Robotics & AI Ethics

Multicultural Education of South Korea through the VIRTUAL REALITY

Seongran Ha¹
Dongguk University, Seoul, Republic of Korea

Gyunyeol Park²*
Gyeongsang National University, Jinju, Republic of Korea

Abstract

Purpose: The framework of online education is evolving from e-learning to XR-learning. As expectations for the educational effect and market growth of reality contents increase, the South Korean government has established related education policies and is making intensive investments. Generation C, Z, and Alpha learners, Digital Natives, are quickly responding and adapting to the concept of Metaverse. Thus, this study suggests the need for the transition of multicultural education in line with the changes in social, educational technology, and intends to present a rough direction of multicultural education.

Method: This study used the approach of literature review and document analysis. The results of this study should be supplemented by quantitative and qualitative studies in the future. For a literature-oriented approach, refer to the government agencies’ presentation materials and academic studies. Document survey is mainly related to cyber education materials presented on the Internet and various resources.

Results: This study presented three ways of multicultural education using VR: First, 'Korean Culture Experience Program' offering experience of traditional Korean culture or historical facts; Second, 'Korean Life Adaptation Program' to settle down in Korean life including markets, banks, or community service centers; Third, 'education program for multicultural understanding and sensitivity' providing virtual cases of language barrier, social exclusion, and discrimination. In reality, there are still problems that require a lot of investment in content formulation, equipment purchase, maintenance, etc., and securing quality of content and finding suitable education methods.

Conclusion: This study aims to present the direction of multicultural education in Korea using the virtual reality. Producing feasible contents needs expensive and very complicated procedures. This study proposes a basic concept how multicultural education in Korean society can be made in virtual space. These VR contents have the advantage of being able to be an education suitable for the actual environment because they have the advantage of allowing learners to experience and discuss directly in virtual spaces. To this end, there remain challenges to overcome both ethical issues and budget problems of developing high-level contents.

[Keywords] Online Education, E-Learning, XR-Learning, Metaverse, Multicultural Education

1. Introduction

In 2019, the Korean government announced the ‘5G+ strategy to realize innovative growth’[1]. Realistic Content was selected as one of the 10 core industries in this announcement. These Realistic Content is a type of content based on ICT that stimulates human sensory organs and cognitive abilities, allowing them to feel the experiences and sensibilities similar to realities. That is, it is collectively referred to as various visual processing and representation techniques such as Augmented Reality(AR), Virtuality Reality(AR), Mixed Reality(MR), and Hologram.

Realistic content is also being paid attention to in the field of education. The Ministry of Education and the Ministry of Science and ICT are establishing and implementing realistic education policies in
elementary, middle, and high school curriculum with expectations for the effectiveness and market growth of realistic educational content. This is because Realistic Content has the advantage of encouraging learners to immerse them in their learning content, induce them to be proactive, and enhance their educational effectiveness by embodying the learning content [2][3][4][5][6][7][8].

Meanwhile, users of the Metaverse platform, so-called the 'Next-Generation Internet, continue to grow. As of January 2021, Roblox's monthly number of users exceeded 190 million, with 67 percent of the users are under the age of 16. FORTNITE has 350 million global users, and the global number of GEPPETTO users has surpassed 200 million, of which about 80% are teenagers [9]. What is important fact is that Digital Natives, named as Generation C, Z, and Alpha, familiar with digital technology, are rapidly establishing the dominance of the Metaverse.

Furthermore, COVID-19 is worsening people's face-to-face contact, there is a movement to use Metaverse in education. Sonchunhyang Univ, Soongsil Univ., and Kongkuk Univ. hosted entrance ceremony and orientation for freshmen, festivals, and lectures on Metaverse. The Busan Metropolitan City Office of Education has signed a business agreement with Unity to "build a metaverse-based artificial intelligence and data education ecosystem" [10]. CMSEDU jointly launched 'codeAlive', a metaverse coding training platform, with Unity.

As such, learners are changing and educational skills are progressing. Current and future learners value fun and communication, are more familiar with visual stimuli than text, are more familiar with digital culture, and are quickly adapting to technology and digital environment. Educational institutions and businesses are rapidly changing the framework of education in line with contemporary trends. In other words, the education system is evolving beyond e-learning to XR-learning utilizing AI and Realistic Contents.

In response to these educational innovations, the multicultural education also requests the development of various educational methods. Unfortunately, Realistic Contents for multicultural education is not well conducted. Until now we could find out two researches: one is a study on the effect of art appreciation class using virtual reality on learners' multicultural acceptance [11] and another is a study on the implementation of a virtual reality-based cognitive behavioral therapy program for trauma intervention in the multicultural youth [12], etc. The former was based on their high content system and achievement standards and, according to the National Curriculum 2015 revision of teaching and learning and design conducted over the actual class and youth cultural soluble scale strip (KMCI-A) for the use of the diversity, relationships, universality, etc. And the latter showed the significant results by measuring the multicultural acceptability. It was on implementing the therapy for trauma experienced persons. And it showed the 8 steps scenario. These studies are expected to be applied directly to the field to produce significant effects. We are waiting for this kinds of further researches. Therefore, this study intends to lay the foundation for future research by presenting a feasible type of realistic content that can be applied to multicultural education.

2. Necessity to Utilize Virtual Reality for Multicultural Education

According to Edgar Dale [13], observational learning of visual phase (indirect symbols) is more effective for memory than linguistic or visual materials. Likewise, behavioral phase (direct experience) using purposive experience is even more effective for memory than the indirect method [14].

Current and future learners, so-called Gen C-Z-Alpha, have been exposed to the digital environment from their early age, are familiar with the Internet and IT technology, utilize laptop, tablet, smartphone, and they are very sensitive to new technologies. In particular, they tend to prefer audiovisual stimulation such as voice, image, and video content over text. However, it is difficult for them to concentrate on the contents when there is no interest or fun due to low concentration capacity. As such, it is difficult for them to achieve learning objectives by acquiring knowledge based on text.
In order to educate these learners and to enhance the learning effectiveness, learners need to be able to immerse themselves by doing their activities while still containing interest and fun and to acquire knowledge through their immersion. Realistic Contents including VR might satisfy the needs.

Meanwhile, it is very important to increase the acceptability of multiculturalism in multicultural education and to eliminate prejudice, prejudice, and negative perceptions. While it is important for learners to be educated in understanding and communication between cultures to solve cultural conflicts, it is also crucial to be exposed to multicultural situations directly to experience, feel, and empathize with them so that they can embody their learning.

Adolescents, the main learners, are heavily influenced by their parents and peers, both culturally and emotionally. Therefore, even if you have been educated about understanding and communication between cultures, if they learn only abstract knowledge, they are likely to forget or ignore the contents of the learning due to their surrounding environment. Therefore, education should consist of contents and methods that can be assimilated on the basis of knowledge and practical experience, and should be consistent and repetitive.

However, it is very difficult for learners to experience various situations in real life. In islands or mountainous areas, it is very difficult to prepare or experience the multicultural situations that teachers want to hypothesize. Even if there is an opportunity, it is difficult to expect continuous effects because it sometimes ends with a one-off experience. Moreover, it is even more difficult to create conditions optimized for the purpose of education and to control the process of training.

Therefore, it is necessary to use virtual reality to enhance the effectiveness of education and to solve the practical problems of multicultural education.

Virtual reality is a technology that allows participants to recognize, experience, and interact with digital spaces, environments, and situations that are artificially created as if they were real experience of five senses. It allows participants to view, manipulate, and recognize situations or environments that are difficult to experience in their daily lives as if they were in that situation or environment without having to face them directly. In other words, virtual reality makes it possible to understand and acquire meanings through experience of seeing, hearing, and feeling, rather than understanding and realizing meanings by interpreting language or visual symbols.

Virtual reality is 100% imagination and fiction, however, it allows the participant feels like interacting with the situation or person in virtual reality by capturing the participant’s senses. In addition, virtual reality prevents humans from distinguishing between the self of reality and the virtual self by intercepting the proprioception which is an ability to recognize their bodies. As a result, participants can acquire embodied knowledge rather than externally injected learning.

3. Ways to Use Virtual Reality in Multicultural Education

3.1. Korean culture experience program

This is a way to increase understanding of culture by experiencing culture directly through virtual reality. Currently, museums and exhibition halls embody relics and spaces as well as traditional events and games using virtual reality or augmented reality. In other words, it implements virtual reality or augmented reality in which participants experience the process of reenacting events or games that cannot be made due to environmental, materials, tools, etc.

For example, you can experience spaces such as Gyoungbogung Palace, Seokuram Grotto, Goguryeo Mural Tomb, Former Seodaemun Prison, Geumgangsan Mountain, or Kite Flying, Chajeon Nori(Chariot Battle), Pungmul-Nori. In addition, historical events such as Imjin War and the Korean War(June 25, 1950) can be reproduced as virtual reality to make it more vivid.
If this content is shared online and can be experienced virtually at school and at home, it can be more vividly experienced and understood than if it is learned through pictures, photos or videos, and VR, AR programs would be very effective in achieving educational goals.

3.2. Korea life adaptation program

Even if immigrants, intermediate immigrants, and foreigners learn Korean grammatically through school, language school, and online learning, it is very difficult to apply what they have learned in everyday life. Even if the classroom creates simulated situations or environments such as markets, banks, and community service centers, it is difficult to provide on-site education. Difficulties at these sites can be supplemented using virtual reality. By experiencing a system or culture that need to be known to adapt to Korean society in advance, one can relieve anxiety about social adaptation and settlement.

For example, an immigrant can experience situations such as using ATM devices or opening bank accounts and exchanging money at banks through virtual reality. In the case of immigrant women, banking is difficult and it hinders them to become economically independent. If they can experience essential situations of life in Korea through virtual reality, they can relieve these difficulties or fears of social adaptation.

The experience of Korean language and Korean life using virtual reality will be very effective not only for multicultural education, but also for foreigners to learn Korean culture even when they stay in their own countries.

3.3. Education to improve multicultural understanding and acceptability

The ultimate expectation that people have in virtual reality is an 'empathic machine'. Participants in virtual reality observe, manipulate, and talk with people from the 'first person perspective'. At that time, if people gets immersed in virtual reality and feel as if they exist in virtual reality, they may realize the different point of existence. By doing so, they will experience the
experiences of others that they have not experienced in real life through the virtual reality environment. Then people can better understand the situation of others, and more likely to participate in pro-social activities that help others.

Experiments to demonstrate the effectiveness of this virtual reality are already underway. Sun Joo Ahn experimented with red-green blindness in virtual reality situations[21], and Stanford Univ's Virtual Human Interaction Lab experimented with watching VR <Becoming Homeless> for seven minutes[22][23]. As a result, it was found that in real-life situations, the participants tend to help the blind and homeless more eagerly. VR experiments changed people’s attitudes and behaviors in a positive way.

Using these characteristics of virtual reality, two ways of multicultural education will be possible. First, an education program to be familiar with multicultural situations and foreigners. Learners who have not experienced foreigners or multicultural situations tend to have fear or curiosity toward them. Or sometimes, if they don’t have a positive interaction, they will form a negative perception. Such case of virtual reality can help them to overcome the negative perception or fear by creating opportunities to contact and interact with them.

Second, an education program could be created through virtual reality to understand the minorities of disability, foreign language, social exclusion, discriminatory remarks and prejudices. For example, Cyberball(ball-tossing game) experimented by psychologist Kipling D Williams could be used. This Cyberball is a situation game that three people play a ball; at first, three people play the ball fairly, but at some point, only two people exchange the ball and do not throw a ball at the third person. Those who do not receive the ball touch will experience bullying or alienation. That experiment could be carried out in real life, but it can improve multicultural understanding and acceptability by allowing avatars of various ethnicities and genders to be set up in virtual spaces <Figure 5>.

**Figure 5. Empathy education by VR(becoming homeless)[24].**

### 4. Conclusion

The government has selected virtual reality and other realistic contents as the top 10 core industries, and has established related education policies and intensive investments in anticipation of the effectiveness of educational contents and market growth. Generation C, Z, and Alpha learners, Digital Natives, are quickly responding and adapting to Metaverse. The framework of education is changing in line with the changes and needs of learners in this era. In other words, it is evolving from e-learning to XR-learning. Multicultural education needs to be transformed according to these changes in social and educational technologies, and learners’ needs.

Until now, multicultural educators have used mainly textbooks and e-learning contents of photography or video. On the other hand, VR content can give much higher learning effectiveness and sustainability by allowing learners to experience and discuss directly, and can understand multiculturalism as an experience and way of life and apply it to life.
This study suggested three ways of multicultural education using VR: Korean culture experience program to experience traditional Korean culture or historical facts, Korean life adaptation program to relieve anxiety about social adaptation and settle down in Korean life, and Education to improve multicultural understanding, social exclusion, and discriminatory remarks[25][26][27][28][29].

In order for such content production to become a reality in the long run, purchase and maintenance of expensive equipment and technology must be premised. For successful results, we suggest some developmental ways as follows: First, it is necessary to equip the realistic content creation and maintenance which is suitable for educational methods. Currently, education using virtual reality is not well known in the sphere of the education field. Training equipments and contents are not enough to sustain. Ant the readiness of teachers for the virtual reality based education is very weak. Second, VR and more advanced education should be supported by variety of contents. The developmental speed of VR technology is so fast. And the societal environment and the learners’ attitude are changing and the level of its diversity is very high. Third, countermeasures against the side effects of using virtual reality should be prepared. At first we can assume the physical side effects. As examples, we can find out the date dizziness, headache, blurred vision, dry of eye, etc. And we can think of the psychological side effects. Because VR use imaginary data and picture, the users brain could be distorted and bring a collective confusion. In particular, youth group, the brain is easily stimulated, in the field of school system, we need to approach very carefully. Finally, we need focus on the ethical issues. Until now most of ethics are based on real contacts and communication. VR can give people the lot of quantitative enlargement of thoughts. If VR’s sphere can hold the mind of human being, it also could be dealt with in the scope of ethics. Especially we need to focus on the data ethics which means to match the transparency and trustfulness of data, and how to lessen harmfulness to human being[25][26][27][28][29][30][31][32].

5. References

5.1. Journal articles


[27] Maccari L & Cagno V. Do We Need a Contact Tracing App?. *Computer Communications*, 166, 9-18 (2021).

5.2. Books


5.3. Additional References


6. Appendix

6.1. Authors contribution
<table>
<thead>
<tr>
<th>Initial name</th>
<th>Contribution</th>
</tr>
</thead>
</table>
| SH | - Set of concepts ✔
| | - Design ✔
| | - Getting results ✔
| | - Analysis ✔
| | - Make a significant contribution to collection ✔
| | - Final approval of the paper ✔
| | - Corresponding ✔
| | - Play a decisive role in modification ✔
| | - Significant contributions to concepts, designs, practices, analysis and interpretation of data ✔
| | - Participants in Drafting and Revising Papers ✔
| | - Someone who can explain all aspects of the paper ✔

**6.2. Funding agency**

This work was supported by the Ministry of Education of the Republic of Korea and National Research Foundation of Korea (NRF-2020S1A5C2A04092485).