Abstract

Purpose: This study aims to examine and understand the effect of immersive learning in poetry writing by using VR games to enhance the creativity of Generation Z.

Method: To examine and understand which emotions among the positive and negative emotions the participating students experienced with respect to playing the VR games, the PANAS scale was used for the investigation. Also, this case study was carried out where a semi-structured interview was conducted to examine and understand the effect of immersive learning for poetry writing to foster creativity via VR games.

Results: As a result of the investigation conducted via the PANAS scale, it turned out that the Generation Z students experienced positive affection (PA) for the immersive learning via the VR games, and experienced nearly no negative affection (NA). Plus, a semi-structured interview was conducted to examine and understand the immersive learning effect of the participating students. Keywords were extracted from the transcribed interview details by the inducive coding. The extracted themes are 1) fun, 2) collaborative problem solving, and 3) creativity.

Conclusion: As the interest in the “metaverse”, which refers to the world of virtual reality has heightened, many of Generation Z are visible as they engage in even economic activities there. It is necessary to pay more attention to designing the learning experience of Generation Z by combining the unique experiences of virtual reality with creativity education. In this respect, it would be worth noting that the opportunities for research findings that the powerful experiential learning provided through immersive learning had a positive effect on the creative poetry writing activity in this study, and such discovery opportunities are quite educationally meaningful.

[Keywords] VR Game, Immersive Learning, Creativity, Generation Z Students, Poetry Writing

1. Introduction

The 21st century has ushered in a society that is faced with highly sophisticated informatization, industrialization, liberalization, and globalization, and is also an era that requires creative talents to play an active role. The intensified international competitiveness demands a higher level of knowledge and skills, and toward this end, various attempts and efforts at the social and national level are urgently called for. In keeping pace with the needs of the time, fostering talented people with creative abilities to flexibly respond to such rapid global changes has become a high-priority role for the field of education. Creative ability refers to the ability to critically accept information and respond in an appropriate manner to changes while forming new knowledge and information. To foster talented people with such creative abilities, new changes are urgently called for in the way of learning and teaching as well as in the educational environment. In Korea’s curriculum, too, creativity education is emphasized based on the ideological
basis of fostering autonomous and creative Koreans who will lead the 21st century toward globalization and the information age[1].

The current elementary, middle, and high school students who need to undergo creativity education intensively are “Generation Z,” who were born in the 2000s. They are familiar with the digital environment having been exposed to it since their birth, pursue the latest trends and unique experiences, and find meaning through such colorful experiences[2]. As the educational environment is undergoing a period of transition, in the current environment for educating Generation Z with such characteristics, “The 20th century teachers are teaching students who will live in the 21st century in the 19th century classrooms”[3]. Although the COVID-19 pandemic is negative, looking on the bright side to find the positives, the pandemic did allow the opportunities to emerge that turned out to be positive to materialize the discourse to call for the creation of a digital education environment. Given the parallel of contactless education and face-to-face education, the use of digital devices has become a daily routine, and the teachers’ experimental attempts and challenges are continuing in pedagogy. The pattern of changes expected after a decade has seen advancement by at least 5 years. This is a time of desperation to find a realistic guide for how the children, who will live in the 21st century, should grow up and with what kinds of capabilities, and for how digital immigrants will lead such digital natives amidst such evolutions. Based on this study, it is intended to examine and understand the effect of immersive learning in poetry writing by using VR games to enhance the creativity of Generation Z.

2. Literature Review

2.1. Creativity and poetry writing

Creativity has been studied and defined from a very wide variety of perspectives. It is generally defined as the “creation of novel and useful products which are recognized, supported, or satisfied by people at a specific time”[4][5][6]. That is, creativity is the act of creating novel and unique ideas that are realistically appropriate in terms of content and effect. The components of creativity are flexibility, originality, elaboration, development, fluency, courage, curiosity, entrepreneurship, optimistic attitude, immersion with work, use of intuition, independence of thinking and judgement, and the perspective of viewing objects[7]. Furthermore, creativity, which is a divergent way of thinking, is also classified by the components of originality, flexibility, sophistication, sensitivity, fluency, and redefinition of thinking[8]. Currently, creative people who have creative personalities are classified based on the “4 Ps” of creativity: product, person, process, and press[9]. The 4P’s of a creative product are only possible when a creative person undergoes a creative thinking process in a creative press.

Creativity has been dealt with across various fields of education, with especially significant focus in the language field. A series of the linguistic activities of listening, writing, speaking, and reading constitutes the creative intellectual process that forms meaning through the various mental processes[10]. Hence, the process of “comprehension,” which involves listening and reading, and the process of “expression,” which incorporates speaking and writing, would naturally vary depending on one’s point of view or worldview, and the very individual nature of the process of reconstructing meaning is absolutely crucial[11]. In particular, poetry helps one to develop creativity by stimulating the imagination and making one curious about new and different worlds, and brings enjoyment through the works embodied in language. That is, the series of the processes of reading, appreciating, and creating poetry stimulates curiosity and the imagination, helping one to develop creative thinking, which can lead to new perspectives. However, in the current field of Korean language education, poetry education is not conducted in a manner that enhances creativity, but rather is focused on the knowledge, memorization, and use of poetry, and hence, it is necessary to find venues in which poetry writing can be taught in a way that fosters creativity[12].
2.2. Experiential learning

Various attempts have been made to connect the unique experiences pursued by Generation Z with learning experiences. Such an educational challenge sheds a new light upon John Dewey's empiricist educational theory, which stresses “learning by doing.” According to John Dewey, “experiential learning” is a process of “trying” and “undergoing,” recognizing issues, gaining ideas, thoroughly testing a response, experiencing the results, and confirming or modifying the previously held concepts, based on which meaningful learning takes place. Such meaning-making induces learning for one to learn through experiences and also stresses that it is more important to create the new knowledge and change oneself via learning to play a new role than to simply learn what to do.

David Kolb claimed that true learning occurs through the process of changing experiences to form new knowledge. The 4-step cycle of experiential learning claimed by David Kolb is “concrete experiences → reflective observation → abstract conceptualization → active experimentation” <Figure 1>. For instance, if students go on a field trip(concrete experiences), they can experience reflective observation while keeping a journal or diary about the field trip, and after returning to school, through additional readings and discussions of each other’s findings, “abstract conceptualization” will be experienced. Thereafter, if the students went on a field trip to another place to test the newly established hypothesis arrived at through the discussions, it would be an active experiment they carried out. David Kolb claimed that only concrete experiences or learning activities by themselves are not very useful, and that learning takes on meaning when reflective observation, critical analysis, comprehensive thinking, and active experimentation are sequentially performed. For the Generation Z students who seek unique experiences and engage in “learning by doing,” the experiential learning theory not only sets the stage for an enjoyable experience, but offers implications such as how the experience can be developed into meaningful knowledge, and when connecting and integrating the previously acquired knowledge and the experience gained this time, and when thinking about this, what kind of active experimentation can be attempted.

![Figure 1. David Kolb’s experiential learning cycle.](image)

2.3. Immersive learning

Immersive experiences offer us the feeling that we are moving somewhere else or are focused on a certain action, and that we have control over what will happen next to some extent. Immersive learning, which makes us feel in this manner, allows us to use our knowledge and resources to resolve problems or hone skills, as if we were there, to create memorable learning experiences. Immersive learning mostly uses augmented reality or virtual reality technologies to enable us to experience the powerful fun that feels like a real experience in an environment.
that is difficult to experience in reality[22]. Such immersive learning can induce the active and in-depth participation of the learners, increase the quality of group discussions, and enhance understanding, and hence, it can positively appeal to the Generation Z learners who are seeking unique experiences. In particular, immersive learning provides us with the experience of moving to another location or environment in a variety of ways, and is also appropriate for learning related to specific contexts or situations where specific skills and strategies are attempted or practiced[23][24][25]. Immersive learning experiences are fun, engaging, and very intense. There are very few examples of immersive learning in the field of language education that take advantage of such strengths. Hence, through this study, it is intended to examine and understand how the immersive learning using VR games that can enhance creativity through poetry writing and language activities influences the Generation Z learners.

3. Methodology

3.1. Participants

A total of 9 students participated in this study, including 4 students from grade 4, 2 from grade 5, 1 from grade 6, and 2 from grade 7. They were all born in or after the 2000s and are among the Generation Z, who are familiar with the digital environment and seek special experiences. This study participated in this VR experience program by visiting municipal and district libraries offline twice in 2020, at the height of the COVID-19 pandemic. Given the frequent closures of the libraries since the outbreak of COVID-19, only 9 people participated in the 2 sessions. Prior to participating in the VR experience and discussion program, a language background survey of the participating students was conducted. Seven of the students disliked writing, and 8 liked reading.

3.2. Research instruments

In this study, the educational effectiveness was examined by focusing on the “Forum VR: Artist of Oz”(developed by Studio Coin Co., Ltd.) (hereinafter, “Forum VR”, http://www.forumvr.co.kr/?lang=en) program through which one experiences and discusses the VR games, which are of an interactive narrative game genre. “Forum VR” is a future-oriented discussion program where multiple participants play VR games together and continue their discussion activities. Forum VR introduced the MR(Mixed Reality) system and the multi-player online system to synchronize the experiences of the experiencers and the participants; in particular, the MR system can implement a multi-player online system in which a person who experiences VR games and a participant who makes decisions with a tablet PC would simultaneously communicate among themselves while looking at the screen. Such a system played a role in strengthening the situational judgement skills and cooperative decision-making process for both the experiencer and the participant, thereby making it possible to connect with the discussion class through their common experiences. Furthermore, including the latest technology, it is designed as a future-oriented discussion program that links to the topic after the multi-participation VR experience activities.

Forum VR consists of a total of 3 volumes, and for this study, the “Artist of Oz” program, which can discuss culture and art, was selected. It is a cooperative learning type of VR program where a team consists of 1 experiencer, 5 to 10 participants undertake conversations and discussions, and the VR device-wearing experiencer and the participant with a table PC take turns experiencing the VR <Figure 2>. In particular, considering the cybersickness of the experiencer wearing the VR device, it is designed in such a way that each person would undergo the experience for 10 to 15 minutes, and then take turns with another participant when the scene changes, thereby minimizing cybersickness. Furthermore, the VR experiencer is the protagonist who experiences the virtual world at the participant’s choice, and the participants play a role in judging and deciding the experiencer’s story via voting while watching the various situations taking place as the story unfolds <Table 1>.
Figure 2. The system of VR experiencer and participants.

![Figure 2](image)

Table 1. The role of VR experiencer and participants.

<table>
<thead>
<tr>
<th>VR experiencer</th>
<th>Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experiences the virtual world at the participant’s choice</td>
<td>Play the role of judging and deciding the story of the experiencer via voting while watching the various situations taking place as the story unfolds.</td>
</tr>
</tbody>
</table>

Hardware consisted of the VIVE set VR equipment, MR equipment ZED Camera, screen, five Android tablet PCs, which are network equipment, and the wireless router. As for the software, among the three titles of Forum VR, for this study, Artist of Oz, in which the acceptability of culture and art could be discussed, was selected. The Artist of Oz is a program for 10- to 14-year-olds <Figure 3>. The Artist of Oz, which is based on the “Wizard of Oz” as a motif, unfolds as a story of solving a situation where a hot air balloon returning home after an adventure in Oz does not work. One can choose a character from among Dorothy and her friends, take care of a mission related to literature, dance, music, and art, and then return home by launching a hot air balloon as a reward. During the discussion session, the topic of “imitation and creation” was discussed in the field of literature, and the “Writing Poetry for a Depressed Witch” activity was carried out while understanding the characteristics of poetry.
3.3. Research procedure

This study was conducted over a total of two sessions and four instructions for the elementary and secondary school students who applied for the VR discussion programs at the municipal and district libraries. Prior to experiencing the VR game program, a survey was conducted on the language background of the students. The 1st and 2nd instructions were offered on the 1st day of the VR discussion program, and the 3rd and 4th instructions were held on the 2nd day. On the 1st day, they experienced the VR game for 50 minutes with the students who applied for the 1st instruction, following which during the 2nd instruction of the 1st day, they performed work for 50 minutes to understand the discussion agenda. After preparing the materials for discussions by using library materials, and during the 3rd instruction on the 2nd day, they had 50 minutes of discussion based on the prepared materials. During the 4th instruction, while experiencing the VR game again for 50 minutes, the participants were asked to confirm and develop their thoughts through the discussions and compare them with the previous experiences <Table 2>.

Table 2. Program sequence.

<table>
<thead>
<tr>
<th>Instruction</th>
<th>1st day</th>
<th>2nd day</th>
<th>3rd day</th>
<th>4th day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sequence of experiences</td>
<td>Experience VR</td>
<td>Understand discussion agenda</td>
<td>Prepare materials for discussion</td>
<td>Proceed with discussion</td>
</tr>
<tr>
<td>Details</td>
<td>Experience forum VR with the peers who petitioned</td>
<td>Understand discussion agenda by undertaking various activities</td>
<td>Prepare discussion materials by using library materials</td>
<td>Conduct discussion with the prepared materials</td>
</tr>
</tbody>
</table>
The Forum VR program made it possible for the elementary and middle school students among Generation Z to immerse themselves in various situations encountered in the virtual reality while playing the VR games with fellow learners, and then to review their experiences in detail while undertaking the discussion activities. During the 2nd instruction, they proceeded in the sequence of having opportunities to validate the ideas discovered via reflective observation and abstract conceptualization while playing the VR game once again. This was designed based on David Kolb’s experiential learning cycle, which proceeds in the phases of “concrete experiences → reflective observation → abstract conceptualization → active experimentation”[20].

3.2. Research method

3.2.1. Survey using the PANAS scale

To examine and understand which emotions among the positive and negative affections the participating students experienced with respect to playing the VR games, the PANAS scale was used for the investigation. The PANAS scale has been validated as a globally valid and reliable scale among the scales that confirm the positive and negative affections of the subjects given any experiences[14]. Using the PANAS scale of a 7-point Likert scale, the students were asked to select the extent to which they felt certain emotions regarding the VR game experience by looking at 16 questions consisting of adjectives. The 16 questions consisted of selected adjectives describing 8 positive affective(PA) expressions and 8 negative affective(NA) expressions <Table 3>.

Table 3. Configuration of the PANAS scale.

<table>
<thead>
<tr>
<th>Positive affection(PA)</th>
<th>Negative affection(NA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Fun</td>
<td>5. Easy</td>
</tr>
<tr>
<td>2. Happy</td>
<td>6. Interesting</td>
</tr>
<tr>
<td>3. Proud</td>
<td>7. Exciting</td>
</tr>
<tr>
<td>4. Pleasant</td>
<td>8. Involved</td>
</tr>
<tr>
<td>1. Worried</td>
<td>5. Difficult</td>
</tr>
<tr>
<td>2. Anxious</td>
<td>6. Depressed</td>
</tr>
<tr>
<td>3. Frustrated</td>
<td>7. Shameful</td>
</tr>
<tr>
<td>4. Tough</td>
<td>8. Lonely</td>
</tr>
</tbody>
</table>

3.2.2. Semi-structured interview about immersive learning via the VR game

A case study was carried out where a semi-structured interview was conducted to examine and understand the effect of immersive learning for poetry writing to foster creativity via VR games. The case study is a research method with which one explores a specific research subject, and using a case study method, a semi-structured interview was conducted to discover the understanding and meaning of the participating students’ program experiences[26]. In this study, the specific experiences of the participating students’ individual poetry writing activities were investigated based on the discussions of group poetry writing activities and “imitation and creation” in the VR game experience process. The one-on-one interview was conducted after they experienced the 2nd VR game during the 4th instruction, and then the voice-recorded interview was transcribed, and the results were analyzed by inducive coding.
4. Research Results

4.1. Results of the students’ affective domain using the PANAS scale

Among the affective domains of the students, it was examined as to whether the affections toward immersive learning using VR games were positive or negative. The Cronbach alpha coefficient was 0.837 for 16 questions, which was very reliable. As a result of the investigation conducted via the PANAS scale, it turned out that the Generation Z students experienced positive affection (PA) with a score of 6.8 out of 7 points for the immersive learning via the VR games, and experienced nearly no negative affection (NA), with 6.1 points <Table 4>.

Table 4. Results of analysis with the PANAS scale.

<table>
<thead>
<tr>
<th>Forum VR game experiences</th>
<th>Frequency</th>
<th>Min.</th>
<th>Max.</th>
<th>M</th>
<th>SD</th>
<th>Reliability cronbach’s alpha value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PA</td>
<td>9</td>
<td>6.7</td>
<td>6.9</td>
<td>6.8</td>
<td>3.8756</td>
<td>.837</td>
</tr>
<tr>
<td>NA</td>
<td></td>
<td>5.8</td>
<td>6.3</td>
<td>6.1</td>
<td>2.1795</td>
<td></td>
</tr>
<tr>
<td>Effective no.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.2. Results of the semi-structured interview about immersive learning experiences

A semi-structured interview was conducted to examine and understand the immersive learning effect of the participating students. Keywords were extracted from the transcribed interview details by the inducive coding. The extracted themes are 1) fun, 2) collaborative problem solving, and 3) creativity.

1) Fun

All of the students who participated in the VR game said that their VR game experience related to this discussion was very interesting. They said that they focused on the situation as if it had actually happened to them and also replied that they felt like they became the protagonist of the video game.

[S1’s extracted text]

“It was fun to choose music and match the rhythm with my friends. I’ll have to read ‘The Wizard of Oz’ again. I became curious about the contents after playing this (VR game).

It was fun, and I want to participate again.”

[S3’s extracted text]

“It was so much fun since I felt like I became the protagonist in the game when I wore the VR (on my head). I wanted to play for a long time, but too bad it was too short. Time flew so fast in the blink of an eye. It was so much fun, and I want to participate again.”

[S9’s extracted text]

“The entire process was fun. It’s sad that it was so short. It was especially fun talking about the ‘Witch of the East.’”

In particular, it was confirmed that the students lost the sense of time and immersed themselves in the VR game and discussion time. It is apparent that this is a powerful immersive experience in which the experiencer identifies themselves with their avatar in the virtual world, and this avatar identity is quickly assimilated into the narrative of the game.
2) Collaborative problem solving

The students who participated in this study were primarily those who applied to participate in the VR program at public institutions, including municipal and district libraries. Hence, a team was formed from different schools and grade levels, and the students replied that the experience of solving problems by collaborating with the team members they met for the first time was very fun and helped them develop a cooperative spirit.

[S5’s extracted text]

“The experience of collaborating with friends to solve problems while exploring the VR was so much fun. It was absolutely nice to be able to develop a cooperative spirit.”

[S7’s extracted text]

“Collaborating and solving problems while listening to the stories of friends who have different opinions than me, and making decisions and choices, was very fun. This program seems to be very helpful in growing a cooperative spirit.”

3) Creative thinking

The VR game selected for this study is a game among those of the interactive narrative game genre, and is also a game with a structure through which the players create stories while interacting with each other. The participating students were able to strengthen their creative thinking by thinking and imagining in various directions while conversing with their team members.

[S4’s extracted text]

“I was thrilled because this game gave me the confidence and the ability to imagine with freedom. I think I have become an even more creative person.”

[S8’s extracted text]

“As I conversed more with my friends, I got to do a lot more imagining. What I imagined was helpful when I was writing poems and creating content. In particular, it was really helpful to listen to other friends discussing what I hadn’t thought about.”

The students replied that the VR game discussion program was fun and also helped them to think creatively and solve problems through cooperation.

5. Discussion and Educational Implications

The students who experienced the VR game of Forum VR: Artist of Oz came to have positive affections toward the program, and it was discovered that they had “fun” the most, among others. Furthermore, after playing the game and completing the writing, they replied that they were able to further strengthen their immersion in the story by playing the game again and discovering the changed thoughts of themselves and their peers. Moreover, they replied that they did not feel any pressure when they experienced immersive content and undertook the writing, which previously they had not usually liked. It has been analyzed that the amusement provided by the game significantly lowered the psychological burden, thereby enabling even more flexible thinking activities, and that it connected to creative thinking more promptly. In particular, it may be interpreted that the various contexts provided by the game stimulated the students’ imagination and also created active opportunities to think in a very new way through discussions with their peers. Such research results provide such meaningful implications that the limitations of the methods of formal classroom learning in analyzing poetry and acquiring information about the poetry or poets can be overcome with realistic experiential discussion classes. Furthermore,
through non-formal learning in discussion classes, it is possible to significantly reduce the burden of viewing poetry, which can enhance creativity and allow students to feel the emotions of poetry and express them freely through the VR games, whereby educational implications are offered in which learning can occur through memorable experiences.

During the interviews, the students replied that they were able to promptly feel intimacy with peers that they had met for the first time in the VR experience, mutually communicating to achieve a common goal, respecting each other’s opinions, and completing every mission and quest safely. This is a strong advantage of the interactive narrative game, and it has also been analyzed that players were able to immerse themselves in the narrative elements of the game much faster and more deeply through their interactions. Furthermore, it is also worth paying attention to the students’ responses that they identified both with themselves in the real world and with the character in the game they had chosen, and that they remembered the flows and contents of the story, even after the games were played, as a meaningful part in terms of language learning. Based on such experiences, more stories can be created by imagining various matters, and this can also be a meaningful resource in generating creative content not only for writing but also across other genres, including music, art, and dance. Moreover, it is worth noting that the game of the Artist of Oz is a creative story based on the original work of The Wizard of Oz, and also worth noting the fact that the students paid attention to the original work and confirmed the possibility of connecting with it, with intentions of reading it. The VR game experience was held at the municipal and district libraries, and based on the experiential learning, it was also possible to verify the possibility of creating an environment in the future that would make reading more interesting. Furthermore, if this program were used in schools, the project-based learning (PBL) that can be connected with various subjects, such as reading, music, art, physical education, Korean literature, and English, will be made possible, and it is also expected that it will be able to meet the educational goal of fostering the talented human resources. Through the follow-up studies, it would be necessary to study the various effects of the immersive learning experience in greater depth, and it would also be necessary to review the learning performance results of the learners.

Generation Z, who pursue unique experiences, are living as prosumers who create and consume various types of creative content in the virtual world. In particular, as the interest in the metaverse has heightened, many of Generation Z are visible as they engage in even economic activities there. “Metaverse” refers to the world of virtual reality under the concept that there is another universe above the earth we live on[27]. It is necessary to pay more attention to designing the learning experience of Generation Z by combining the unique experiences of virtual reality with creativity education. In this respect, it would be worth noting that the opportunities for research finding that the powerful experiential learning provided through immersive learning had a positive effect on the creative poetry writing activity in this study, and such discovery opportunities are quite educationally meaningful.

6. References

6.1. Journal articles


6.2. Book


### 7. Appendix

#### 7.1. Authors contribution

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

#### 7.2. Funding agency

This study was funded by Seoul R&BD program(IU190022).