

Boosting students' motivation for cultural sensitivity via the use of Metaverse in flipped classrooms

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How to cite: Chu, KMC.; Zhou, L.; Mark, KP., Wong, C-M., Chu, K-Y. (2025). Boosting students' motivation for cultural sensitivity via the use of Metaverse in flipped classrooms. In: 11th International Conference on Higher Education Advances (HEAd'25). Valencia, 17-20 June 2025. <https://doi.org/10.4995/HEAd25.2025.20131>

Abstract

Cultural sensitivity, the ability to interact with diverse cultural backgrounds, is often developed through experiential learning, such as service-learning. Flipped learning involves students reviewing theoretical information before practicing skills in class. Undergraduate students increasingly consist of Generation Z, whose growing environment filled with technology, prefer active online learning. This study examined the use of the Metaverse as a flipped learning approach to enhance undergraduate students' cultural sensitivity. Twenty-two undergraduates used the Metaverse to learn about ethnic minorities and engage in interactive activities before designing service projects. Questionnaires were used to gather their insights on this experience. Results indicated high satisfaction with the Metaverse, as it enhanced their understanding of ethnic minorities and offered reflection opportunities. Interactive activities and the design of virtual environment (e.g., tasks-oriented) in the Metaverse were key factors in motivating students to develop cultural sensitivity through peer collaborations. These findings offer valuable insights for educators on optimising Metaverse design.

Keywords: *The Metaverse; flipped learning; cultural sensitivity; service learning.*

1. Introduction

Cultural sensitivity, defined as the ability to interact appropriately with people from diverse cultural backgrounds (Brook et al., 2019), is built on cultural competence and is mainly accumulated through practical experiences (Laszloffy & Habekost, 2010). Undergraduate students are increasingly made up of Generation Z, which refers to individuals born between 1995 and 2010, have grown up surrounded by technology (e.g., the Internet). They prefer active roles in online learning environments (Anastasiadis et al., 2018), making lesson designs aimed at enhancing their learning motivation more challenging.

The flipped classroom approach, where students review teaching materials (e.g., videos) before attending face-to-face classes for hands-on practice, has gained popularity in higher education in recent years (Divjak et al., 2022). Research indicates that this approach enhances students' critical thinking and problem-solving skills, essential for addressing 21st-century global challenges (Zhao et al., 2021). However, it relies heavily on technology (Tomas et al., 2019), which is crucial for students' motivation, engagement and satisfaction (Wang & Zhu, 2019). A recent review from Baig and Yadegaridehkordi in 2023 highlighted the common technology tools used in flipped classrooms, such as learning management systems (e.g., Blackboard), video creation tools (e.g., YouTube), and collaboration platforms (e.g., Google Drive), only allow one-way interactions. Of note, such limitation would reduce students' interest and motivation, further hindering their ability to apply learned knowledge in face-to-face classes.

The Metaverse, a virtual three-dimensional (3D) world (Alpala et al., 2022), offers a solution by enabling continuous real-world interactions and cultural exchanges (Lee & Hwang, 2022). Known as the Educational Metaverse, its use in education has become a significant topic of interest (Camilleri, 2023). Within the Metaverse, students can interact and collaborate with peers and teachers through their chosen avatars, engaging with teaching materials in a dynamic 3D environment. A recent study from Hwang and colleagues in 2023 has shown that adopting the Metaverse can enhance students' motivation and interest, promoting autonomous learning as a lifelong learner.

By integrating the Metaverse as a flipped classroom, we can create a more interactive and engaging learning experience. This approach not only addresses the technological preferences of Generation Z students, but also enhances their motivation of being culturally sensitive, further preparing them to interact with people from diverse cultural background in various settings (e.g., workplace). While the Metaverse's immersive capabilities offer a promising avenue for fostering students' deeper cultural understanding and engagement, however, as suggested by López-Belmonte et al. (2023), the use of the Metaverse in education is still in its infancy, therefore more research should be conducted to assess its impacts on students' learning.

The present study aimed to explore students' experience using the Metaverse in a flipped classroom. To achieve this, we conducted a survey on undergraduate students enrolled in a service-learning course at a local university in Hong Kong. Service-learning involves students in designing and delivering community-based service activities to enhance their academic skills and civic responsibility (Naudé, 2011). These students needed to have a good understanding of ethnic minorities before designing service activities for a partnered secondary school with ethnic minority students.

2. Methods

This study was conducted in the fall semester of the 2024/25 academic year and included a total of 22 undergraduate students from a local university in Hong Kong enrolled in a service-learning course focused on promoting child and adolescent development. Given that our partnered secondary school consists of ethnic minorities, it is crucial for the undergraduate students (acting as service providers) to be culturally sensitive when planning and executing service activities.

To enhance their understanding of ethnic minorities in Hong Kong, students were invited to join Frame VR (a Metaverse platform that requires no downloads or installations) to learn the background information about ethnic minorities as part of the e-learning module, using a flipped classroom approach.

In Frame VR, the virtual space is divided into four areas. Students first gathered in the “Welcome Area” to be greeted by the teacher and sign a virtual whiteboard, enhancing platform familiarity and engagement. They then spent 20 minutes in the “Exhibition Area” exploring information on ethnic minorities’ daily challenges (e.g., language barriers) and relevant ordinances (e.g., the Race Discrimination Ordinance) through group discussions with peers and the teacher via their chosen avatars.

After learning about ethnic minorities, students entered individual rooms for interactive activities. Each room provided background information on the partnered school (e.g., ethnicity percentages). Each room featured virtual whiteboards for students to jot down thoughts and virtual posters linking to Padlet boards. In Padlet, guiding questions assisted students brainstorm ideas for suitable service activities for their service targets.

After the interactive activities, students completed a survey on the Qualtrics platform in the “Evaluation Area”, achieving a 100% response rate. The survey included 8 statements on a 5-point Likert scale (1=Strongly Disagree to 5= Strongly Agree), assessing their opinions on using the Metaverse for learning about ethnic minorities. Two open-ended questions were also included for additional insights. A week later, students visited the school to interact with service targets in real life settings and began designing service activities with their university teacher in subsequent face-to-face workshops.

3. Results and Discussion

Overall, students’ responses regarding their experience with the adoption of the Metaverse as a flipped learning approach were very positive, with a strongly agreement and agreement percentages of approximately 72% for all questions (Table 1). Our students reported not only being satisfied with using the Metaverse to learn about ethnic minorities but also being willing to recommend the E-learning module to others. This finding aligns with Elliott and Shin (2002),

showing students' satisfaction crucially influence their willingness to recommend courses, with peer influence significantly impacting learning motivation (Admed et al., 2024).

Table 1. Student responses on Metaverse as flipped classroom approach.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
This E-learning module enhanced my knowledge of the ethnic minorities in Hong Kong	27.3%	54.5%	4.5%	9.1%	4.5%
This E-learning module promoted my understanding of the needs of the service targets	36.4%	50.0%	0%	13.6%	0%
This E-learning was relevant to what I might be expected to do when conducting service activities	22.7%	59.1%	13.6%	4.5%	0%
This E-learning module provided content that is relevant to my role in conducting service activities	31.8%	50.0%	4.5%	9.1%	4.5%
The use of Metaverse in this E-learning module enhanced my motivation to learn more about the ethnic minorities in local communities	40.9%	31.8%	9.1%	13.6%	4.5%
I would be more motivated to participate this E-learning module if more people joining me simultaneously	27.3%	50.0%	13.6%	4.5%	4.5%
I was satisfied with this E-learning module overall	40.9%	40.9%	9.1%	4.5%	4.5%
I would recommend this E-learning module to others	22.7%	59.1%	13.6%	0%	4.5%

3.1. Unveiling the Positive Aspects: Students Embrace the Metaverse

Two open-ended questions gathered students' insights on the Metaverse's strengths and weaknesses for flipped learning. Students reported that the Metaverse enhanced their understanding of ethnic minorities' daily challenges and provided them with an interactive platform for brainstorming and reflections with their peers about ways to coexist with ethnic minorities in local communities. This aligns with service-learning goals in university education, which aim to deepen students' understanding of curriculum-community connections, as well as fostering personal growth and social responsibilities through service experience reflections (Naudé, 2011).

The Metaverse's immersive capabilities, presenting information in various formats (e.g., texts, images and videos), engaged students by allowing them to navigate freely with chosen avatars. Key motivators included peer and teacher interactions with instant feedback, which foster active learning through group brainstorming, is crucial in flipped classroom (Thai et al., 2024). Unlike other tools like Blackboard, the Metaverse uniquely offers simultaneous bi-directional interactions with instant feedback (Baig & Yadegaridehkordi, 2023). Most students reported increased motivation to learn about ethnic minorities, enhanced by collaborative learning in Frame VR. Motivation and willingness to learn about cultural diversity are vital for developing cultural sensitivity (Alizadeh & Chavan, 2016).

The Metaverse's layout of information motivated students by offering a task-orientated learning environment. Student first learned theoretical background on cultural sensitivity and ethnic minorities before engaging in interactive activities. This layout provided two benefits: it helped students understand service targets' needs and teachers' expectations, forming a foundation for designing suitable service activities in face-to-face lessons. Additionally, service-learning courses emphasise experiential learning, where cultural sensitivity is developed through practical experiences (Laszloffy & Habekost, 2010). Thus, using the Metaverse in flipped learning can enhance students' cultural sensitivity.

3.2. Students' Concerns: Addressing the Flaws

Although the Metaverse allows users to navigate virtual environments freely with their chosen avatars, its resemblance to real-life settings can cause inconvenience. For example, students reported being blocked from reading information posted in the virtual environment when others moved in front of them unexpectedly. Additionally, the text size should be larger to ensure readability from a distance.

This study has several limitations. Firstly, the findings are limited to one university in Hong Kong and may not be generalisable to other institutions or educational settings. The small participants number, despite a 100% response rate, limits generalisability, particularly without mathematical justification for conclusions. Secondly, the analysis lacks sociodemographic

information (e.g., gender and academic discipline), which could hinder our understanding of how these factors influence the Metaverse's impacts as a flipped classroom tool. Thirdly, the study focuses solely on students' experiences with the Metaverse, neglecting their digital competence. Students' prior Metaverse exposure (e.g., online gaming) can influence their perception of it as a learning tool (Sezer & Gül, 2024). Future research should involve a larger, more diverse sample, along with examinations of their digital competence and prior Metaverse exposure.

4. Conclusion

Flipped learning encourages students to review materials before class practice, but traditional tools (e.g., YouTube) often lack interaction, reducing motivation. This study explored the Metaverse's impacts on Generation Z undergraduates' motivation to develop cultural sensitivity. These tech-savvy students found it effective for learning about ethnic minorities. The immersive environment fostered cultural sensitivity and reflection, aligning with service-learning goals. Interactive activities enhanced motivation through collaboration, despite real-life-like navigation issues. Enlarging font sizes can improve readability.

Acknowledgements

This study is supported by the Hong Kong Polytechnic University Departmental Learning and Teaching Grant (DLTG) and Fund for Innovative Technology-in-Education (FITE/01) (FITE/04/FHSS).

Ethical Approval

This study (HSEARS20250221002) was approved by the institutional review board of the Hong Kong Polytechnic University.

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