allowing users to explore places they have never visited and access information in a simulated reality, thereby creating novel experiences (López-Belmonte et al., 2023).

The analysis indicates that the Metaverse market could reach a value of US$783.3 billion by 2024, with a compound annual growth rate (CAGR) of 13.1%, up from US$478.7 billion in 2020. Game developers are upgrading existing games to create 3D online worlds that function like social networks. Opportunities for market expansion include organizing virtual concerts and sporting events, as well as generating revenue from advertising on social media platforms, as shown in Figure 1 (Blomberg Intelligence, 2022).

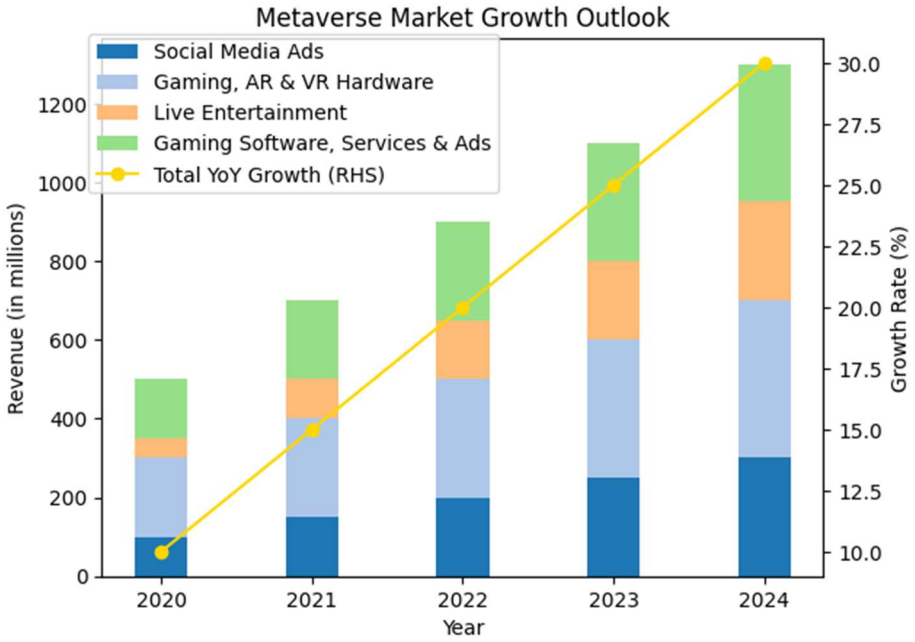

Figure 1 Market Growth Estimates for Metaverse Technology Blomberg Intelligence (2022)

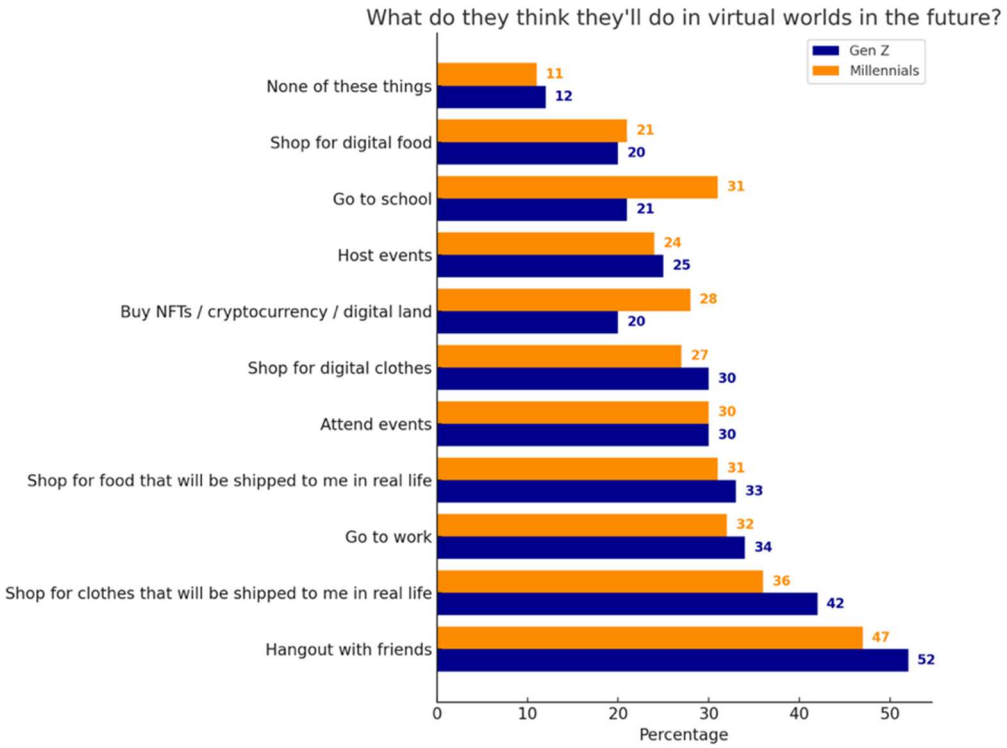

Figure 2 Popular Activities in the Metaverse Blomberg Intelligence (2022)

Furthermore, public relations media are essential for raising awareness and understanding of programs and activities, effectively engaging the public and advancing institutional objectives, as shown in Figure 2. Virtual learning in educational settings has evolved significantly, offering interactive and immersive experiences that engage students deeply. By leveraging Metaverse platforms, educators can create realistic scenarios and hands-on learning opportunities in a digital space, enhancing flexibility and accessibility for students. The integration of these elements not only increases engagement, but also improves learning effectiveness, making virtual learning a valuable tool in modern education. (Yohannes et al., 2023; Y. Song et al., 2023).

Thailand's plan for digital development focuses on speeding up the use of digital technology as a key tool for national progress. In the Thailand context, digital technology has the potential to tackle the country's challenges and create new opportunities for economic and social development. Aligned with the 20 Year National Strategy, digital technology can enhance citizens' quality of life by providing learning opportunities, increasing income, improving access to services, and encouraging participation (Digital Government Development Agency, 2024).

In the current competitive educational landscape, institutions are in active competition for student enrollment. Embracing Metaverse technology for curriculum promotion showcases institutional foresight and adaptability to emerging technologies, thereby establishing a significant competitive advantage (Muthmainnah et al., 2023).

Learning outcomes can be enhanced through virtual learning on the Metaverse platform in several ways. The immersive 3D and virtual formats increase engagement, providing interactive experiences that deepen participation compared to traditional methods. Metaverse also helps learners visualize complex content more easily, using virtual imagery to boost understanding and retention. Additionally, the platform fosters effective communication and collaboration in virtual environments, enabling efficient group work (Chomjumjang, 2023). Since Digital Business Computer plays a critical role in the fast-growing digital economy, promoting this field will attract students eager to develop essential business and technology skills, which are in high demand in the current and future job markets. Utilizing the Metaverse to present the program further highlights its innovative approach, making it even more appealing to prospective learners.

Therefore, this research has developed public relations media on the Metaverse platform for enhancing engagement by using virtual learning in the case of Digital Business Computer at the Faculty of Management Science, Loei Rajabhat University. The objectives are to design and develop effective media, evaluate its quality, and study user engagement within this virtual learning environment. This initiative aims to improve participation by addressing the evolving needs of learners in the digital age, highlighting the institution's modern approach and adaptability.

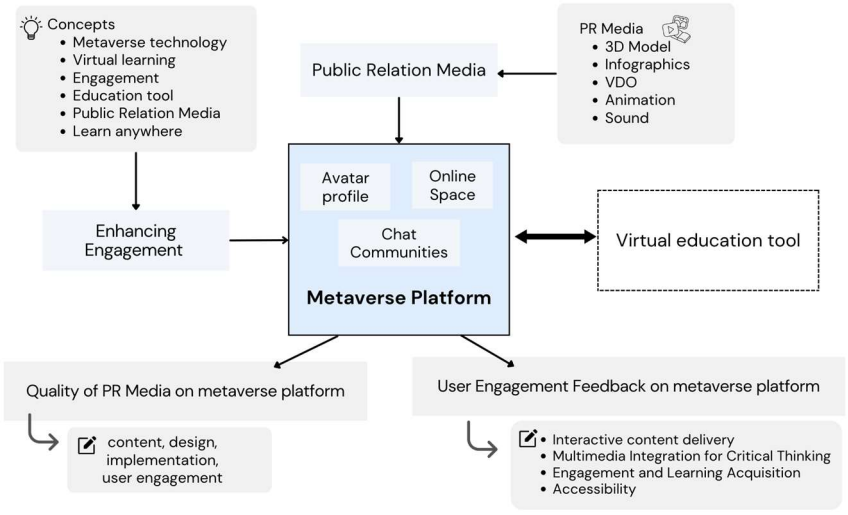

Figure 3: Conceptual Framework

2. Purpose

1) To design and develop public relations media on the Metaverse platform for enhancing engagement by using virtual learning in the case of the Digital Business Computing program at the Faculty of Management Science, Loei Rajabhat University.

2) To evaluate the quality of public relations media on the Metaverse platform for enhancing engagement.

3) To study user engagement through virtual learning on the Metaverse virtual learning platform.

3. Methodology

3.1 Research Methodology

This study focuses on the development of digital media using the ADDIE Model as follow:

3.1.1 Analysis: The study involves researching documents and resources on creating public relations media, as well as exploring Metaverse technology to analyze and design engaging content that attracts specific audiences, ensuring the media is developed effectively. This includes studying documents and information for the Digital Business Computer Program, such as curriculum details, course introductions, teaching methods, activities, internship opportunities, career paths, alumni information, photos and videos of various activities.

3.1.2 Design: Based on the analysis, design the digital media content for the Metaverse platform. To ensure easy access, the program content for the Metaverse room will be designed with three exhibition spaces: the General information space, the activities apace, and the career guidance and alumni space in Figure 4.

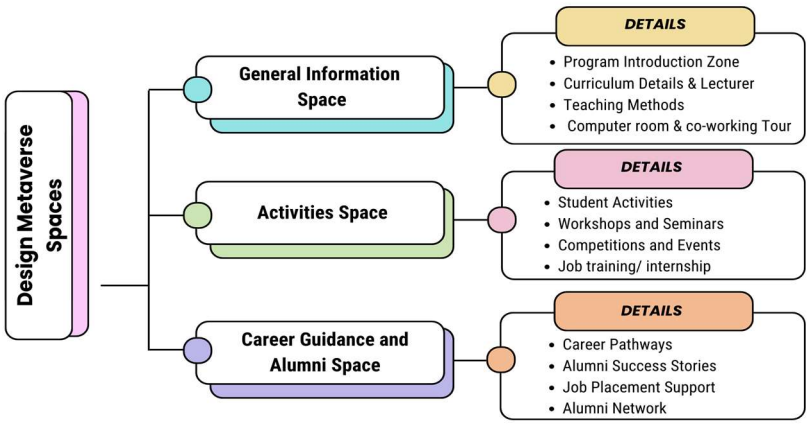

Figure 4 Metaverse spaces design

In figure 4 illustrates the structure of the program contents for the Metaverse room, organized into three exhibition spaces.

1) The general information space in the exhibition includes: program introduction zone, curriculum details, teaching methods and internship opportunities.

2) Activities space in the exhibition includes: student activities, workshops and seminars, competitions events and room tours.

3) Career guidance and alumni space in the exhibition includes: career pathways and job opportunities for graduates, alumni success stories, job placement Support.

3.1.3 Development: This process of developing metaverse spaces and public relations media is as follows:

1) Registering for Spatial Metaverse and creating an Avatar: Begin by signing up for the Spatial Metaverse platform. Once registered, create a personalized avatar that will represent you in the virtual environment. This step is crucial as it establishes your identity and presence within the Metaverse.

2) Creating spaces according to the design: Utilize the tools provided by the Spatial Metaverse to create virtual spaces. These spaces should be designed in alignment with the planned layout and structure. Each space will serve a specific purpose, such as an exhibition hall or an activity zone, to facilitate engagement and interaction.

3) Designing all media: Designing all media in the form of infographics, animations, videos, and 3D models.

4) Importing all media into spaces: Import all the created media, including infographics, animations, videos, and 3D models, into the designated spaces within the Metaverse. Ensure that each piece of media is placed appropriately to maximize its impact and accessibility. The decoration process includes arranging 3D models to create an immersive and interactive experience for the users.

3.1.4 Implementation: In this phase, we ensure that all planned elements are seamlessly integrated and accessible to the target audience. The implementation phase includes specific steps:

1) Setting up interactive elements: Design virtual spaces for the Digital Business Computer program for easy navigation with clear pathways and interactive hotspots

to guide users through the content. Integrate interactive tools like clickable elements, quizzes, and tours to enhance user engagement and learning.

2) Testing: Test all media elements in the Metaverse for issues like broken links, unplayable videos, and faulty animations.

3.4.5 Evaluation: The evaluation of the public relations media on the Metaverse platform was divided into two parts.:

1) The quality assessment by five experts included questions on content, design, implementation and user engagement. These experts include university professors with advanced degrees in digital media, professionals in the field of 3D content design, and specialists in educational technology.

2) The engagement assessment includes the following aspects: interactive content delivery, multimedia integration for critical thinking, engagement and learning acquisition, accessibility, and the improvement of learning outcomes. These factors work together to enhance learners' understanding and retention of information, promote critical thinking, and foster active participation, all of which contribute to the overall enhancement of learning outcomes (López-Belmonte et al., 2023; Muthmainnah et al., 2023).

The data were analyzed using mean and standard deviation, with the Likert scale used as the evaluation criterion.

To further validate the accuracy and relevance of the questionnaire, the Index of Item Objective Congruence (IOC) was used to determine its content validity. This process ensured that each question on the questionnaire was aligned with the objectives of the media, contributing to a more accurate and effective evaluation of its overall effectiveness, quality, and user engagement. Based on the media assessment, research questions for evaluating Metaverse media were selected with an IOC score between 0.5 and 1.00 to ensure relevance and accuracy.

3.2 Population sampling

The population in this study consists of students and the undergraduate who are interested in the Digital Business Computer program.

The sample group includes students and the undergraduate, selected through simple random sampling. A total of 400 individuals were chosen based on W.G. Cochran's sampling formula (1953). The sample size formula used is:

$$\frac{n = p(1-p)z^2}{d^2}$$

Where:

n is the required sample size, p is the estimated proportion of the population, which can be substituted with past statistical values, z is the z-score corresponding to the desired confidence level (z=1.96), d is the acceptable margin of error.

Thus, the required sample size is 384. To ensure a robust sample, the study included 400 participants.

3.3 Research tools

1) The quality assessment for public relations media on the Metaverse platform included questions on content, design, implementation and engagement, using a 5-rating scale. Five expert professors in public relations media were selected via purposive sampling.

2) The engagement assessment for using Public Relations Media on the Metaverse Platform consists of 12 questions categorized into four aspects: interactive content delivery, multimedia integration for critical thinking, engagement and learning acquisition, and accessibility. The results will be analyzed using the mean, standard deviation (S.D.), and interpretation of findings. The evaluation topics have been refined based on theoretical studies and research focusing on engagement, the use of interactive communication technologies to enhance learning and participation, collaborative learning, and student learning outcomes (López-Belmonte et al., 2023; Muthmainnah et al., 2023).

4. Research results

4.1 The development of public relations media on the Metaverse platform for the Digital Business Computer program

The development of public relations media on the Metaverse platform through the Spatial application includes the design of infographics, animations, posters, and videos, as well as the creation of 3D models. The content is divided into three spaces, which include:

1) General Information Space: https://tinyurl.com/3avmyjjd
2) Activities space: https://tinyurl.com/3t9fsrwp
3) Career Guidance and Alumni Space: https://tinyurl.com/yhhymfe7

Figure 5 Exhibition information space

Figure 6 Activities space on Metaverse platform

Figure 7 Career guidance and alumni space on Metaverse platform

The exhibition information space depicted in figure 5 encompasses several key areas of information. It starts with the program introduction zone, which provides an overview of the Digital Business Computer Program, highlighting its vision and mission. It then details the curriculum, offering comprehensive information about the courses, including their descriptions, credits, and intended learning outcomes. The teaching methodologies are also explained, covering both practical and theoretical approaches. Additionally, the exhibition includes information about internship opportunities, outlining available programs, partnerships with companies, and the application process.

In figure 6, the Activities space in the exhibition includes information and videos of various student activities, clubs, and organizations within the program. It also details past and upcoming workshops, seminars, and special lectures. The space highlights competitions, events, and hackathons that students can participate in, and offers interactive virtual tours of the campus and facilities.

In figure 7, the Career Guidance and Alumni space in the exhibition includes guidance on potential career paths and job opportunities for graduates, along with success stories from alumni that highlight their achievements and career growth. It also provides information about job placement services, career counseling, and networking opportunities, and details the alumni network, showing how current students can connect with alumni for mentorship and guidance.

Figure 8 Participation in the Metaverse space

Figure 9 Program introduction zone

Figure 10 Room tour zone

Figure 11 Talk room zone

Figure 9 illustrates the program introduction zone, where users are introduced to the various aspects of the program, as Figure 10 depicts the room tour zone, offering a virtual tour of the facilities and Figure 11 shows the talk room zone on the Metaverse platform, where interactive discussions and sessions take place.

4.2 Quality assessment of public relations media on the metaverse platform

The quality evaluation results of the media by five experts are shown in the graph below, displaying the mean scores for each aspect as detailed.

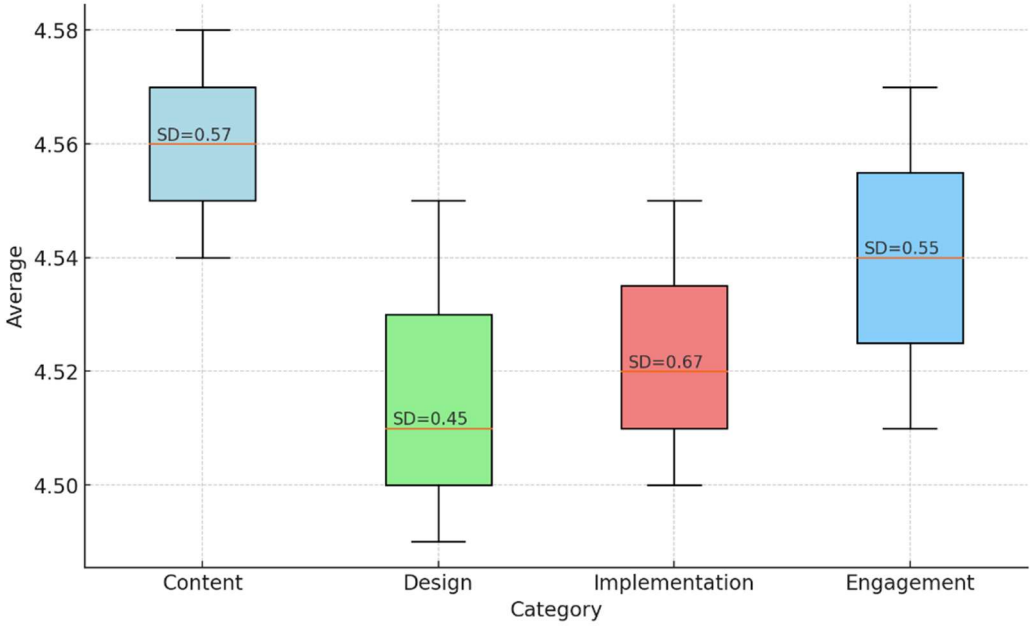

Figure 12 Quality evaluation results by experts

As shown in Figure 12, The results of quality assessment indicate that all aspects were rated at the highest quality level ($\bar{x}$=4.53, S.D.=0.56). The results demonstrate that the content aspect received the highest average score ($\bar{x}$=4.56, S.D.=0.57).

4.3 The result of engagement feedback with virtual learning on Metaverse.

Table 1: Engagement assessment on virtual learning

Assessment topics	$\bar{x}$	S.D.	Results
1. Interactive content delivery			
1.1 Presenting content on the Metaverse platform in the form of text and images can significantly enhance learner comprehension.	4.52	0.57	highest
1.2 Presenting content on the Metaverse platform in the form of videos can significantly enhance learner comprehension.	4.56	0.56	highest
1.3 Presenting content on the Metaverse platform using interactive links can significantly enhance learner comprehension.	4.44	0.61	high

Assessment topics	$\bar{x}$	S.D.	Results
2. **Multimedia Integration for Critical Thinking**			
2.1 Presenting content on the Metaverse platform in the form of text and images can encourage learner critical thinking.	4.54	0.55	highest
2.2 Presenting content on the Metaverse platform in the form of videos can encourage learner critical thinking.	4.42	0.76	high
2.3 Media on the Metaverse platform can present content in a way that enhances learner understanding.	4.67	0.59	highest
3. Engagement and Learning Acquisition			
3.1 Media on the Metaverse platform can help the learner access and find content information effectively.	4.23	0.65	high
3.2 Media on the Metaverse platform can facilitate learner engagement and enhance the acquisition of knowledge and experience.	4.66	0.67	highest
3.3 Various forms of media on the Metaverse platform can help the learner expand their understanding and knowledge.	4.54	0.56	highest
4. **Accessibility**			
4.1 Using media on the Metaverse platform in virtual reality can create realistic and immersive experiences for the learner.	4.62	0.55	highest
4.2 Easy-to-navigate interfaces on the Metaverse platform can enhance user engagement and accessibility.	4.67	0.57	highest
4.3 Tools for real-time interaction, such as live chats and virtual classrooms, can increase student engagement.	4.55	0.54	highest
Overall	**4.54**	**0.60**	**Highest**

Table 1 shows the learner engagement feedback result on the Metaverse platform performs exceptionally well in enhancing engagement through virtual learning. The highest value for interactive content delivery for videos ($\bar{x}$=4.56, S.D.=0.56), indicating their strong impact on comprehension. Multimedia integration for critical thinking scored the highest ($\bar{x}$=4.67, S.D.=0.59), emphasizing its role in enhancing learner understanding. In engagement and learning acquisition, media facilitating learner engagement and knowledge acquisition scored the highest ($\bar{x}$=4.66, S.D.=0.67). Accessibility and inclusivity were highlighted by easy-to-navigate interfaces and real-time interaction tools, scoring 4.67 and 4.55 respectively. Overall, the platform effectively supports high levels of learner participation and engagement ($\bar{x}$=4.54, S.D.=0.60).

5. Discussion

5.1 The quality assessment for public relations media on the Metaverse platform included questions on content, design, implementation and engagement by experts

An evaluation of the quality of PR media on the Metaverse platform, conducted by five experts, indicated that all aspects were rated at the highest level of quality. This demonstrates the efficiency of the platform, especially in terms of content, which is of high quality and facilitates easy student engagement. This is consistent with existing literature that suggests the importance of content being interesting through digital media, as it promotes deep student engagement and understanding (Ti-Shen & Sen, 2019; Muthmainnah et al., 2023). High ratings across media areas indicate that the Metaverse platform is outstanding in integrating multimedia elements, which is necessary for enhancing critical thinking and student interaction (López-Belmonte et al., 2023).

The results of this study clearly reflect the potential of the Metaverse platform in creating an interactive learning environment, both in terms of participation and knowledge. With reference to previous studies on virtual learning and digital engagement (Song et al., 2023; Lee, Woo & Yu, 2022). the results of this evaluation demonstrate that Metaverse's capabilities can transform public relations and learning strategies by leveraging advanced digital technology to provide high-quality and engaging interactive media. Additionally, feedback from engagement assessments indicates that the platform's interactive content delivery, with multimedia integration and real-time interactive tools, greatly increases student participation and understanding. These findings suggest that the Metaverse platform is not only effective in delivering content, but it also creates interactive and engaging learning experiences that support critical thinking and knowledge acquisition. It is poised to be a leading tool in virtual education and digital media.

5.2 Engagement Feedback for Using Public Relations Media on the Metaverse Platform

The engagement feedback includes the following aspects: interactive content delivery, multimedia integration for critical thinking, engagement and learning acquisition, and accessibility. The research findings revealed that most learners had not previously used the Metaverse for educational purposes. Therefore, it can be concluded that learners lack sufficient experience with the Metaverse platform and are not very familiar with its applications. Despite this, the platform effectively supports high levels of learner participation and engagement.

One of the findings of the research is that learner feedback on the Metaverse platform reveals its exceptional capability to enhance engagement through virtual learning. First, the use of interactive content, such as videos, received the highest level. This indicates a significant impact on learners' understanding, as videos stimulate both visual and auditory senses, promote greater engagement, and offer flexible learning options. The present findings align with Muthmainnah et al. (2023), who observed that the use of interactive content on metaverse technology positively impacts learners' engagement by promoting active involvement, interest, and interaction in their educational activities, ultimately enhancing their overall learning experience and educational outcomes. To capitalize on these strengths, it is essential to develop promotional materials that highlight the platform's ability to deliver high-quality, relevant, and interactive content. Emphasizing these features, along with clear communication, personalized adjustments, and consistent updates, will further boost learner engagement and position the Metaverse platform as a leading tool in virtual education.

The empirical findings of our research are consistent with prior studies (Ti-Shen & Sen, 2019) discusses the growing interest in interactive videos in higher education, highlighting the potential of videos to enhance learning through visual and auditory stimulation, which significantly impacts learners' understanding.

In addition, the results indicate that multimedia integration on metaverse for critical thinking scored the highest, highlighting its significant role in enhancing learner understanding. This high score demonstrates that the use of multimedia not only engages learners, but also significantly improves their ability to think critically about the content they are interacting with. These findings align directly with those of López-Belmonte et al. (2023), who found that the integration of bite-sized video learning technologies can enhance students' critical-thinking skills.

Moreover, in terms of engagement and learning acquisition, media that facilitates learner engagement and knowledge acquisition scored the highest. This suggests that the Metaverse platform can further enhance its ability to engage learners and support knowledge acquisition. These media forms help capture learners' attention, sustain their interest, and support the acquisition of new knowledge (Lee, Woo & Yu, 2022). Highlighting the benefits of interactive and diverse media, such as improved engagement and learning outcomes, can attract more learners and showcase the platform's commitment to providing a high-quality, engaging learning experience.

Additionally, research on accessibility shows that designing Metaverse environments with easy-to-navigate interfaces can significantly enhance both user engagement and accessibility. This approach aligns with Song et al. (2023), which emphasizes that tools for real-time interaction, such as live chats and virtual classrooms, are essential for increasing student engagement. By creating realistic and immersive experiences, these design elements make the virtual learning environment more effective and user-friendly.

To capitalize on these strengths, it is essential to develop promotional materials that highlight the platform's ability to deliver high-quality, relevant, and interactive content. Emphasizing these features, along with clear communication, personalization, and consistent updates, will further boost learner engagement and position the Metaverse as a leading tool in virtual education.

Furthermore, research shows that engaging with media on the Metaverse platform enhances learning outcomes and improves learners' performance. The platform allows learners to interact with public relations media in 3D or virtual formats, creating a more engaging and interactive experience that promotes active participation. Additionally, the use of the Metaverse helps learners visualize complex content more easily, with virtual images stimulating better understanding and improving retention of information, making it more effective than traditional methods (Muthmainnah et al., 2023).

Future research should focus on understanding the specific mechanisms by which metaverse technology influences learning motivation, engagement, and academic outcomes to develop effective educational interventions.

References

Bloomberg Professional. (2023). **The Metaverse market, next tech platform.** Retrieved from https://www.bloomberg.com/professional/insights/trading/metaverse-may-be-800-billion-market-next-tech-platform

Chomjumjang, S. (2023). Innovation in teaching art education in the virtual world: Metaverse. (In Thai). **Journal of MCU Peace Studies**, **11**(7), 2978-2988.

Digital Government Development Agency. (2022). **Digital Government Development Agency**. Retrieved July 22, 2024, from https://www.dga.or.th/en/

Ti-Shen, E. T., & Sen, A. (2019). Effective use of interactive videos as an educational tool in higher education – an Asian context. **EDULEARN19 Proceedings**, 10379–10385. https://doi.org/10.21125/edulearn.2019.2610

Jenifer, S. A., Arfa, K., Deepika, S. (2023). Metaverse. **International Journal of Innovative Research in Information Security, 9**(3), 215-220. https://doi.org/10.26562/ijiris.2023.v0903.29

Mohamed, K., & Bukhari, S. (2023). The media in Metaverse; Baudrillard's simulacra, is Metaverse that begins the Apocalypse?. **SSRG International Journal of Communication and Media Science, 10**(1), 14–22. https://doi.org/10.14445/2349641x/ijcms-v10i1p102

Lee, H., Woo, D., & Yu, S. (2022). Virtual reality Metaverse system supplementing remote education methods: Based on aircraft maintenance simulation. **Applied Sciences, 12**(5), 2667. https://doi.org/10.3390/app12052667

López-Belmonte, J., Pozo-Sánchez, S., Moreno-Guerrero, A.-J., & Lampropoulos, G. (2023). Metaverse in education: A systematic review. **Revista de Educación a Distancia (RED), 23**(73), 1–25. https://doi.org/10.6018/red.511421

Muthmainnah, A., Ahmad, Al, Yakin, P., Mahbub, I., & Seraj. (2023). Impact of Metaverse technology on student engagement and academic performance: The mediating role of learning motivation. **International Journal of Computations, Information and Manufacturing (IJCIM), 3**(1), 10–18. https://doi.org/10.54489/ijcim.v3i1.234

Song, Y., Cao, J., Wu, K., Yu, P. L. H., & Lee, J. C.-K. (2023). Developing "Learningverse"—A 3-D Metaverse platform to support teaching, social, and cognitive presences. **IEEE Transactions on Learning Technologies, 16**(6), 1165-1178. https://doi.org/10.1109/TLT.2023.3276574