ISSN 2964-5387 (online)
Vol 1, No 2, 2022

Virtual Learning using Metaverse-based Platform

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Abstract

Metaverse is the next iteration of the internet with a network of decentralized virtual spaces where users can socialize, learn and play. In addition, people leverage other new technologies (5G, blockchain, artificial intelligence), moving from 2D graphics on flat screens to 3D graphics on HMD. Metaverse will enable the creation of interactive and virtual equivalents of the physical world that we will be able to explore via the extended reality platform. In educational institutions, the development of teaching materials is considered as one of the main aspects that will encourage student learning and help achieve academic goals and objectives. In addition, educators need to innovate education under student characteristics and technological developments.This paper aims a guide for those who want to improve themselves in developing metaverse-based teaching materials for various fields of study. Learning in multiple subjects using metaverse-based learning materials is not dull for students. By mastering this material, it is hoped that you will be able to complete work related to the development of metaverse-based teaching materials.

Keywords: learning resources, metaverse, virtual

I. Introduction

In the School of Game Development, part of the mission is to prepare students to work effectively in a collaborative environment. Because we aspire to provide students with opportunities to work with one another, many of our business courses build metaverse-based earning into their course.

Students are expected to work in a small team to complete a semester-long project. This project lends itself to a student-driven collaborative environment because of the assignment is taken from metaverse learning resources. [1] This project is broken down into three small tasks with each task taking 1-2 weeks to complete. Because the project builds on each task and knowledge gained from any task funnels into the knowledge needed to complete the next task, students tend to make communication using metaverse learning entitled Game Programming. To help our students to work effectively in this project and to prepare them to work in a contemporary programming environment where teams use technology to facilitate communication and the completion of tasks, we extended the current Metaverse-based Learning system to support the efforts of student teams [2]. This article will focus on these efforts and discuss our strategy for enhancing team effectiveness in virtual space including the development of a self and peer assessment tool used to determine the effectiveness of student teams. We will also provide advice for implementing this environment with metaverse-based space platform currently available on the web.

In the past, students relied on email to communicate with their teammates and to send each other individual work. If they needed to meet, they came to campus. There are limits and challenges to working in this manner. For instance, email is an asynchronous communication tool. Our students often send messages that are incomplete at best and confusing at worse. Because of this, email may not facilitate a common understanding

ISSN 2964-5387 (online)
Vol 1, No 2, 2022

of the theory or requirements needed to properly complete a project. In addition, there are times that team members cannot be reached and may not show up for a meeting. A student's absence may be legitimate or illegitimate but, either way, the rest of the team could find themselves empty handed, with incomplete files, or rushing to complete a team member's assigned task. We found that reliance on email and on campus meetings increased the risk of turmoil for our groups and often left students with undesirable grades.

We also found that each class would have a handful of students who did not fully participate with completing team projects [3]. Because the grades were assigned to the projects, some unscrupulous students would take advantage of the system and earn a grade that was based on their peers' efforts. If the team members were willing to speak to the teacher about such problems, faculty intervention could help. But, oftentimes, such interventions were too late; students tended to wait until the end of the semester when stress and emotions were high

II. Utilization of Technology in Education

Living up to this reputation, school systems in the 1990s and 2000s fervently adopted and integrated the latest technologies. They were from television and interactive whiteboards to the iPad and beyond. The expected measurable improvements in academic performance have not been as immediate as many had hoped. What's more, technology has repeatedly proven to be an unreliable strategy for fixing problems in education. Even more often causes new problems, especially around the issue of equity.

Undoubtedly, technology has changed how we learn, both inside and outside of school. But unfortunately, the history of technology failing to meet unreasonable expectations has been repeated so many times that researchers coined the term „rhetoric-reality gap" [4]. To illustrate this phenomenon, researchers have warned against the blind support of technology in education [5].

Sometimes unrealistic promises are made by biased stakeholders with vested interests in the success of the technology. These promises are made to increase interest in technology, then influence decision-makers about the relationship between technology and education. Once implemented at great expense in schools, teachers face an uphill battle. Many are not provided with training, or educational institutions do not acquire the technological, pedagogical, and content knowledge needed to apply technology in learning practice. [6]

For teachers, time is also not in favor of implementing new learning tools. Teachers need the necessary tools for learning. Even computers that should be indispensable in schools are not available to adapt lesson plans to accommodate new technologies. After the first implementation, the teacher needs to reflect on how things are going and start the iterative process. This process requires time that most teachers do not have, who are already burdened with a heavy teaching burden. Therefore, it is imperative that XR project managers and developers design and build their product roadmap.

III. Developing Virtual Reality Environment

To support students working in virtual space, we provided students with a custom-designed virtual space on SPATIAL network [7]. This space is public; all visitors can accessed the document, communicate or activities. As an additional benefit, secluding the virtual workspace in this way allows students the ability to work without interruptions, advertisements, and virtual noise. To accomplish this goal, we were able to enhance our learning resources to support our ideas on how to support effective teamwork in a virtual space. The following diagram depicts the virtual team environment we developed.

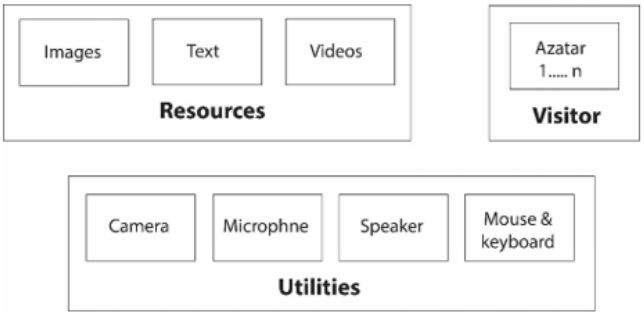

Figure 1. The Virtual Learning Platform

Our virtual leaning system provides a modular environment that allows faculty members to select

ISSN 2964-5387 (online)
Vol 1, No 2, 2022

a variety of tools based upon the specific goals of a team. We decided to utilize a combination of tools that we identified as being critical elements in an online virtual team experience. The virtual environment has a peer and self-assessment tool that is used to evaluate student performance periodically during the semester.

Within the team space, we provide students with the ability to upload documents that the team needs to work on using the metaverse space, and of course add the label. It can be the PDF documents.

Students need to be instructed on the proper administration of virtual learning environment. If not, they tend to post all documents to one area causing clutter and losing the richness of the system. We've seen students struggling with identifying the document that they either need to submit or obtain advice on. On the positive side, we've also witnessed students begin to understand the need for documentation, versioning, file organization, and uploading the correct one.

IV. Discussion

Through the course administrator module, we can also discover the level of participation of all team members by reviewing team statistics, such as the number of visit per student, activity within each module, as well as the amount of time spent on a particular task. This analysis tools allows us to spot problems in teams and address them before they become problematic.

The discussion module allows students to post messages and files to a shared group space. The board is organized by thread and date, and can be moderated by the instructor of a class. This module works well in situations where a quick and simple common space is needed to share ideas.

After some discussion, we decided to provide students with the discussion board tools in order to allow them to leave messages, instructions, links, and resources for their fellow team members. They tend to focus on earning high grades and are not as intellectual stimulated as compared to students observed in other programs across campus.

We have seen how the metaverse can benefit a business. There is no doubt that the metaverse can also help the eLearning industry.

1. Better eLearning by Leveraging the Virtual World

A student enjoys learning more with a smartphone than with a book in modern times. Metaverse apps can create virtual spaces for students where they can walk, take notes, and communicate with other students, changing the eLearning industry. They can also play games in a virtual world similar to reality. In addition, with the developed application, students can change clothes, hairstyles, and expressions, with various options available.

2. Better Illustration by Leveraging the Virtual World

Instructors often use videos but cannot present proper illustrations of real-life objects through the videos. With technology like AR, instructors can show these illustrations effectively to their students. For example, if a teacher wants to demonstrate car parts, they can use a holographic app to mirror 3D images. Students will better understand scientific experiments, physics, and mathematics.

3. Better Parent-Teacher Interaction

Metaverse can help parents with their child's performance in school. Parents can attend students' classes and see clearly the quality of education offered at the institution. With virtual reality applications, parents can also interact with teachers from remote places and see the quality of the games their children are playing. Similarly, parents can also arrange regular meetings with teachers and plan better eLearning for their children.

XR has several limitations in achieving particular learning objectives, namely:

1. Cognitive Load: XR experiences provide students with a wealth of visual and auditory stimuli that can increase their cognitive load as they process what they see, hear, and read. It may explain the varying learning outcomes with immersive technology regarding what content knowledge is retained. More is needed to understand the optimal learning methods in XR to maximize student understanding and how best to integrate them into learning designs in other materials such as books, slides, and modules.

ISSN 2964-5387 (online)
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2. Time Limitation: The HMD used for VR and MR can make people uncomfortable or nauseous in just 10-15 minutes, with worsening effects during long exposures. It suggests that VR and MR are best used in small doses rather than as instructional modes for whole lessons. Other technologies such as mobile-based AR and computer applications may be more suitable for long-term interventions.

3. Accessibility: The current XR technology is not easy to use for many people. For example, someone with limited mobility in their hands may have difficulty using the controller. Even something as mundane as wearing glasses can make using an HMD difficult. In addition, some technologies are not equally accessible to people from different backgrounds and identities.

4. Affordability: XR technology remains more expensive than other learning resources such as computers and books and often requires a high-speed internet connection. In addition, content is also more expensive to create due to the need for specialized equipment and skills to develop the interactive virtual environment necessary for effective learning.

5. Lack of Educational Content: There are not many learning programs, nor is there a platform that makes it easy to find content based on learning objectives, the field of study, or age group. In addition, few educators have the ability or capacity to create their own XR learning materials, let alone provide students with information on how to make them.

6. Privacy and Security: XR technology was developed by a company whose business model relies on the collection of increasingly detailed and extensive data on each user. XR technology has the potential to track people's movements and emotions, which could reveal sensitive and private information about them.

7. Difficult to Assess Learning: XR can provide a more individualized and unstructured learning experience and is well suited to teaching skills, competencies, beliefs, and attitudes that may not be captured by multiple choice learning assessments. And while XR offers the possibility of collecting various forms of user data (e.g., movement, eye tracking), this data has not yet been translated into meaningful learning assessments.

IV. Conclusion

We have seen how the metaverse can benefit a business. There is no doubt that the metaverse can also help the eLearning industry: 1) Better eLearning by Leveraging the Virtual World. A student enjoys learning more with a smartphone than with a book in modern times. Metaverse apps can create virtual spaces for students where they can walk, take notes, and communicate with other students, changing the eLearning industry; 2) Better Illustration by Leveraging the Virtual World. Instructors often use videos but cannot present proper illustrations of real-life objects through the videos. With technology like AR, instructors can show these illustrations effectively to their students; and 3) Better Parent-Teacher Interaction, that metaverse can help parents with their child's performance in school. Parents can attend students' classes and see clearly the quality of education offered at the institution.

References

[1] M. Damar, "Metaverse Shape of Your Life for Future : A bibliometric snapshot," no. November, 2021.

[2] D. Pimentel, G. Fauville, E. McGivney, S. Rosas, and E. Woolsey, "Learning in the Metaverse : A Guide for Practitioners TO LEARNING IN THE," no. May, 2022.

[3] A. H. Sutopo, Qualitative Analysis using NVivo Open-ended Surveys on Basic Literacy. Jakarta: Topazart, 2022.

[4] M. Sanders and A. George, "Viewing the changing world of educational technology from a different perspective: Present realities, past lessons, and future possibilities," Educ. Inf. Technol., vol. 22, no. 6, pp. 2915–2933, 2017, doi: 10.1007/s10639-017-9604-3.

[5] R. Säljö, "Digital tools and challenges to institutional traditions of learning : Technologies, social memory and the performative nature of learning.," J. Comput. Assist. Learn., no. 26, pp. 53–64, 2010, doi: 10.1111/ j.1365- 2729.2009.00341.x.

[6] M. J. Koehler and P. Mishra, "What is technological pedagogical content knowledge?," CITE J., vol. 9, no. 1, pp. 60–70, 2009.

[7] Spatial, "Explore the Metaverse," Spatial, 2021. Explore the Metaverse (accessed Feb. 06, 2022).

ISSN 2964-5387 (online)
Vol 1, No 2, 2022

[8] D. Štreimikienė, A. Mikalauskienė, U. Sturienė, and G. L. Kyriakopoulos, "The impact of social media on sales promotion in entertainment companies," E a M Ekon. a Manag., vol. 24, no. 2, pp. 189–206, 2021, doi: 10.15240/tul/001/2021-2-012.