Makyung in Metaverse: Issues and Challenges of Delivering Performing Arts Education in The Virtual Worlds

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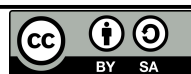
ABSTRACT

Metaverse potentially translates physical face-to-face (f2f) education into the virtual environment. Current research indicates that the technology is already employed in social and gaming activities yet is still in its infancy in education, particularly in teaching Makyung (noun: [ma/. yung] alternative spelling: Mak Yong/Makyong) performing arts. This study aims to examine the potentials, issues and challenges associated with tutoring performing arts in the metaverse through observing an adiguru (master) tutoring Makyung class in a virtual world (metaverse) platform that is accessible through Virtual Reality (VR) and web. A cross-sectional study is conducted involving Malaysian educators and cultural experts using a semi-structured interview. A thematic analysis is carried out based on the focus group interview, and open-ended questionnaires are transcribed verbatim. Findings showed that despite tutors being challenged by movement limitation, self-regulation, sense of presence, technological competency, and e-learning system support, such platforms provided a potential domain for aspiring practitioners. Considering the challenges, the metaverse could be beneficial for delivering cultural performing arts education. Therefore, future research will focus on designing a metaverse-based performing arts teaching and learning assessment tool.

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1. Introduction

Metaverse refers to open-ended digital reality and culture connecting virtual worlds by operating at multiple levels: parallel to, overlaid on, or interactive with the physical domain via advances in interface technologies and real-time data sharing (IEEE, 2022) which refers to a 3D virtual world populated by stylised avatars (Ng et al., 2021; Putra & Wayoi, 2022) associated with real-time netizen. The emergence of the metaverse may be traced back to the early internet gaming era circa 1960s. Nevertheless, most studies revolve around earlier virtual Communities of Practice (CoP), such as Second Life and Web 2.0 in the early millennium (Tira et al., 2022). The term metaverse is affiliated with the CoP within social Virtual Reality (VR) worlds in which it may fall under the umbrella of the Reality-Virtuality (RV) Continuum. Such a continuum is segmented into four (4) prominent components that consist of Real Environment, Augmented Reality (AR), Augmented Virtuality (AV), Virtual Reality (VR), also known as virtual environment, and Mixed Reality (MR). The term XR, which stands for Extended Reality, literally refers to X as the variable for reality, hence anything reality.

The COVID-19 pandemic has changed the global way of education and working. Video and audio-conferencing software such as Zoom, Google Meet, Microsoft Teams, and even Discord has increased users circa 2019. Those who have never really used video conferencing software have gained dependency on these platforms as main communication tools for remote work and especially learning. Aside from e-learning platforms that focus on lifelong learning, such as Coursera and Udemy, which have gained users over time, the Learning Management System (LMS) for educational institutions is upgraded to cater to the change of digital consumerism. One of the most popular e-learning platforms that has gained high usage is Google Classroom, which allows educators and learners to upload materials and assignment submissions with the integration of Google Meet. Several platforms have increased their immersiveness to attract target audiences, such as Gather. Town that allowed a top-down view of a gamified environment like that of a pixel art platformer game (2022). Virtual education allows interaction with educators or instructors, usually in real-time (synchronous), more than online learning, which tends to be more self-paced (asynchronous) (Florence Martin et al., 2023). The difference between online and virtual education resides in the digitality method – "online" refers to face-to-face (f2f) methods via video conferencing or the readiness of e-learning materials to be accessed online. Despite the emphasis on "virtuality", which refers to an immersive virtual environment that integrates the embodiment of avatars of real-life educators and learners (Gwo-JenHwang et al., 2022), virtual education aims to humanise and not entirely virtualise humans (Tira et al., et al., 2022) and is often portrayed in a gamified manner within the learning environment (Phongsak Phakamach et al., 2022).

Makyung, also spelt as Mak Yong or Makyong [ma/. yung] is a Malaysian ancient theatre that combines acting, vocals, and gestures, accompanied by instrumental music and elaborate costumes. Popularly known in Northwest Malaysia, specifically in Kelantan, Makyung is performed as a form of entertainment as well as a mystical practice (UNESCO, 2022) that also records customs of Malay society that encompass behaviours, beliefs, values, and norms inherited from the ancestors (Mohamad Ghazali Abdullah, 1995)—recognised as an intangible heritage of Malaysia by UNESCO as inscribed in 2008 (3. COM) on the Representative List of the Intangible Cultural Heritage of Humanity (originally proclaimed in 2005). The practice falls under oral tradition and expression, performing art, social practice, ritual, and festive events (UNESCO). As highlighted by UNESCO and the Ministry of Arts, Cultural and Heritage of Malaysia, Makyung stories are unique to their genre and do not fit into any of the significant story cycles or epics traditionally used in Southeast Asian theatre. Secondly, Makyung's performance represents a unique blend of rare and outstanding artistic traditions such as music, dance, acting, and oral literature not found in any other genre in Malaysia or elsewhere. Therefore, these artistic traditions must be preserved to be passed down to future generations.

Additionally, Makyung's insight into the ethos of the diverse Malay community spans from Kelantan and Terengganu to Pattani in Southern Thailand and the Riau islands of Indonesia. Aside from performing art, the ritualistic elements present in the genre, such as incantation texts and some of the more specific kinds of rituals and ceremonies, are not found in any other genre of Malay performing arts, and their loss would be devastating to the Malay World and the world in general. Lastly, as identified by the National Arts and Cultural Division (JKKN), the practice of Makyung must be preserved for scholars to continue research, documentation, and analysis of this and other Malaysian performance genres, related literary materials, and visual arts (2005).

2. Literature Review

2.1 The Nature of Makyung Traditional Performing Art

Makyung is one of the famous traditional performing arts in Kelantan, Malaysia. It combines various elements: dance, singing, acting, music, ritual, comedy, and story. All stories in Makyung use the inner dialogue of the Kelantan dialect entirely. It is presented in a circle shape on the stage, without a set, and only using props such as '*rotan berai*' and '*golok*'. As Makyung usually is not dependent on a sophisticated set, the costume is essential for supporting aesthetic values in the performance of Makyung. The actors in Makyung usually consist of beautiful young girls who take all gender roles, including men and women, except the comedian character played by the male actor. This scenario originated from the olden days as Makyung was a court performance for the queen and the princess. As the king at the time was worried that the queen and princess would fall in love with the male character, the actors of Makyung only consisted of women. Makyung's performance also has a structure where the form is the same in all the stories played. In a Makyung performance, the significant characters may be Pakyung, Makyung, Peran, and Dayang. Performances of Makyung are deeply rooted within the Malay community and may be traced back to the pre-World War II circa 1920 (2009). The stories have a level of narrative development; it begins with a basic story, 'Dewa Muda', which tells about the origin of Makyung, then it grows to seven stories and so on, to the twelve stories, considered complete, authentic, and high with aesthetic value. Makyung's story talks about the Kings in the palace through different conflicts and themes whereby each level has an element of magic,

fantasy, and ritual (Ghulam Sarwar Yousof, 1976). Besides the function, value, and philosophy contained within the art of this traditional Malay art, it is also a delicate Malay dance that makes Makyung unique and special. For this privilege and uniqueness, Makyung was recognised by the world until being appointed as an Intangible Cultural Heritage of Humanity by the United Nations Educational Scientific and Cultural Organisation (UNESCO) in 2005. Aside from a modern performance setting that is usually known for this day and age, Makyung originated from the tradition of a traditional village setting, whereby the performances are held on a temporary open stage made of palm leaves and wood. As part of the performance, the orchestra of traditional instruments, which consists of a three-stringed spiked fiddle (*rebab*), a pair of double-headed barrel drums (*gendang*), and hanging knobbed *gongs*, sits on three sides of the stage (*tetawak*) in which the fiercely euphonious music accompanies the performance (Figure 1).

Figure 1. Makyung Practice and Performance That Are Accompanied by Music from Traditional Instrument

In line with ASWARA's motto, "Melangkah Kehadapan Bersama Tradisi" (Moving Forward with Tradition), traditional courses such as Makyung, Bangsawan, Mek Mulung, Randai, and Wayang Kulit are offered as compulsory courses to all ASWARA Diploma and bachelor's degree students. It is required for all the students to pass these courses to graduate. These courses are offered under the Traditional Performing Arts Centre (PuTRA), accredited under Malaysian Qualifications Agency (MQA) programmes, and taught by experienced Adiguru and experts in traditional arts. This uniqueness sets ASWARA apart from other institutions in Malaysia. For the Makyung course, the first teacher invited to teach at ASWARA was the late *Seniman Negara* (National Artist), known as Khatijah Awang or Mak Jah, a Makyung *primadonna* famous in Kelantan. In 1995, she was appointed as a lecturer with her daughter Noor Hayati as an assistant in teaching dance, singing, music, acting, and Makyung performance to all Diploma students for two semesters. After Mak Jah's passing, her daughter Noor Hayati replaced her, but she eventually moved back to Kelantan. Fatimah Abdullah (Figure 2), also an expert in Makyung, replaced Noor Hayati from 2000 until now. As a co-curricular activity, Makyung is offered at ASWARA and other Public Higher Education Institutions. At the University of Malaysia Kelantan, Makyung is taught by Khatijah Awang's daughter, Noor Hayati Zakaria. In contrast, at Universiti Sains Malaysia, Makyung is taught by Adiguru Rebab Che Mat Jusoh, Associate Prof Dr. AS Hardy Shafii, and ASWARA alumni Nur Liyana Che Muhammad and Mohd Farid Kamaruzaman. Offering Makyung courses at public institutions of higher learning is an effort to preserve and empower the traditional art of Makyung among the younger generation, especially students.

Figure 1. Makyung Adiguru Fatimah Abdullah Performing Makyung

2.2 Virtual Education in the Metaverse

The metaverse can potentially translate physical Face-to-Face (f2f) education into a virtual environment, as in the Meta-education model (Kye et al., 2021), such as learning syllabus via VR and the web. Nevertheless, outside of the contemporary performing arts in the metaverse, traditional cultural art such as Makyung is still mainly disseminated within its niche community or through physical dissemination with a threatening factor of aged practitioners. Hence, this research aims to investigate the virtual ecosystem aligned with UNESCO Sustainable Developmental Goal (SDG) 4: Quality Education (UNESCO, 2022). In the metaverse context of virtual education, four (4) metaverse types are identified that consists Augmented Reality (AR), Lifelogging, Virtual Reality (VR), and the Mirror World, such as Lifelogging that allows educators and performers to record body information, behaviours, or even emotions through a particular device (Hwang & Chien, 2022) (Figure 3).
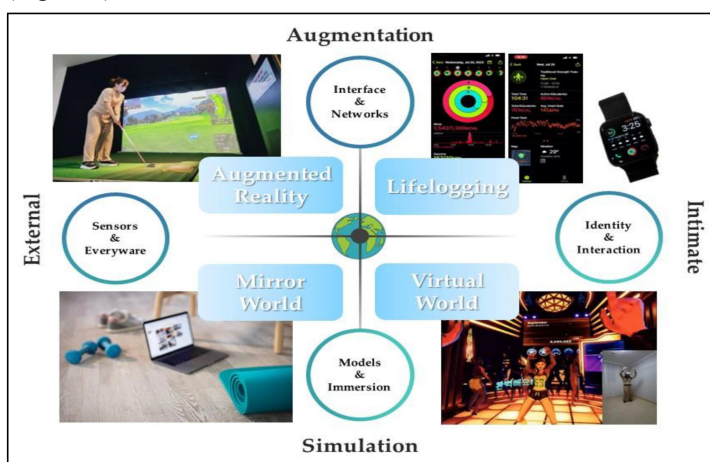

Figure 3. Metaverse Mapping for Physical Interaction (Hwang & Chien, 2022)

Several free-to-use metaverse platforms intentionally made for community engagement and entertainment rather than formal education have been utilised for lifelong learning activities. AltSpaceVR, which was founded in 2013 and acquired by Microsoft circa 2017, has gained popularity amongst educators and researchers who have utilised the platform in conducting conferences, creative art workshops such as performing art and open mics, as well as support groups through the ecosystem of Educators in VR. Despite avatar customisation limitation that only allowed half-body tracking with disembodied limbs, the platform itself has an actively established gamut of community that consists of cultural heritage preservation, as well as language learning, coaching and personal development, curriculum development for institutionalised and virtual schooling, and research than spans across arts, computer science, mathematics, science, medical and healthcare, diversity, and even towards ethics and policy making that may include etiquette and cyberbullying issues. The platform targets a wide range of educators, students, world builders, and business stakeholders. With its cross-platform capacity for users to access via VR or web, the platform has a rich community support system and pre-set avatars that can be instantly utilised. However, with the closing of

AltSpaceVR in March 2023, the VR development of the platform has shifted to a more immersive and accessible Mixed-reality spatial environment that is Microsoft Mesh.

2.3 Metaverse Platforms for Education

2.3.1 Engage VR

Engage VR, which has been around since 2015 through the Apollo VR immersive education initiative, is also known to be a professional metaverse platform accessible not only in VR and the web but also on mobile devices. To ensure better accuracy in data management of the platform, ENGAGE has introduced ATHENA, an Artificial Intelligence (AI) virtual employee that would assist ENGAGEVR users within the VR worlds (2023). Aside from the AI integration, ENGAGEVR also provided ecosystem services for reputable enterprise clients such as BMW and Lenovo, as well as educational institutions conducting virtual and remote education such as film production, acting for motion capture and performances (Figure 4), and virtual classrooms. ENGAGEVR also allows users to have their 3D models and scenes added to the world and to import upper-body avatars. Nevertheless, such features are only available for paying users; the free version only allows ten users in a specified world.
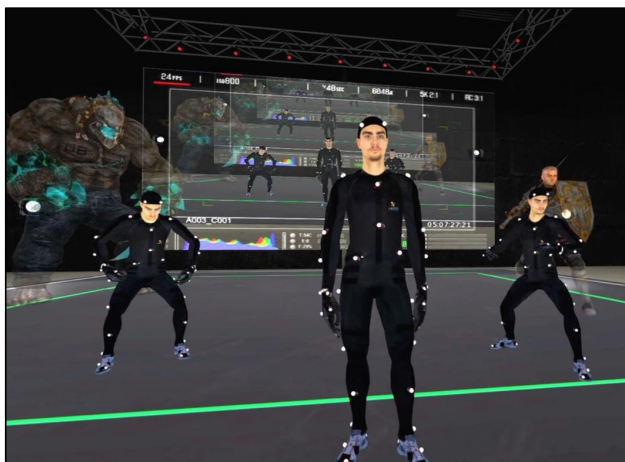

Figure 4. Motion Capture Setup and Acting in ENGAGEVR Platform (The Metaverse Film School LLC, 2023)

2.3.2 Neos

Neos, also known as NeosVR, started as a free-to-play (F2P) Massively Multiplayer Online (MMO) game in 2018. It is an emerging metaverse platform that runs on the crowd-surfing business model and peer-to-peer environment. As promoted by the company as an educational and business ecosystem, Neos runs on Neos credit, a digital currency for the platform. Having a higher fidelity graphic than VRChat that is more attractive to leisure and younger audiences, Neos attracts a more mature audience for educational purposes. Due to its sense of realism of avatars, training and demonstrations are conducted by educational institutions and companies to save the cost of physical training. As there is no specific performing art-oriented project within NeosVR yet, the metaverse platform is known for roleplay training in medical and health, such as in first aid paediatric health awareness (Figure 5). As of 2023, Neos has allowed full-body avatars compared to the upper-body limitation in the past. Users, as worldbuilders, can build their worlds by using existing templates or uploading their worlds. As a free Neos user, 30 users can simultaneously be in a Neos world.

Figure 5. Motion Experiential Education of Full-Bodied CPR Demonstration for Advanced Paediatric Life Support in Neosvr

2.3.3 Spatial.io

However, regarding culture and heritage development, the NeosVR platform is still in its infancy compared to the newer Spatial.io (2016). Spatial.io is branded as a space for creators and brands to share culture through close-knit communities and virtual property potentials. Spatial.io also offers custom stylised 3D full-bodied avatars that allow users to generate realistic heads from self-portrait uploads and integration with Ready Player Me, a cross-game avatar platform for the metaverse. Due to these free features made available, Spatial.io has provided a virtual biosphere with diverse content creation worldwide. One of the projects that has gained attention is a celebration of the Lunar New Year, which featured zodiac art by Humberto Leon (Figure 6), in which he aimed to encapsulate his identity as an artist of Chinese-Peruvian American within the metaverse (2022). As the space is meant to replicate real life, the space has also been curated considering *feng shui*. Aside from Spatial.io, the project is also made available on AltSpaceVR to expand the celebration where visitors can take selfies and communicate with other users. As a Spatial.io creator in the free account, only 50 users can simultaneously be in the created World.

Figure 6. Virtual Space for Lunar New Year Celebration as An Initiative in Cultural Awareness Within the Virtual Realm of Spatial.Io

2.3.4 Virbela

Virbela is a metaverse platform known for enterprise usage as well as education. With remote learning as one of its features, Virbela promotes a customisable virtual campus sandbox, encrypted conversations, and breakout room features. Virbela allowed full-body avatars within the low-poly world with a focus on increasing student learning retention and peer-to-peer community support in the community and culture, such as concert hosting (Figure 7). Additionally, Virbela provides a flexible and dynamic platform for academic institutions to create virtual campuses and learning environments and host conferences and events. Its intuitive interface and easy-to-use tools make it accessible to many users, while its robust security measures ensure that user privacy and data protection are maintained. One of the features of Virbela includes voice and text chat capabilities, which facilitate real-time communication and collaboration between students and

instructors and its integration with multimedia tools, such as video conferencing software and virtual whiteboards, which allow for more interactive and engaging learning experiences (Virbela, 2022).

Figure 7. Large Group Gathering for Virtual Concert Participation in Virbela

3. Methodology

3.1 Study Direction

This study examines the potentials, issues and challenges associated with virtual education within the context of cultural performing arts in the metaverse. Secondly, the direction is to identify the components that may contribute to Malaysian cultural heritage appreciation among youth in a techno culture context and to investigate the acceptance of utilising new media technology tools such as the metaverse in knowledge dissemination for cultural performing arts education. Makyung is chosen as the theme of the project as outside of the niche community of creative practitioners, the impact of modernisation and westernised media may cause youth, especially in urban areas, not to have enough awareness nor appreciation towards cultural art (Siti Zainon, 1985; Gilman, 2015; Noor Zatul Iffah Hussin et al., 2020) beyond the mainstream Wayang Kulit or Silat.

3.2 Study Design

A cross-sectional study involving a selected group of e-learning educators was conducted in February 2023 (Romero-Tena et al., 2020). The participants were selected based on their knowledge of conducting teaching deliverables on virtual simulation. The participants should be familiar with conducting performing arts teaching and learning activities. Therefore, participants with such backgrounds are available in institutional settings that offer e-learning education on creative arts. The purposive sampling method was used to determine participants for qualitative data collection, which is most suitable for the research of a minimum of 4 sample sizes (Guetterman, 2015). The purposive sampling strategy is used to identify cases that meet predetermined criteria of importance (Palinkas et al., 2016). The ethical approval for this study was obtained from the institutional research committee. At the same time, permission letters were sent to the respective institutions, and the interview was initiated once the approval letter was received.

3.3 Pilot Study

Two experts were selected for the pilot study to assess the reliability of the questionnaire and estimate the average time for a respondent to complete the survey. The respondents took an average of 30 minutes to complete the survey.

3.4 Data Collection

Independent self-administered survey questionnaires were conducted via video conference with the subject matter experts. The respondents were briefly introduced to Makyung in the Metaverse project on Spatial.io. They were then instructed to observe the questionnaires via Google Forms to be answered verbally. The session was video recorded (Google Meet) and transcribed verbatim using Chrome additional plugins.

3.5 Instruments

The questionnaire comprises three main sections: expert's background, teaching deliverables, and summary. The expert's background survey includes name, age, gender, academic qualification, job position, teaching experience, experience in a simulated environment (e-learning), and familiarity with metaverse. In the second section, the respondents were asked about their perspectives on teaching deliverables, including self-

regulation, technological competency, isolation, and e-learning support systems. In the summary section, the respondents were asked to provide overall feedback and opinions on the survey.

3.6 Case Study

Makyung in Metaverse (Figure 8) is a project on Spatial.io that features sharing sessions that provide exposure to the potential of utilising new media technology, such as VR, in the creation of a metaverse space through gamified learning and animation to participants with little to no prior experience in Makyung. "Makyung" is the chosen central theme of the program that integrated several modules: (01) Pre-Masterclass in the form of talks with speakers from animation and digital games that have implemented the theme of Makyung in their work, concurrently, (02) the finale of the programme features Adiguru (Master) Fatimah Abdullah – Makyung educator who demonstrated Makyung and the story of its movements in the metaverse.

The programme utilised Spatial.io as the most accessible platform chosen from three (3) other educational metaverse platforms, including Engage VR, Neos, and Virbela. The Spatial.io platform is chosen based on full-body avatar capabilities, avatar and world customisation, technology accessibility, and beginner learning curve for performing art education in teaching and learning (Figure 9).
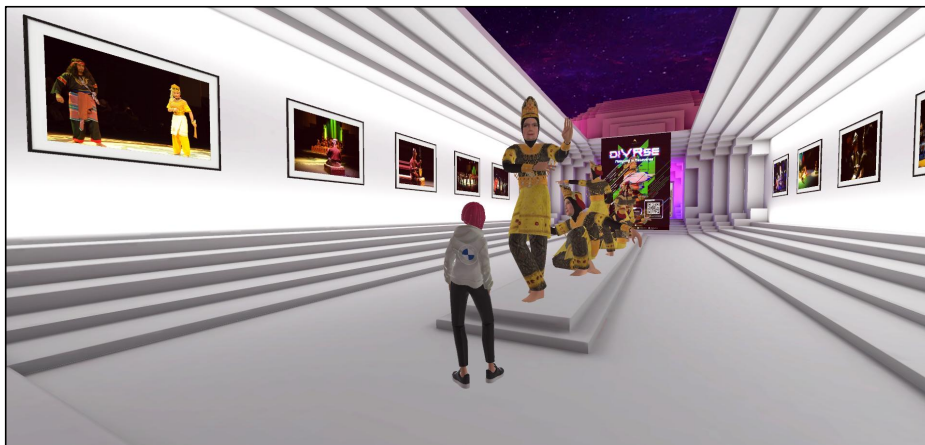

Figure 8.   Third Person View Of A User Navigating Through A Virtual Gallery That Showcased The Educator's (Adiguru Fatimah Abdullah) Makyung Performance And Digital Costume Artefacts

Figure 9. Makyung In Metaverse Promotional Poster Through ASWARA DIVRSE Webinar (2022)

3.7 Data Analysis

Thematic analysis is applied to discover recent themes that develop thematic structure from individual studies based on subject matter experts' overviews (Varma et al., 2022). Table 1 illustrates that to conduct a thematic analysis, the challenges associated with distance teaching education consist of four main themes: self-regulation, technological competency, social isolation, and e-learning support system (Rannastu-Avalos, 2020). The themes were derived from interviews with subject matter experts that were transcribed.

3.8 Thematic Analysis For Interview

Table 1. Attributes And Keywords For Interview Analysis

No.	Attribute	Keyword
1.	Self-Regulation	Sense Of Presence; Practical Teaching; Teaching Preparation; Educational Materials.
2.	Technological Competency	Controller Navigation; Technology Skills Learning Curve; Internet Connectivity; Calibration; Adapt
3.	Social Isolation	Sense Of Presence; Lonely Experience; Audience Less Responsive; Social Detachment; Motivation.
4.	E-Learning System Support	UI/UX Metaverse Platform; Responsive; Learning Features; Instructional Design; Syllabus; Learning Management System (LMS).

4. Data Analysis

4.1 Processes of Makyung in Metaverse Digitisation for Virtual Education

Towards the process of conducting the Makyung demonstration in the metaverse, several stages are conducted (Figure 10). Firstly, a preliminary session with Adiguru or the Makyung educator is conducted. The session will familiarise the educator with Oculus Quest 2 controllers and navigation with Spatial.io. Spatial.io is chosen as the metaverse platform as it is accessible to users without prior experience and knowledge in metaverse or Virtual Reality (VR). The platform can also be accessed through web, mobile, and VR devices. Secondly, the dance movements of Makyung are identified with the educator's knowledge. In this case, "Mengadab Rebab" is chosen as the movement that would be demonstrated in the programme due to its limited movement that can be replicated in the metaverse. Then, before digitising the educator into an avatar, the researchers establish a design document for the project to ensure the production process fulfils the study's objective. The design document is segmented into character design, world design, and workshop curation processes. Then, the educator with a full Makyung costume is digitised into semi-realistic 3D and rigged. Concurrently, the ReadyPlayerMe avatar and 3D assets are imported into the Spatial.io platform for programme execution.
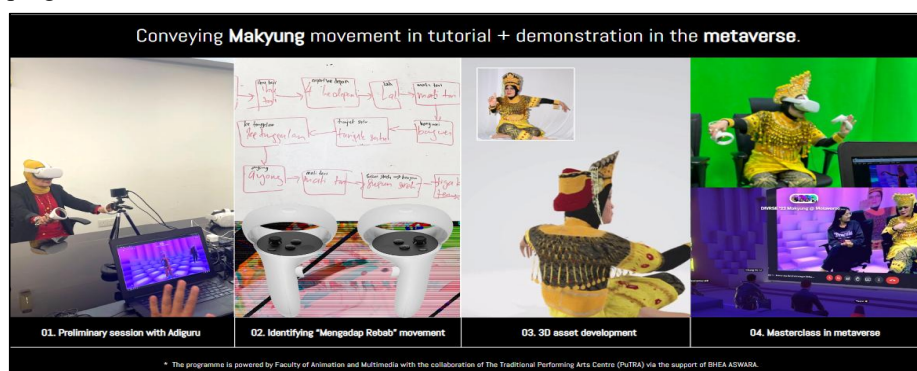

Figure 10. Pre-Production to Programme Execution for Makyung in Metaverse

In ensuring the accuracy of Makyung representation, several do's and don'ts are identified in the development process. This included the core components of Makyung attire, which consisted of headgear with Jasmine buds (odd numbers such as 5, 7, or 9 strings only), beaded necklace net, hand bangles, plain top, *sampin sarong* with trousers, belt buckle, and additional *keris*. The agile development method is chosen to set up learning materials and the metaverse training world to ensure iteration based on review with Makyung Subject Matter Expertise (SME) (Figure 11).
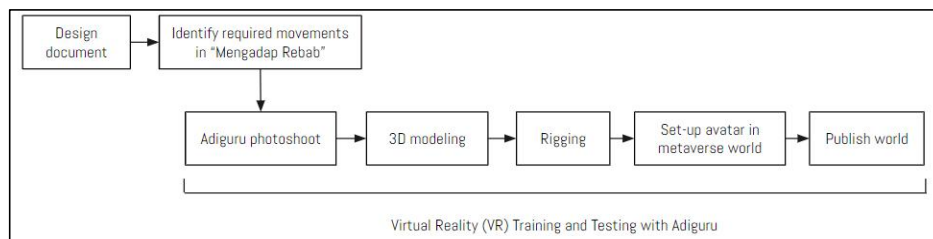
Figure 11. 3D Asset Development Pipeline for Makyung in Metaverse

4.2 Programme Feedback

Programme feedback is gathered from a questionnaire distributed to participants who have attended Makyung in the Metaverse programme (Figure 12). The participants comprised 63% aged between 18 - 24 years old, dominantly students from higher educational institutions in Malaysia. Additionally, 18.2% are segmented into 30 - 35 years old and 35 - 40 years old. Through the post-programme questionnaire, it is identified that 100% of the respondents agreed that documenting Makyung in a virtual platform (i.e., a virtual gallery) has the potential to enhance public awareness of culture and heritage. Meanwhile, 63.6% agreed that teaching or learning Makyung on a virtual platform such as Spatial.io could enhance public awareness of culture and heritage, with 36.4% answered "Maybe". Additionally, 90.9% agree that utilising new media technologies such as Virtual Reality or the metaverse can increase cultural heritage appreciation for youth, whilst 9.1% answered "Maybe".

Figure 12. Participants Attended the Makyung in Metaverse Masterclass by Observing in Google Meet or Attending Via VR and Web on The Spatial.Io Platform

4.3 Interview Data

Educators and cultural experts are interviewed to validate the effectiveness of utilising a metaverse platform for performing art education. Interview sessions were conducted from 14 January to 13 March 2023. Four experts were interviewed, whose ages ranged from 37 – to 56 years old, with current job positions as a lecturer and cultural consultant who served more than ten years. They were seasoned in the performing arts experience as performers and audience. They are also familiar with the metaverse environment since the inception of virtual reality.

Interview data from the subject matter were structured in four main themes, as described below.

4.3.1 Self-regulation

Commonly, the traditional performing arts deliverables are performed at arena stages, surrounded by musicians, performers, and audiences as addressed by the experts. The teaching deliverables require performing the dance move according to the music cues. The results obtained indicate that delivering the performance for teaching purposes disengages the presence of physical beings and affects the sense of presence:

"...I feel incomplete space performance (in the metaverse). When I perform, I am still in the room but in a different world. I can hear music from my computer, but I am unsure what the audience can hear."

<div align="right">Interviewee A</div>

Challenges in teaching performing arts in a virtual environment have been addressed. The teaching in the metaverse is pre-maturely ready for fundamental communication conversation features that include motions and expressions. Results indicate that the teaching of the performing arts is limited to practical-based teaching as stated:

"Yes, it will be challenging for practical exercise, but not so much in theory-based teaching."

<div align="right">Interviewee B</div>

This study also indicates a higher workload in preparing the educational materials for the metaverse. Current performing arts practices are commonly practised by the dancer (teacher), using the body as the instrument. Due to the limitation of hand tracking, which is still in the beta stage, delivering the teaching of the performing arts requires external devices such as virtual reality controller to operate functions, which become a new learning curve as stated:

"I (the performer) need to know how the controller works. Then, I need to know the buttons' functions. All this needs time to learn; it is not easy, but perhaps it would be easier if I get used to it."

<div align="right">Interviewee A</div>

Moreover, besides preparing to learn to control the device, it also considers the preparation of the learning materials, mainly to document and digitise Makyung information and translate it into the metaverse world as stated:

"Preparation will take more time as digitisation of materials, for example, 3D models, textures, animations needed to be done pre-teaching."

<div align="right">Interviewee B</div>

4.3.2 Technological competency

Technological competency concerns the performer's experience using virtual reality technology in surrounding websites in the metaverse. The feedback consistently addressed challenges in willingness to adopt the technology as stated:

"...as for now, adoption of VR headsets in a household is still considered nice-to-have and not essential equipment.

<div align="right">Interviewee A</div>

"It is the willingness to adapt because if you are not willing to adapt, you already stop at the point."

<div align="right">Interviewee C</div>

The experts highlighted the stability of internet connectivity in delivering teaching experiences in the metaverse.

"Slow or unstable internet will be an issue."

<div align="right">Interviewee B</div>

"...you do not want to disrupt the user's experience, especially when they watch or try to learn the traditional arts within the metaverse. I think this will affect the user learning experience, especially when the internet connection is not good."

<div align="right">Interviewee C</div>

4.3.3 Social isolation

Distance learning education for teaching online highlights the issues of social detachment. This study addressed the feeling of loneliness when delivering education in the metaverse as most of the experts agreed, stating that:

"..I may have to become [sic] like a robot to teach Makyung in this metaverse, feel funny looking like a cartoon character."

<div align="right">Interviewee A</div>

"VR can be a lonely experience."

<div align="right">Interviewee B</div>

Moreover, besides preparing to learn to control the device, it also considers the preparation of the learning materials, mainly to document and digitise Makyung information and translate it into the metaverse world as stated:

"Even I do not know them and their reactions."

<div align="right">Interviewee D</div>

The experts raised concerns about constant reactions and expressions like the face-to-face experience in delivering the performance. Hence, observing the audience's body language can help the performer profile the learner's attitude, as stated by experts:

"There are other players, too, standing watching the performance. However, we do not know if they are cheering, happy, sad, or doing something else."

<div align="right">Interviewee D</div>

"... it is a dimension and tricky space where people can just interact with each other. We all sort of computer-generated objects using avatars (that) people have another form of identity of themselves."

<div align="right">Interviewee C</div>

Social distance contributes to low motivation while delivering education in the metaverse has been highlighted in the concerns of the preparation for the deliverables, stated:

"The novelty of the experience might not cause low motivation, but challenges for adoption, onboarding, and getting the learning outcomes right (which) might cause low motivation for us."

<div align="right">Interviewee B</div>

4.3.4 E-learning support system

A learning platform system supports the academic activities between the teacher or performer and the learner in assessing learning outcomes. This study reveals that challenges in assessing performing arts within the educational context in the metaverse were not suitable for practical assessment, as stated:

"I cannot do practical assessment in the metaverse."

<div align="right">Interviewee D</div>

"Custom platform and content definitely allow you to have features such as assessment in the metaverse, if it is theory based."

<div align="right">Interviewee B</div>

Teacher expectations towards the learners are responsive and actively engaged in the delivery session were supported by most experts:

"As long as they find the medium's novelty, you will get engagement from the participants."

<div align="right">Interviewee B</div>

"(new) technology is really on the fingertips…problems can be solved easily if we know how to use (the) Internet properly."

<div align="right">Interviewee C</div>

"This new technology always gives new opportunities to experience a new way of learning. For sure, the students will love it."

<div align="right">Interviewee D</div>

5. Findings and Discussions

Using the metaverse for performance has advantages and drawbacks for teachers and learners. It may consist of uncertainty for the educator as one could be unsure about what the audience or learner can hear. As using the metaverse in theory-based teaching may be less challenging, it would be more challenging for practice as one needs to learn how the controller works and the functions of the buttons, which requires time and practice. In addition, digitisation of materials such as 3D models, textures, and animations will be needed before teaching, which increases the preparation time needed to ensure the accuracy of Makyung in the metaverse realm. Nevertheless, two-way communication in the metaverse allows for immediate feedback and response, which can be valuable in various contexts, such as gaming, education, and business (DeLucia, 2021). Engaging in two-way communication within the metaverse presents several unique advantages that can enhance communication and collaboration among individuals in various settings.

Adopting VR headsets in households is still considered optional rather than necessary. The willingness to adapt to new technology is crucial, as resistance to change can lead to stagnation. However, a slow or unstable internet connection can be an issue as it may disrupt the user's experience, particularly when learning traditional arts in the metaverse. A poor internet connection can negatively impact the learning experience, making it essential to ensure stable connectivity and uninterrupted learning. Even so, the cross-platform nature of the chosen metaverse platform, with support for web, VR, and mobile devices, offers significant advantages for learning. One key advantage is providing a seamless and flexible learning

experience, where users can access the metaverse from various devices and platforms based on their preferences and needs. This allows for greater accessibility and convenience, enabling learners to participate in immersive learning experiences at their own pace and from their own devices. Additionally, the cross-platform nature of the metaverse facilitates collaboration and knowledge-sharing among learners from different backgrounds, regardless of the device or platform they are using. Furthermore, using different devices and platforms can provide learners with diverse perspectives and experiences, enhancing learning and promoting innovation. The metaverse's cross-platform nature presents several learning advantages, including accessibility, collaboration, and innovation.

Teaching traditional arts like Makyung in the metaverse can be challenging since the teacher would feel detached and unable to see students and assess their reactions, so the VR experience can feel isolating. In a dimension where people engage with one another in artificially created settings, the usage of avatars raises difficulties for onboarding and achieving the intended learning results. Users may need more motivation due to these difficulties and the novelty of the experience. On the upside, the lack of motivation can be increased by incorporating game-like aspects, such as challenges, rewards, and leaderboards, into learning sessions. Learners can receive immediate feedback, allowing them to monitor their progress and identify areas for improvement, which can enhance learning outcomes. Gamification can also help with skill acquisition by providing active learning and practice opportunities. The metaverse provides a unique platform for individualised, gamified learning experiences that cater to each learner's requirements and interests, making learning more fun and exciting. In general, gamification in the metaverse offers a potent tool for improving learner engagement.

Practical assessment for traditional performing art such as Makyung in the metaverse is almost impossible with the current technology, which still has finger tracking and room for error (Figure 13). However, theory-based teaching can incorporate assessment aspects using a customised platform and content. Participation will be maintained if individuals feel the medium to be innovative. The technology employed in the metaverse is simple to use, and proper internet usage can solve problems. Students will likely benefit from the potential for novel learning methods presented by modern technologies. Nevertheless, the critical advantage of the metaverse for learning is its low cost compared to an actual physical Makyung performance. Unlike conventional classroom-based learning, the metaverse offers a cheap substitute that can be accessed anywhere in the world, necessitating significant investment in physical infrastructure and resources. Also, due to the metaverse's scalability, it can accommodate many students at once without additional resources, making it a practical and reasonably priced method of delivering education. Additionally, without the need for costly facilities or equipment, the metaverse enables the development of immersive learning experiences that imitate real-world settings and give students practical, hands-on training. Overall, the metaverse is a desirable choice due to its cost-effective benefit if hardware limitation is not considered on the learner's end.

Figure 13. Example Of Quest 2 Controller Navigation and Hand Tracking That Allows Gestures Such As Pinching And Grabbing

6. Further Recommendations

Based on the findings of this study, it is recommended that other researchers, XR developers, and creators investigate further the advantages and limitations mentioned in this study. Specifically, avatar customisation and hand tracking for performing arts, especially of traditional art nature in the metaverse. Additionally, the results of this study can be used to direct future research in this field and to help build best practices for designing avatars that faithfully reflect various cultural backgrounds. Adding diverse representation, the metaverse can offer a more welcoming and inclusive atmosphere for students from all backgrounds. The

study also emphasises the necessity of suitable instruction and training for teachers and students to navigate remotely.

7. Conclusions

Given the challenges, metaverse platforms like Spatial.io could help deliver cultural and performing arts education in the virtual world. As a result, future studies will concentrate on developing a metaverse-based performing arts teaching and learning assessment tool framework. Concurrently, based on the findings of the study, it is recommended for metaverse platform providers, creative developers, XR content creators and metaverse worldbuilders to improve further and utilise existing metaverse features towards instilling initiatives of safeguarding localised cultural heritage practices for current and future generations. Additionally, diverse character and cosmetics personalisation that allows one to upload one's avatar would be beneficial in enhancing the sense of presence - whilst the instructional method and framework of implementation may be disclosed for reference in metaverse good practices for virtual education. Concurrently, it is proven that the metaverse is a conducive experiential learning platform in disseminating awareness and discussion, specifically among young learners, despite its challenges for educational purposes.

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