



# Exploring Students' Experiences of Virtual Learning Environment for Art History Classroom

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Submitted: 2022-12-19. Revised: 2023-04-03. Accepted: 2023-05-02

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## Abstract

During the Covid 19, students and instructors experienced double-way synchronization distance classes. Recently, the metaverse was drawn much attention to the online virtual world as a channel for social interaction. It has received renewed interest as a new method of surmounting the limitations of external activities after the pandemic. A few studies have focused on the usability of metaverse in a classroom, but no attention was paid to its applicability to Art History as well as to the higher level of education. In order to compensate for the limitations of two-way synchronized remote learning in university art history classes, Gather.Town was adopted as a metaverse platform in both Western modern art history classes and art history methodology classes. In this study, we surveyed and interviewed students who used both WebEx and Gather.Town. This study examines students' experiences in accessibility, social presence, convenience of interaction, interest and immersion, and satisfaction when the students use the metaverse platform, Gather.Town. The examination of this study confirms that the virtual space of metaverse was more helpful in making students feel a sense of presence, interaction, and engagement than WebEx and demonstrates the possibility of this platform as a sustainable and valid tool in Art History Education.

**Keywords:** metaverse, Gather.Town, art history education, synchronous online learning

**How to Cite:** Park, J., & Sohn, S. (2023). Exploring Students' Experiences of Virtual Learning Environment for Art History Classroom. *Harmonia: Journal of Arts Research and Education*, 23(1), 105-120

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## INTRODUCTION

During Covid-19, real-time non-face-to-face distance learning has become the main teaching method at universities. Online classes have existed before the Covid-19, but after the pandemic, online classes were operated by a double-way and synchronous interactive learning method. However, even if the place for education transferred from physical space to online space, the slide-table lecture was maintained as a main teaching method in art history education.

Art history education, especially for higher-education institutions, requires higher-order cognitive skills (Kali et al., 2015). According to Erickson (1983), the traditional teaching methods of art history are exposing students to artworks, presenting information verified by art historians, and leading them to approach art history as a process of inquiry. Teaching art history has been conducted mainly through lectures and text-based methods which have retained their traditional position in the university (Black, 2015; Elkins, 2007; Simons, 2007). On the other hand, the in-

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quiry of art history, teaching art historians' thought processes to conclude artworks, encourages students to use their own original perceptions of the works of art (Martikainen, 2017). Also, an active learning approach is needed to educate students to cultivate the skills of an art historian.

Digital technologies contribute to promoting active learning in art history education (Gasper-Hulvat, 2017). Recent discussions on art history education introduced new technologies such as digital images, Virtual Reality (VR) or Augmented Reality (AR), computer-based interactive methods, and remote learning (Di Serio et al., 2013; Donahue-Wallace, 2008; Harris & Zucker, 2016; Janet & Miles, 2009; Pitt et al., 2003; Simmons, 2008). Especially extended reality (XR) technologies were noticeable at the Museum Website, and VR was utilized to support self-regulated strategy learning (Lee et al., 2021; Wu et al., 2021). After the lockdown due to the Covid 19 pandemic, educators and curators attempted to search for a new online teaching method (Noble, 2021). Noble (2021) discovered the potential of virtual museum spaces for local residents for their connection, inspiration, and creativity. Now, scholars have focused on the possibility of XR technologies in teaching art or art history. Moreover, they experimented with blended learning, including face-to-face classes and asynchronous remote classes, by watching recorded videos or utilizing programs (Lee et al., 2021; Noble, 2021; Wu et al., 2021).

As the pandemic situation prolonged, the pros and cons of the double-way synchronization distance classes were revealed. All students who attended class equipped the electronic devices, which facilitates approaching digital resources such as high-quality images and additional references. On the other hand, most of the disadvantage of current distance learning has been caused by video conference meeting programs. Students suffer isolation and loneliness because of an absence of interaction with peers and instructors (Vandenberg & Magnuson, 2021). Besides, when participants mute and turn off the

camera cause fatigue because of difficulty reading their reaction or being aware of their presence (Nesher Shoshan & Wehrt, 2022). Social interaction which is the perceived amount and frequency of students' communication, and social presence which is the psychological feeling of other people's existence are insufficient in distance learning than face-to-face learning (Weidlich & Bastiaens, 2019).

Metaverse refers to a term from Neil Stevenson's novel, *Snow Crash* published in 1992 (Lee et al., 2022), and it is the space that interacted with the virtual and real world to create social activities. It has received renewed interest as a new method of surmounting the limitations of external activities after the pandemic (Park & Kim, 2022a). The metaverse was categorized as a mirror world, life-logging, virtual world, and AR (Lee et al., 2011) and it is often presented as a channel for social interaction (Park & Kim, 2022b). Although many studies have considered the possibility of using the metaverse platform, there is a lack of practical application of the metaverse in a higher level of art history education.

This study presents findings from a case study of synchronous online learning in the higher education art history classroom after the COVID-19 pandemic. In the literature, a few studies dealt with metaverse in a classroom setting, but there was none of them on its applicability to art history. In particular, we will find out whether the metaverse is more suitable for students to actively inquire beyond text-based learning. This study examines students' experiences in accessibility, social presence, the convenience of interaction, interest and immersion, and satisfaction when the students use the metaverse platform, Gather.Town in classes. The examination of this study confirms that the virtual space of the metaverse was more helpful in making students feel a sense of presence, interaction, and engagement than WebEx. These results verify the applicability of the platform as a durable and valid tool for teaching art history. This research was

performed in two classes, Western Early Modern Art History and Methodology of Art History classes at the H University in Seoul, South Korea, from September to December 2021.

### Theoretical Consideration

Smart-history is one of the early online Art History Educational programs that Professors Beth Harris and Steven Zucker provided as a learning experience for the public in 2005 (Goldman, 2014). Smart-history offers open access to high-quality images of the works of art in global art history. One of the purposes of Smart-history is to provide an alternative to paper textbooks (Harris & Zucker, 2016) since the paper textbook has limited in size and the details of images are unreadable. Especially in art history, image is a crucial source of inquiry. Scholars in art history need high-resolution images for observation (McCann & Ravas, 2010) and digital images can rotate freely or be viewed at a larger magnification than seen with the naked eye.

The digital revolution in the 1990s facilitated the availability of high-resolution digital sources through digital cameras, projectors, and the internet. According to Murray (2011), these changes revolutionize the way of projecting images in the art history classroom. However, Murray points out that only presentation slides are mainly used in the recent art history classroom so further new exploration and collaboration of technical facilities are necessary. Recently, instructors attempted to supplement varied digital resources to offer more realistic learning environments and experiences of viewing to students. Smart-history can record not only lecturers' voices but also background ambient sounds such as noise in a museum, including the echo of a cathedral (Harris & Zucker, 2016).

Walter Benjamin (2018) mentions that interaction with actual artworks is preferable because working with reproduction images lacks presence in time and space. One of the methods for students to

look at the work of art is to include a plan for visiting museums in the art history curriculum (Kali et al., 2015). However, most students and scholars who study Western, early modern art history in Asia are hard to get access to real artworks because of distance and financial problems. VR and AR could be alternatively used for improved online experiences. During Covid-19, furthermore, the world has experienced a critical situation with the obstacle limiting visitation. Google Art & Culture with Google Street View technology enabled the public to take tours of various museums reproduced by 3D digital spaces. In addition, there are multiple digital resources on the website of museums and galleries and individual developers' sources on the Steam platform (Cecotti, 2021). However, it is still hard to say that the VR experience is a complete solution to replace the real experience due to the limitation of the resolution of VR headsets.

Gamification is also one of the attempts to apply digital tools in Art history education. Most games are casual games, such as answering art history quizzes, identifying famous painters and matching paintings, and taking virtual tours (Champion & Foka, 2020). Games, in particular, provide users with a relevant art history experience with an immersive environment for increasing motivation and encouraging active learning processes such as ThLARTRO and ARTé: Mécenas (Hutson, 2022). Applied virtual heritage and Art history in the game clearly aroused interest and fun; however, adjusting the platform for use in Art history education seems to blur the boundaries between academic and fun (Champion & Foka, 2020). In order to be used in art history classes, each educational content needs to be designed for each individual grade level (Hutson, 2022).

There are also some considerations in applying new technology to higher art history classes. For example, technology-assisted learning can stimulate the interest of learners, but it is questionable how helpful it is in real-world lessons where students need critical thinking (Wu et al.,

2021). Although asynchronous online learning systems such as Smart-history and MOOCs (Massive Online Open Courses) were operated, a new approach is necessary since the Covid pandemic has made synchronous online learning the primary method of online learning rather than an asynchronous system at universities.

Asynchronous online learning systems such as Smart-history and MOOCs seem to be more suited to the self-learning method. For example, studying lectures by Smart-history did not need instructors and classmates at the same time. The advantage of an asynchronous online class is that enables one to study in self-paced learning. In addition, most of the lectures and materials are provided in English. Korean subtitles are only partially provided and even viewed with Google Translator which sometimes mistranslates art terms.

Elsen (1954) argued that discussion is a useful pedagogical approach to sharing a variety of viewpoints and backgrounds when analyzing artworks. Also, in the experiment of Donahue-Wallace & Chanda (2005), when face-to-face interaction was not possible in art history online classes, learning was well achieved even when an alternative means called animated interactive activities were used, and the interaction between students was improved. Since the pandemic situation, we have been able to try a new method of synchronous online learning.

Since the 2020 spring semester, H University has conducted synchronous online learning with the WebEx program (Cisco-WebEx). The downside of WebEx is that if there are many students, more than 40, there are some transition issues. A delay between the instructor and the learner frequently happened in a chatting window. When the instructor wanted students to answer in the middle of a lecture, it takes time for students who turned off the camera and microphone for better screen quality. Moreover, students hardly felt the presence of others, thus, not only students but also educators feel isolated to some degree.

The metaverse was noted as an alternative tool to compensate for this shortcoming. Webex is also a metaverse in a broad sense. However, the original purpose of WebEx was for meetings, and WebEx interface focused on the meeting function, in which people existed in a grid box with camera streaming. Gather.Town is a synchronous video conferencing platform and web browser-based application set on a 2-D virtual environment (Najjar et al., 2022). Gather.Town enables people to enter the 2-D virtual space as an avatar, navigate through it and interact with objects. Participants could move freely and connect widgets to external software. Gather.Town is available to access via the web which is unnecessary to install any program. According to Latulipe & De jaeger (2022), students showed strong preferences for the Gather.Town class setting than Zoom. 2-D Gather.Town environment improved students' interaction, collaboration, and overall satisfaction with an online learning experience (Najjar et al., 2022). Furthermore, Gather.Town is easier to edit sites and objects compared to other programs providing virtual space with characters like Zepeto, and Second Life. Therefore, Gather.Town is more suitable for an active learning approach in non-face-to-face art history classes.

## METHOD

### Methodological Approach

The questionnaires for the survey began with some simple demographic questions, and the sub-factors consisted of accessibility, social presence, ease of interaction, interest, and immersion, and satisfaction. Most of the questions are about the difference between WebEx and Gather.Town. Table 1 shows the sub-factors, information of questions, and Cronbach's *a* value. The overall Cronbach's *a* was measured at 0.94 for internal consistency. This study defined social presence as the psychological feeling of other people's presence in the group (Bailenson et al., 2003; Weidlich et al., 2018). The survey questions were modified



**Table 1.** Student Experience of Virtual Learning Questionnaires : Composition and Internal Consistency

Sub-factor	Summary of Questions	Quantity of Questions	Cronbach's $\alpha$
Accessibility	Questions asking if there were any inconveniences or difficulties while using Gather.Town, and how quickly they got used to it	3	.74
Social Presence	Awareness of being in the same space with other users, high social presence, and easy formation of bonds	4	.86
Ease of Interaction	Easiness of communication and interaction with other participants and instructors	2	.78
Interest and Immersion	Active participation in classes in terms of fun, immersion, and interest	4	.90
Satisfaction	Satisfaction and necessity in terms of continued use	4	.64
Total		17	.94

from Bailenson et al. (2003) and Weidlich & Bastiaens (2019). To evaluate the degree to which students felt the situational interest in Gather.Town rather than in WebEx, the questions were modified from Wang & Adesope (2016). We have also added our own questions assessing student satisfaction with using the metaverse platform in the Art History course. The response scale ranges from totally disagree (1) to totally agree (5). In the quizzes, we included open-ended questions that allowed students to explain their experiences in their own words. The questionnaires were conducted after the Western Art History course discussion activities.

In-depth interviews were conducted by meeting them in person other than class time, after obtaining the volunteers' consent among those students who completed the survey, and the in-depth interview questions were chosen based on the survey questionnaire items. In this sequential process, the two data were naturally integrated and analyzed. The interview took place over WebEx and lasted approximately 90 minutes. In the in-depth interview, most of the questions were analogous to the survey questions. Additionally, we asked them to specifically explain how they thought Gather.Town had influenced their learning of art history and if they had any

suggestions for a virtual classroom in Gather.Town over the next semesters.

**Participants**

In this study, the survey participants were students in Western Early Modern Art History and Methodology of Art History during the 2021 second semester at H University in Seoul, South Korea. Table 2 shows the participants' characteristics, including grade, gender, and experience of the metaverse. Fifty-nine participants are from the Western Art History class and five from the Methodology of Art History class. In the Western art history class, there are eight first-year students (13.6%), 23 second-year students (39.0%), eight third-year students (13.6%), 13 fourth-year students (22%), and seven graduate students (11.9%). There were ten males (16.9%) and 49 females (83.1%) in the class, and only two students (3.4%) had previously used metaverse platforms. In the Methodology of Art History class, there were one third-year student (25%) and three fourth-year students (75%). By gender, there were two male students (50%) and two female students (50%). In this class, none of the students had used a metaverse platform before.

**Designing Virtual Space in Gather.Town**

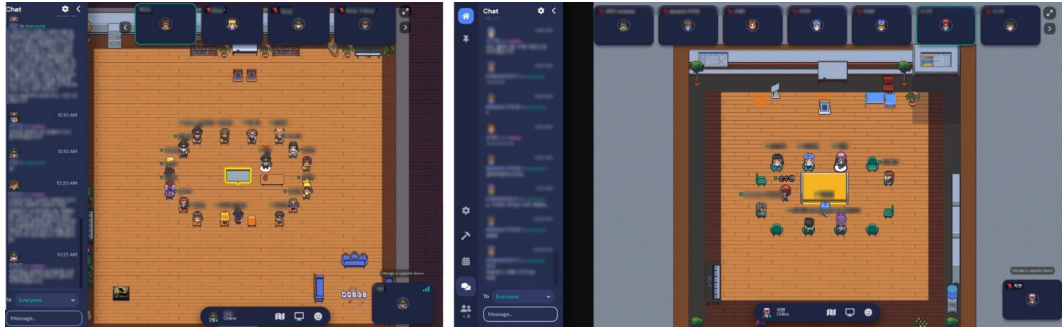


Figure 1. Building, lounge, and museum in Gather.Town

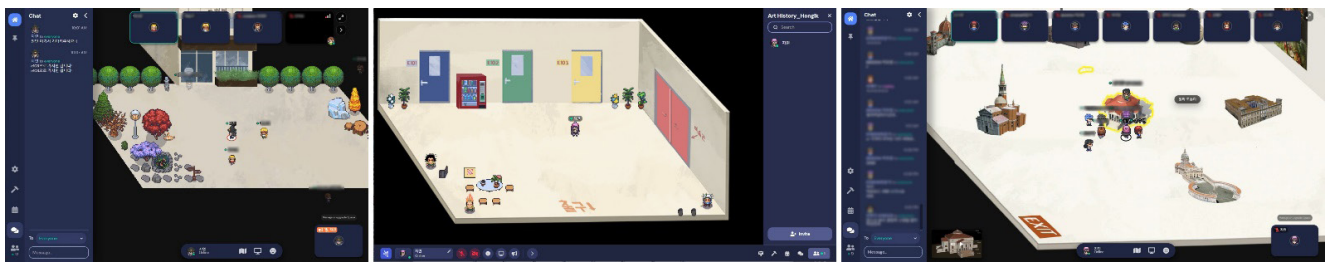


Figure 2. Classroom for discussion and lecture in Gather.Town

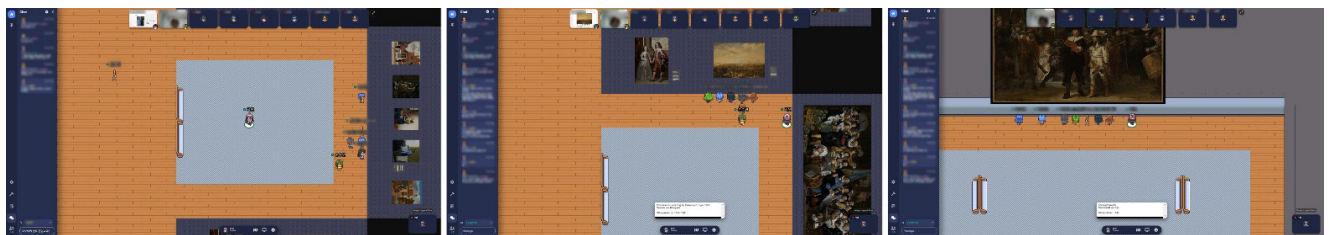


Figure 3. The hall for presentation in Gather.Town

Virtual worlds are networking environment that mimics the physical world and organizes a place for activities in the physical world (Maher, 1999). According to Luke (2021), online lectures should engage students by creating an informal and approachable virtual learning environment. An immersive learning software must allow users to modify and customize content easily. Also, software should allow instructors to add works of art and related data (Cecotti, 2021).

In Gather.Town, we designed the main building which was a replica of the art college building at Hong Ik University, as in Figure 1. Figure 2 shows the interior of a room for discussion, which was set like an ordinary classroom with chairs and a writing board. We also made virtual museums utilizing online resources provided by other museums and galleries, and stu-

dents could tour them during their break time.

In the art history methodology class, each student made a presentation to interpret one work of art in the Rijksmuseum collection with the methodology they had learned so far. As shown in Figure 3, in a space similar to the actual space, students can interact with each other while presenting in front of their chosen work. Students could move and watch artwork freely while listening to the other students' presentations. This is different from presentations that use only the screen-sharing function.

### Data Analysis

The process for analyzing the results of the questionnaires is as follows. The data collected in the survey were analyzed using the SPSS 21.0 program. First, to check the reliability of the research tool,

**Table 2.** Demographic of Participants.

		n(%)	
Experience of Virtual Learning Questionnaires (N=59)	Grade	Freshman	8(13.6)
		Sophomore	23(39.0)
		Junior	8(13.6)
		Senior	13(22.0)
		Graduate Student	7(11.9)
	Gender	Male	10(16.9)
		Female	49(83.1)
	Prior Experience of using Meta-verse Platform	Yes	2(3.4)
		No	57(96.6)
	In-depth Interview (N=4)	Grade	Freshman
Sophomore			0(0)
Junior			1(25.0)
Senior			3(75.0)
Graduate Student		Graduate Student	0(0)
		Male	2(50.0)
Gender		Female	2(50.0)
		Prior Experience of using Meta-verse	Yes
No	4(100)		

Cronbach's  $\alpha$  was calculated, the frequency and the percentage were calculated for the general context, and the analysis of the results of the research subject, and the mean and the standard deviation of each sub-factor of the questionnaire tool were analyzed.

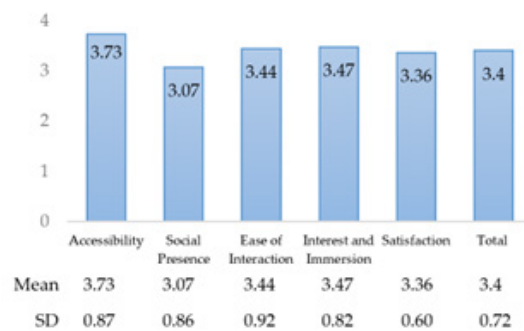
The in-depth interview data collected were transcribed and analyzed by Content Analysis by Elo & Kyngäs (2008). We read the content of the scripts repeatedly and then categorized the inductive coding patterns, which was an open coding process (Moser & Korstjens, 2018). Subsequently, we used the highest level of abstraction through the integration of hierarchical categories. In this study, we focused on the student experience rather than the measurement of learning. Table 3 shows the deductively derived themes in this study.

**RESULT AND DISCUSSION**

**Results of the Student Experience Survey**

Figure 4 illustrates the results of the

student experience survey. Experience of accessibility is highest at 3.73, followed by interest and immersion (3.47), ease of interaction (3.44), satisfaction (3.36), and social presence (3.07). Social presence turns out to be a positive answer with 3.07 points out of 5, but the average score is the lowest among the other questions.



**Figure 4.** Results of the student experience survey

The overall average score is 3.4, suggesting that discussion activity in the Art History classroom using Gather.Town was

**Table 3.** Deductively Derived Themes

Theme	Sub-Theme	
Use case for Synchronous Learning Tools -WebEx	Digital Resources (Facility)	Limited Number of Student Camera Views – Obstruction of Communication Small Video View in Big Class Inconvenience of Screen Sharing Request When Needed
	Feeling a Sense of Presence, Interaction and Engagement Visually Designed Virtual Space	Low Social Presence and Interaction Difficulty in Concentration -Fatigue and tension from using the camera Feeling a Sense of Reality- Classroom Designed like a Real School Space can be decorated Sense of Self Consciousness and Others' Presence
Experience in Using the Metaverse platform , Gather.Town for Class	Avatars	Good for Interaction Good for Concentration Alleviation of Mental Burden of Presentation
	Disadvantage	Links with Expiration It takes time to enter the classroom Good for Exhibition Plan
Usability (Applicability) of the Metaverse platform in Art History Education	Efficiency in Art History Education	360-degree rotational viewing point of art work that is impossible in reality High-resolution artwork
	Requirements for the course progress	Need for Adjusting Time for Metaverse Integrated Platform Needed Appropriate for Small Class
	Suggested Metaverse class in Art History	Class for Exhibition Planning Inclusion of Metaverse in Art History class Composition

more effective than WebEx.

In the open-ended survey, twenty-eight of fifty-nine students agreed that the Avatars interaction feature in Gather.Town was more interesting and useful than WebEx. They talked about how the characters helped them; "Interesting" and "Fun" are the frequently mentioned words. Additionally, there were endorsements such as 'the feeling of participating in an actual classroom', 'revealing a presence through characters', 'making it easier to interact with characters by moving them', and 'becoming more active in the participation'. The second question was addressed to all the students of this questionnaire, asking for reflections on the conditions of a successful group discussion in the course of art history. 'Participation', 'deepening of questions', and 'atmosphere of freedom' are the keywords often mentioned by students.

### Results of In-depth Interview

This subsection discusses the results of qualitative analysis based on the in-depth interview.

#### Use Case for Synchronous Learning Tools

Most of the participants talked about the tools they mainly used for online education such as Zoom, WebEx, and Microsoft Team. However, during Covid 19, H University used WebEx and this in-depth interview is mainly based on the students' experience with WebEx.

The limited number of student video screens and small WebEx video screens hampered student communication. One of the downsides of WebEx is that students have to ask the host to share their screen every time they want to view material on Webex. Student B noted, "WebEx is only half the size of a regular table."

Participants reported that they could not recognize others in class without tur-



ning on the camera in WebEx. The uncertainty of the presence of others diminishes commitment. Also, turning on the camera and microphone caused fatigue.

"Also, no matter how many students' names are on the screen in WebEx, it doesn't feel like that person exists there." (Student A).

"Because the audio volume comes at the same level to everyone, the microphones overlap unintentionally in WebEx." (Student B).

"In WebEx, students should have to post words like 'Can I speak?' in the chat window and present their opinions... So many times, I just replied as quickly as possible without thinking enough and finished it." (Student A).

The second theme concerns students' experiences using virtual spaces and avatars, which is the biggest difference between Gather.Town from WebEx. Students said that there were more reasons why they think Gather.Town was more suitable for synchronous online learning.

Students felt like they shared the same place with one another as they were in a virtual space. In addition, students pointed out that a visual environment makes them more visually focused.

"I didn't feel like we were all connected in WebEx, but in Gather.Town I felt like we were in one space." (Student A, from Art History Methodology Class, Dec.10, 2021).

"At the time of the presentation, I felt that our classroom was similarly implemented in Gather.Town like our real classroom. So it felt like we were in the same classroom together." (Student B).

"It was good to increase the concentration in class because it was no more boring." (Student C).

Avatars were very effective for communication and social presence. They made it easier for students to recognize others in Gather.Town than in WebEx. With avatars, they were able to see others around them, which made them feel connected in space, although they did not have their video on.

"It makes me feel like they are here, and helps to realize they did not disappear after attendance processing." (Student

D).

"I think it was good because I felt like I was with the students when I went to Gather Town. [...] avatars are moving and reacting... inform that everyone is there." (Student E).

Students felt avatars made it possible to participate more and express their reactions easily by confirming the existence of a body and physical properties in a classroom. One student even mentioned that avatars alleviated her mental burden of doing presentations before others.

"It was good for me to concentrate in class because it was not boring." (Student C).

"Compared to Webex, I think I could turn on the microphone in the class with a little less pressure." (Student A).

In this study, although students' responses to Gather.Town was more positive than WebEx, and the results for the degree of feeling social presence are the lowest compared to other factors in the survey. A previous study comparing Zoom and Gather.Town found that Gather.Town gave students a more social presence than Zoom did (Latulipe & De Jaeger, 2022; Najjar et al., 2022). In fact, the communication between people in Gather.Town was more effective than WebEx.

During the COVID-19 pandemic, it seemed that students did not feel comfortable speaking at first in non-face-to-face classes. There were often moments of silence, so the discussion did not proceed smoothly. This seems to be associated with a characteristic of Asian students. Asian students in a big lecture tend to raise a hand and be called on by instructors for talking (Takahashi, 2019).

Students reported that the expiration of links was not convenient. And unlike WebEx, one disadvantage of Gather.Town is that it took time to enter a classroom.

### Usability of the metaverse platform in Art History Education

The third theme concerns the usability of the metaverse platform in Art History Education. Students presented their opinions on improvements to the use of

metaverse in the classroom.

Many students expressed positive opinions about the virtual space designed for the art history classroom and the necessity of a virtual space suitable for art history classes. Students evaluated Gather.Town as more useful for using digital resources in Art history classes:

"I feel that the metaverse is necessary for Art history class because there are a lot of visual elements." "Paintings are flat, but sculptures are actually three-dimensional. It would be nice to have a function that I can turn over the sculpture or view sideways and backward." (Student A, from Art History Methodology Class, Dec.10, 2021).

"The screen of Gather.Town was higher quality than that of WebEx. I could enlarge the screen in WebEx too, but the picture quality was poor." (Student B).

"In art museum, there are things I can't see because of the person in front of me or my physical limitations. Here, I can see more details." (Student C).

Regarding the final presentation held in a virtual museum, many students responded positively about doing a presentation as avatars. Most students were satisfied with the way of using the metaverse in Art history class.

"Today the space implementation of Rijksmuseum is the good direction of metaverse class." (Student B).

"I thought that it would be good if the students have the opportunity to design exhibitions in this kind of space by themselves." (Student E).

There was a student opinion that online classes cannot completely replace face-to-face classes. However, it is judged that the metaverse platform has sufficient competitiveness in the Western art history classroom in South Korea. During the pandemic, cultural heritage institutions began to provide and develop digital resources due to restricting physical access (Samaroudi et al., 2020). Museums in Italy are digitalizing works of art and archives to simplify museum administration with paperless documents, increasing social online interaction with the public (Agostino et al., 2020).

In this study, students reacted positively to using digital resources in Art history classes to see artwork in a virtual space that is not physically observed in reality. In other words, digital resources can support investigations from multiple perspectives. However, digital resources are surrogate objects that can only reflect some of them. That restriction can force people to interpret the resource in a certain way (Stanford, 2020). Therefore, careful study is required of scholars when they utilize digital resources. When students analyze artworks, it will be helpful to find various points of view under the guidance of professors.

The communication among people in Gather.Town was more effective than WebEx. To improve the student's communication and participation in the Gather.Town, student D suggested that it would be great to have means of assistance such as roulette for students to participate spontaneously. Furthermore, this method could function as a game in which students could have time to form a bond and intimacy like the time icebreakers. This also could facilitate participation by giving each part of the class a sequence. Adding a function like this, to a certain extent, can be an alternative. As Kreijns et al. (2003) argued, non-task contexts with informal and casual conversations foster creating social relationships and group cohesion better than task context can. Therefore, additional distinctive sections could increase interaction and intimacy among students in non-face-to-face synchronous online learning. They also viewed Gather.Town would be more effective for a small class rather than a big class.

"Since we had to use two platforms, WebEx and Gather.Town, we needed multiple devices. I thought that it might be a little difficult for students who are going to listen to a large lecture or do not have devices ready." (Student C).

"It was possible because it was a small class. It would not be easy to move avatars at the same time if there were fifty students or more than twenty students... I think it is best to have less than

ten people." (Student C).

The students said they would take the metaverse class again next time, not because it was a metaverse class, but because it was fun and well-organized. Thus, content and activities remain the most important factors in the classroom. There is a need for more creative teaching methods for metaverse classrooms.

### Discussions

This article examined the feasibility of using a distance learning course in contemporary art history using the metaverse platform. For this purpose, we first compared Webex, which was used in post-pandemic distance education, and Gather.Town, a metaverse platform with an emphasis on visuals, to determine which platform is better and more appropriate for use in art history classes. In the first survey, the Western Modern Art History 2 students were asked about their experiences in the Metaverse platform course in the discussion section. The survey consists of the items that identify accessibility, social presence, the convenience of interaction, interest and immersion, and satisfaction sub-factors. In a non-face-to-face situation, many students did not encounter any technical inconvenience in various access environments when using Gather.Town, and they did not have much difficulty getting used to the new platform. Overall, Gather.Town is better suited for classroom use than Webex; in particular, student-student and student-lecture interactions in Gather.Town has been found to be easier than Webex; this means that Gather.Town is a better platform to use than Webex in lecture-style art history classes, where interaction among learners as well as between learners and instructors is important.

Next, in-depth interviews were conducted to investigate the specific experiences of students regarding the experience of using the Gather.Town platform in the Art History Methodology course. In the in-depth interview, we first compared Webex and Gather.Town to find out why Gather.Town is better suited for art histo-

ry lessons. As a disadvantage of Webex, a student pointed out that it was difficult for students to communicate together. In particular, the difficulty in recognizing others and the communication depending on audio are the reason for this; even if the camera is in charge of the visual part, it increases the feeling of load and tension. On the other hand, in Gather.Town, the visual element that implements and replaces the existence of students called avatars, allows for more advanced mutual communication than Webex. Being able to recognize the existence of others and being able to visually check movements during class is helpful for class participation.

In the in-depth interview, we tried to understand the usefulness of Gather.Town in the art history course. Students are aware of the importance of visual elements in art history lessons and the need to appreciate works of art in a spatial context. Compared to Webex, Gather.Town was rated suitable for using digital resources. Indeed, by linking the original or high-definition image of the corresponding digital resource to the object, it is possible to appreciate the work from different angles that are not possible in reality, which is possible with a resource clear digital. One can notice that the courses take place in a virtual space designed as a real museum and connected to each object and digital resource, and that students can walk around in avatars is an element that makes them feel the need during the use of the metaverse platform in art history. In particular, if students listen to a presentation via screen sharing, such as Webex, they only passively listen to the part shown by the presenter, whereas using Gather.Town, when listening to a presentation, the students can actively examine the digital assets of the works directly connected, allowing much more active participation in class. Thus, the students thought using the metaverse platform with many visual elements in art history lessons was necessary.

Not only the study of digitized resources but the study of the use of digi-

tal technology is required for researchers in Art History education (Drucker, 2013). The freedom of unlimited space, sustainability, and ease of updates contribute to developing the possibility of digital art history (Westerby & Keegan, 2019). Digital tools are continually developing, and researchers have difficulty using the technology as an evolving. The field of Art history is traditionally conservative and does not follow changes quickly (Stanford, 2020). Nevertheless, the consideration of digital art history has been proceeding. Beyond the digitization of materials in art history research, attempting to use digital materials is helpful in diversifying the ways where digital resources can be additionally adopted in art history education.

In higher education art history courses, traditional academic instruction in the form of lectures is essential. Even though it is a static lecture, the interaction between the lecturer and students is essential, so Gather.Town, which facilitates communication and interaction with visual elements, is more suitable in art history classes than Webex. Because a strong visual element is effective in teaching art history, directly decorating a virtual space, where we cannot be visited physically and temporally, and moving around and checking the works greatly contributes to increasing participation and interest. Recently, it has been very difficult for Korean students studying early modern Western art history to have a real excursion opportunity, and hence then, it is almost impossible to see real works in class. The development of digital resources increases the accessibility of modern Western arts to Korean students. Despite the development of digital resources, sharing the ppt screen is mainly adopted in art history courses using synchronous online learning tools such as Webex, and when using these tools, it has a certain limitation that the used visual materials are flat and shown via photo slideshows. The ability to connect, organize, and browse various digital resources in the Gather.Town virtual space makes Gather.

Town more suitable for art history classes taken by Korean students who rely heavily on digital resources. Also, the ability to archive as a visual element linked to digital assets in Gather.Town's virtual space is convenient for users by increasing visual intuitiveness. When the lecture takes place in the space created for the art history course, the students are allowed to explore works of art in a spatial context. In addition, active participation in class and the study of art history become possible. This can allow skill training to visually analyze works more actively in the classroom and enable in-depth investigation. Metaverse platforms like Gather.Town can be a powerful tool that overcomes the physical and temporal limitations of art history education.

## CONCLUSION

This study presents the results of a case study of synchronous e-learning in the Art history class in higher education under the evolving situation of digital humanities accelerated by the COVID-19 pandemic. A few studies have focused on the usability of a metaverse in a classroom, but no attention was paid to its applicability to Art History as well as to higher levels of education. The results from this study confirm that the virtual space of metaverse was more helpful for students to feel a sense of presence, interaction, and engagement than WebEx. The accessibility and convenience of digital resources were better. The feeling of reality from the similarly designed classroom space and the freedom of students to move their characters on their own are other effective advantages of the metaverse. In addition, while providing learning content and the exhibition space for the museum, Gather.Town was effective for students in Art History to actively participate and interact by directly attaching spaces or additional materials. These results verify the applicability of this platform as a sustainable and valid tool for Art History education.



## ACKNOWLEDGEMENT

This research was supported by the Hong Ik University Academic Research Promotion Fund for the 2021 academic year.

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