Shih, JL. et al. (Eds.) (2023). Proceedings of the 31st International Conference on Computers in Education. Asia-Pacific Society for Computers in Education

The Impact of Metaverse Worlds on International Collaborative Learning for Cross-Cultural Understanding

Masako HAYASHI[a*], Takehiro SUZUKI[a], Yuki KAWATA[a] & Keisuke GOTO[a]
[a]*Tohoku University, JAPAN*
*masako.hayashi.c5@tohoku.ac.jp

Abstract: We examine factors that influence the students' memorability of the presentations given in the Metaverse International collaborative learning class, where students work in groups to give presentations to promote cross-cultural understanding. The results show that the students chose the presentation of the group using Metaverse World as the most memorable, with the "Metaverse World" being the reason.

Keywords: Metaverse Worlds, International Collaborative Learning, Cross-Cultural Understanding, Collaborative Presentation

1. Introduction

In the 'Metaverse International Collaborative Learning with Overseas Partner Universities' class, a collaborative presentation was given for the purpose of cross-cultural understanding. In this class, students from partner universities abroad, domestic and international students in Japan work together in a mixed environment of students from different cultural backgrounds. The introduction of the Metaverse in the HyFlex class format has improved various issues (Hayashi et al., 2022).

Through observing students in their cross-cultural understanding studies using the Metaverse, we thought that the worlds in the Metaverse might be useful to foster a deeper cultural understanding. These worlds can be freely created and edited, and they allow for a variety of experiences through the objects, functions, and sounds in the world, compared to simply viewing slides.

Therefore, we set a research question, "What influences the memorability of the presentations for the students who listen?" To answer this research question, we compared monomedia and multimedia such as metaverse worlds, VR videos, 2D videos, and images to determine what learning content was memorable for the students. This allowed us to understand how differences in the learning environment affected the students' learning.

2. Comparison of this study to previous studies

There is a study about cultural understanding in which students from three countries learn about Japanese culture in a metaverse (Inaba et al., 2023). Another example includes Shadiev et al. (2021), which is a study of cross-cultural understanding using VR.

However, to the best of our knowledge, there are no previous studies in which students from many different countries created their own worlds for the purpose of cross-cultural understanding, as in this study. Students used these worlds and VR movies to introduce their own culture and other cultures in an international collaborative presentation.

3. Research Methods

In the first semester of 2023, about 40 students (17 Domestic students, 13 international students, 10 overseas students) from 15 countries participated in the Intercultural

Collaborative Learning class. Overseas students are students from cooperating schools in Kenya, Indonesia, Belgium, etc., who participated mainly through Metaverse while still living in their own countries. In mixed groups of students from Japan and abroad, students give international collaborative presentations. In addition to explanations on slides, students introduce aspects of their culture by creating a world in the Metaverse, or by projecting a VR video of their own creation. The Metaverse platform used in this study is VRChat. At the beginning of the class, most students had no experience with the metaverse. In the first half of the class, the learners were divided into six groups according to their choice of the theme of the presentations, which introduce Japanese culture in comparison with other cultures around the world.

After the presentation, a report assignment was given, stating "Please list the three most memorable presentations. Write what was memorable and explain why." Of the 40 students, 24 submitted their reports by the due date, making this a valid response. First, in response to the question "Please list the three most memorable presentations," the votes received by each group were divided into two groups: the most memorable group and the first to third most memorable groups. Next, the comments were analyzed quantitatively for the question "Write what was memorable and explain why." In doing so, we divided the comments into three categories: monomedia represented by textual information, multimedia other than textual information, and others not belonging to these two categories. Furthermore, multimedia was divided into four categories: images, 2D videos, VR videos, and Metaverse worlds. The number of classmates who cited each media as a reason for their memorability was tabulated. If more than one media was mentioned in one person's memorability, scores were given to each of those media. Three of the four authors tabulated the results individually, and the four of us discussed the different results at a later date.

4. Result

Figure 1 shows the results of the ranking of the most memorable groups after the class. Group 1 and Group 6 created and used Metaverse worlds for their presentations, while the remaining groups used VR videos. Table 1 summarizes the reasons why the presentations were memorable, given in the comments, per attribute.

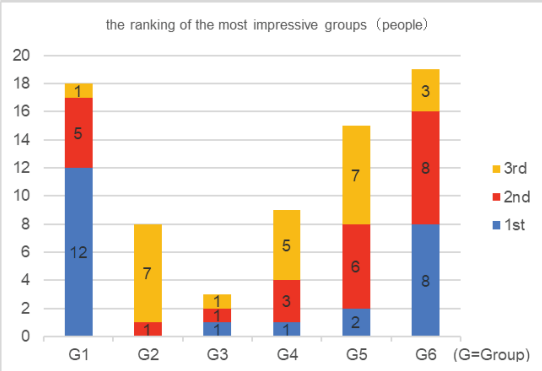

Figure 1. Ranking of the most memorable groups（number of people）

Table1. The reasons why the presentations were memorable

	monomedia	multimedia				Others
		Images	2D videos	VR videos	Metaverse World	
1st	8	1	6	0	18	3
2nd	13	1	0	3	12	1
3rd	14	2	0	7	2	7
total	35	4	6	10	32	11
		52				

As illustrated in Figure 1, the two groups that created and used Metaverse worlds for their presentations (Group 1 and Group 6) received 12 and 8 votes, respectively, in the most memorable group category. The average number of votes received by the other four groups, that did not create Metaverse worlds, was one vote. Of these groups, even the most memorable group, Group 5, received only 2 votes. This shows there is a significant difference between groups which did create Metaverse worlds and those which did not. In addition, for the combined results of the three most memorable groups, Group 1 and Group 6 were again the highest, with 19 votes and 18 votes, respectively. The other four groups that did not create a Metaverse received an average of 8.75 votes.

As shown in Table 1, from the comments describing the reasons why each group was memorable, many of the comments cited the presenting group's own Metaverse world

as the reason. 18 comments, the largest number for the most memorable group, cited the Metaverse world as the reason the presentation was memorable, while 8 comments cited monomedia as the reason it was memorable.

5. Discussion

The most common reason given for the top three most memorable groups was multimedia (52 comments), followed by monomedia (35 comments). In the four categories of multimedia, Metaverse world received the highest number of comments (32 comments), followed by VR videos (10 comments).

Thus, it was found that the groups that used the Metaverse worlds for their presentations were more likely to leave a lasting memorability on their classmates. In addition, many of the comments below indicate that the creation and use of Metaverse worlds in accordance with the content of the presentation deepened the cross-cultural understanding. The use of multimedia was more memorable than monomedia. In international collaborative learning where there is a language barrier, multimedia may be more helpful for learners to understand than text alone.

A degree of active experience was consistent with higher learners' ratings of memorability. Among the types of multimedia, the metaverse world allows learners the most active experience. While VR videos are superior to 2D videos in that the viewpoint can be selected independently, they are still more passive than the metaverse world. Furthermore, images, which offer a passive experience, were rated lowest.

6. Conclusion

In this study, where students gave international collaborative presentations, the groups that created and used Metaverse worlds occupied the first and second most memorable positions. In addition, of the reasons for being most memorable, the number one commented reason was the Metaverse world.

The Ministry of Education, Culture, Sports, Science and Technology (MEXT) issued "Guidelines for the Implementation of Distance Education at Universities and Colleges of Technology," in which it recommends the "Introduction of Metaverse." The method used in this study, which has a major development compared to Hayashi et al. (2022), utilizes Metaverse not only as a tool for communication, but also as a tool for students to learn about cultural understanding. This study demonstrates that the use of Metaverse worlds in presentation has an impact on student’s memorability. The results obtained in this study contribute to the development of research studies on distance education using Metaverse.

Acknowledgements

This research was supported in part by a grant from the Takahashi Foundation for Industrial and Economic Research, the Center for Knowledge Creation, Tohoku University Research Promotion and Support Organization, and by a joint project research by the Research Institute of Electrical Communication, Tohoku University.

References

Hayashi, M., Yoshida, H., Maruyama, N., & Suzuki, T. (2022). Advantages and Challenges of Intercultural Collaborative Learning Using Metaverse. Annual Report of Center for Language and Culture Education. Tohoku University, 78-86.

Inaba, M., Hosoi, K., Thawonmas, R., Nakamura, A., Uemura, M. (2023). Research on Supporting Japanese Culture Learning Mediated by "Play" on Metaverse. Replaying Japan, 5, 27-33.

Shadiev, R., Wang, X., & Huang, Y. (2021). Cross-cultural learning in virtual reality environment: facilitating cross-cultural understanding, trait emotional intelligence, and sense of presence. Educational Technology Research and Development 69(5), 2917-2936.