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Construction of Comprehensive Student Support Using Metaverse Platforms in a Distance Learning University

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Abstract

In recent years, correspondence education has become more common, and the number of educational institutions incorporating correspondence courses has increased enormously. As distance learning universities offer online classes via videos and other media, students do not need to commute to the campus and can engage in learning at any time of their choice. Therefore, these universities have students of a wide range of ages, including not only high school students, but also working adults and the older people. However, as these universities do not have campuses like the in-person learning universities, they have not established an environment to support students. Hence, student support is lacking, and many students are unable to keep up with their classes and choose to take a leave of absence or withdraw from school. Therefore, this study aims to construct an environment that enables comprehensive learning support not originally existing in distance learning. It specifically proposes and examines the construction of a comprehensive learning support environment for distance learning universities by building learning commons, a third place where students can casually interact with each other, and a student counseling room in the virtual space of the metaverse.

Keywords: Metaverse, Third Place, Learning Commons, Student Counseling Room, Student Support

1 Background

In recent years, distance learning has become increasingly common. This is partly due to the semi-compulsory adoption of distance learning in the wake of the new coronavirus disease (COVID-19) outbreak in 2019, when a state of emergency was declared worldwide due to the rapid spread of the virus, forcing many students to study at home, highlighting the need for distance learning. Distance learning programs were employed by almost all educational institutions, and awareness of such programs spread rapidly. At present, the number of educational institutions that have adopted distance learning has greatly increased, and the number of institutions that offer only distance learning is also on the rise. "Tokyo Online University" to which the authors belong, is one of these distance learning universities.

Current universities that offer distance learning are characterized by asynchronous online classes using e-learning systems and media. Owing to the online format, students can take classes not only from all over Japan, but also from overseas as long as they have computer and technology skills and telecommunications infrastructure. Each class at Tokyo Online University consists of

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four 15-minute video clips and a 30-minute test, for a total of 90 minutes per class. This allows classes to be divided into 15-minute units, making it possible for students to take classes during their spare time. Therefore, students of a wide range of ages are enrolled in the program, including not only high school students but also working adults and the older people.

While this system has its advantages, it is not a "face-to-face classroom environment in which students attend lectures together with multiple students in one classroom at a fixed time;" hence, students need to manage their classes by themselves, and they must be able to plan their classes. Without the ability to control their own learning and maintain continuous motivation to learn, students may not be able to keep up with their classes. In the worst-case scenario, many students may choose to take a leave of absence or drop out of school.

In principle, students in distance learning do not have to commute to the campus, which makes it difficult to provide the student support available in an in-person class, such as the ability to interact with other students with whom they have become close in their student life, to directly ask faculty members about points they did not understand in class, or to consult with them about problems in their daily or student life.

In light of the above issues, the following specific functions are considered to be lacking in distance learning compared with in-person classes:

(1) A place where students can casually interact with each other (a third place);
(2) A function that allows faculty members to respond to students' questions in real time (learning commons);
(3) A function for students to seek advice and consultation in daily and school lives (a student counseling room).

In this study, focusing on the above three functions, we develop measures to realize these functions in the virtual space of the metaverse.

The purpose of this research is to develop concrete measures to realize these three functions in the metaverse space: (1) "social space," (2) "learning commons," and (3) "a student counseling room," to realize comprehensive student support at distance learning universities.

Many universities have been forced to switch to online classes or on-demand video delivery of classes due to the COVID-19 pandemic. Further, in the coming post-COVID-19 era, the number of newly established distance learning universities specializing in online courses is expected to gradually increase based on the successful experiences during the pandemic.

Since university administration and student support are inseparable, exploring and demonstrating the possibility of a feasible comprehensive student support method in the metaverse may provide suggestions for providing student support at distance learning universities, which are expected to increase in the post-COVID-19 era.

2 Advantages and Challenges of Distance Learning Universities

2.1 Advantages of distance learning Universities

Distance learning universities have several advantages over in-person universities.

First, students can study anywhere without being limited by distance. By contrast, in-person universities require students to "commute" to campuses to attend lectures. Even some students have to move near the campus and then commute to the campus. Thus, in addition to tuition fees, the cost of transportation can be also significant.

However, in the case of distance learning universities, students do not need to commute to the campus, in principle, thus allowing them to attend lectures even from remote locations. In other words, students do not have to incur transportation costs to commute to school, thus facilitating the learning process.

Second, students can balance their studies with their work and family lives. At traditional universities, lecture times are clearly defined in the timetable; therefore, it is common for students to choose which lectures to attend and how to distribute them. Attendance and absence for each lecture were also considered to be influenced by the instructor's discretion. Conversely, in the case of distance learning universities, students can study on their own initiative using textbook materials, monthly report assignments, and self-study using various media such as TV, radio, and the Internet, allowing them to balance their work and family responsibilities and study in their own leisure time. The e-learning system adopted by Tokyo Online University allows students to access a virtual campus (portal site) on the Internet and study by watching 15-minute video clips during their spare time. The 15-minute video units allow students to study during their commute to work, lunch breaks, and so on, depending on their individual circumstances. Students of all ages are enrolled at the university, and they are working hard to learn every day.

For working adults with limited time who are eager to study at a university, this is a valuable learning opportunity that allows them to study and learn new skills. In fact, Tokyo Online University has a higher percentage of enrolled working students than students who have just graduated from high school, making it a university in high demand from working students who are conscious of their desire to learn during their spare time.

Third, students can enroll at a lower cost than at a traditional university. While many in-person universities charge tuition, facilities, and equipment fees for the admission and use of campus facilities, some distance learning universities do not charge facilities and equipment fees. In many cases, the cost of distance learning universities is relatively low compared to that of traditional universities. According to Hamanaka (2017), who conducted a questionnaire survey of parents with children who graduated from high school in March 2016, in a research report conducted at the University of Tokyo as part of a Ministry of Education, Culture, Sports, Science and Technology (MEXT) project to promote university reform in the fiscal year 2016, those who did not attend college were found to be mostly in the lower income brackets in terms of household income **[1]**. In addition, Oh (2017) conducted a survey on college enrollment and education expenditure of children from low-income families and found that they are less likely to attend a four-year college when they go on to higher education, indicating that they are relatively more likely to attend junior colleges or vocational schools where tuition fees are lower **[2]**. Thus, for students who have given up on attending a traditional university for economic reasons as well as for those who had hoped to obtain a bachelor's degree but were unable to do so, the existence of distance learning universities with inexpensive tuition fees is considered a valuable source of support.

2.1 Challenges Facing distance learning University

While distance learning universities have considerable advantages as discussed in the previous subsection, they face significant and unique challenges.

First, opportunities for faculty and students to interact with each other and with students are less frequent at distance learning universities. Saito (2022) conducted a questionnaire survey of students attending distance learning classes during the COVID-19 pandemic. The results showed that "lack of human relations," "learning efficiency," and "learning content" were the most frequent responses to the classes offered by the distance learning program, in that order **[3]**. Based on Saito's survey results, it can be inferred that the lack of opportunities for students to interact with others in classes offered at distance learning universities may affect their learning efficiency and understanding of the learning content. This means that distance learning universities do not provide opportunities for "interaction with others," which is thought to be a factor that improves the motivation to learn, and the lack of satisfactory interaction with others makes students feel more isolated and lonely than students in traditional universities, making it more difficult to maintain their motivation to learn, and consequently, lowering their motivation to learn.

Second, there is no environment in which students can easily ask faculty members and other students questions about their studies. Conversely, at traditional universities, students visit the campus to receive lectures directly from faculty members, where they can raise their hands to ask questions during or after the lecture. Even during self-study, students are provided with an environment in which they can visit faculty members' laboratories and ask questions casually.

Meanwhile, at distance learning universities, while students have the advantage of being able to watch asynchronous lectures using text materials, television, the Internet, and other media in their own time, they must proceed with their studies alone. Although students can communicate with faculty members through messages and bulletin boards, they cannot directly ask questions to faculty members unless they make an appointment in advance during office hours. This makes it difficult to answer these questions in real time.

In addition, students are unable to talk casually with other students who attend the same lectures, resulting in isolated learning. Therefore, owing to this significant hurdle, some students might fail to understand what they are learning or give up on learning itself.

Third, there is no "student counseling room" for students to consult about problems in school and daily life. While many in-person universities have a "student counseling room," a distance learning university, such as Tokyo Online University, only functions as a "counseling office" and does not have a "student counseling room" in either the real or virtual world.

In addition, Tokyo Online University provides a place for individual consultations with academic advisors during office hours, as a means for students to discuss their problems. These individual consultations, which require students to provide their real names and make an appointment in advance, are conducted using a web conferencing tool. Students are required to provide their real names for consultation, and in many cases, their voices and faces are projected on the screen for consultation with academic advisors.

Students who can talk to faculty members with their own faces, names, and voices may be able to receive support, but there may be some students who feel that the hurdle of talking to a faculty member is too high and are unable to talk to them. At a distance learning university, such as Tokyo Online University, students often study in isolation and tend to have weak relationships

with others, and the lack of consultation may further isolate them mentally; thus, many students may be forced to withdraw from the university.
In other words, the problem in distance learning universities is the lack of an environment in which students who need counseling can feel free to seek advice.

Thus, various issues remain in today's distance learning universities. In this research, we focus on the "metaverse" as a useful technology that can help us solve these issues and examine how to utilize it. We propose a method to enable comprehensive online student support at distance learning universities that provides the same level of student counseling and interaction with other students at traditional universities and aim to construct a student support environment that utilizes the metaverse.

3 Utilization of the Metaverse in Distance Learning Universities

3.1 The Metaverse

The metaverse is a word coined by combining the words "meta" and "universe" and refers to "a virtual space constructed on the Internet." The term "metaverse" is said to have originated in the novel "Snow Crash" written by Neal Stephenson **[4]**. In recent years, the term has come into the limelight after Facebook Inc. changed its name to "Meta."

Most metaverses are virtual spaces with a three-dimension (3D) structure; however, some metaverses have a two-dimension(2D) structure. In Second Life and other metaverse environments, users of all races and genders can freely access the virtual space and enjoy the virtual world in the virtual space. They can enjoy role-playing, chatting, and voice communication with other users through their "avatars," which are their alter egos in the virtual space. In some metaverses, users can edit scripts and objects in the metaverse, use external tools to create new things **[5]**, offer or sell their creations to other users free of charge, trade land, and so on. A metaverse has a variety of characteristics. Users can enjoy interacting with other users in the virtual space as if they were in the real world, and they can freely create their own avatars using external tools such as Unity and blender. Since a common file extension (.vrm) is used for avatars created in specific metaverses such as VRChat, cluster, and NeosVR, users can upload files to the metaverse and use avatars created with external tools to interact with others in various metaverses.

3.2 Advantages of Using Metaverses

Many people have used web conferencing tools to interact with others during the COVID-19 pandemic. This section summarizes the advantages of using metaverses over web conferencing tools. The first point is that with a metaverse, one can feel the presence of people in a space, whereas with a web conferencing tool, there is no space, and participants other than oneself can only be recognized as "people moving in a video image." Therefore, when the screen is turned off, it is impossible to determine whether the participants are on the other side of the display. Additionally, in the case of a metaverse, a "virtual space" for interaction is prepared as a prerequisite, and interaction is conducted using avatars that are one's alter ego in this virtual space. The presence of avatars controlled by others in the virtual space allows one to experience "being there." Moreover, in the case of a 3D metaverse, a sense of distance can be obtained through a 3D structure that cannot be experienced in a 2D metaverse, which leads to the creation of a sense of immersion. **[6]** Furthermore, by wearing virtual reality (VR) goggles, such as Meta Quest or HTC

Vive, to participate in the metaverse, visitors can feel an even higher sense of immersion.

Second, metaverses are thought to reduce tension compared with interacting in the real world. In a metaverse, users interact with others through their own "avatars," which are their alter egos, and this can reduce tension, resulting in lower psychological stress when discussing problems with others. Furthermore, since there is no need to disclose one's name or face as in the real world and no need to vocalize using the chat function, it is an environment that guarantees complete anonymity, making it possible to interact with others in peace.

Third, there is no need to worry about one's appearance in metaverses. Since people are basically interacting with others through their avatars, there is no need to wear makeup, and people can interact with others dressed as they like, whether they have just woken up from sleep or after taking a bath. Therefore, there is no need to be conscious of the appropriate attire for different occasions.

Fourth, by using avatars that are not related to one's age or gender, communication barriers are overcome and students of all ages can talk freely with each other. As mentioned above, Tokyo Online University has students of all ages, and there are many students who are enrolled to learn new skills rather than those who enter the university immediately after high school graduation. The age difference between students who have just graduated from high school and those who have worked and are enrolled at the university for learning new skills may make it difficult for them to casually interact with each other, as they may be forced to pay attention to each other even though they are studying the same subjects, and a generational gap may arise. However, by interacting through avatars, students could communicate with each other in a more casual manner. That is, by interacting with avatars, it is possible to change the appearance of an avatar at will, which may help break down the age barrier. In addition, transgender students can use avatars that match their gender identities, without being restricted by their biological sex, making it easier for them to break down gender barriers. Students with disabilities can also communicate with each other through voice chats even if they have limited mobility, while those with hearing disabilities can communicate through text chats.

3.3 Disadvantages of Metaverse

There are several disadvantages to the metaverse. First its security and privacy measures are imperfect. In some metaverse spaces, past text chats are stored as logs, and there is a risk that others may be able to look into the logs later. Second, if many people visit an area, they can become overloaded, and depending on the performance of the terminal used, the avatar operation may face problems such as slowdowns or lags. Third, the metaverse that can be used is limited, and dependent on device performance. Fourth, some individuals may experience VR sickness while using the 3D metaverse with an HMD. Amemiya (2023) mentioned that VR sickness is similar to motion sickness, during and after the experience of wearing an HMD. Although the underlying mechanism has not yet been clarified, VR sickness may interfere in communication with others. [7]

4 Utilization of the Metaverse in Distance Learning Universities

Based on the aforementioned merits of the metaverse technology, we would like to build learning commons, a third place for students to interact with each other, and a student counseling office at a distance learning university to support students in these three areas.

4.1 Construction of Learning Commons

Learning commons are "places that provides a learning style enabling multiple students to gather and engage in discussions using information from a variety of resources, both electronic and printed. In addition to providing computer equipment and printed materials, library staff also provides services to support students' self-study using these resources. **[8].**

Donkai et al. (2011) defined Learning Commons as learning support spaces that provide a one-stop shop for equipment, facilities, human services, and materials to support all types of learning, primarily for students. Compared with a traditional library, learning commons are considered a place for group study, where the atmosphere is lively and noisy and library staff and student assistants are available **[9]**. Although many in-person universities now have learning commons, as mentioned above, this study examines a distance learning university, where classes are not conducted in person but using remote media, which means that students are alone in the classroom. In the case of distance learning universities, there is no environment in which students can easily interact with other students as in the real world. Hence, it is highly important to construct learning commons in metaverses, that is, spaces where students can gather and study, as in traditional universities. To obtain real opinions from students, we conducted a survey in December 2023 on cluster, a metaverse platform, under the name of "Metaverse Roundtable Discussion. Five individuals participated in the survey.

4.1.1 Research Methodology

Focus group interviews in the form of roundtable discussions were conducted with five participants. The interviews were limited to students enrolled at the Tokyo University of Communications who have used or continue to use metaverse platforms.

4.1.2 Ethical Considerations

All participants were asked to use their preferred avatar and were anonymized using their nicknames. The survey did not collect any information that would allow for the identification of individual students. Furthermore, after receiving consent that the opinions expressed in the interview survey may be used for research purposes, the participants were asked to speak freely and express their opinions on the subject of "learning commons."

The following is an excerpt of some of the opinions expressed in the discussion:

- Older students may be more distant from other students. Owing to the wide range of ages in the distance learning system, it may be difficult for students around 18 years of age and students in their 30s to 50s to talk to each other, even in the metaverse.
- It would be beneficial to create a library in the learning commons of metaverses. Some people have difficulty switching on and off their learning, so it would be good if they could switch on and off when they are in the learning commons by logging in to the metaverse and "studying."

- I would like to use the learning commons for programming classes. Learning commons are not used during the daytime on weekdays; therefore, the best time would be in the evening on weekdays.
- I have never heard of learning commons and I would like to use them if I can make friends there.
- Students do not want to use learning commons if there are teachers there. Therefore, it is preferable to have students in similar positions. There may be some discrepancies between what seniors and faculty members say.
- If something is going to be performed in the metaverse, it would be better to establish rules. It would be better to provide training to students in advance.
- It would be beneficial to have a space similar to a library, where links to touch physical objects are displayed.
- It is important to create a space where people can connect with each other.
- It would be good if students could learn while watching videos online.
- How to design the space is important.
- It would be beneficial to ask students in a survey what metaverse platforms can be utilized as learning commons.
- (Since Tokyo Online University has a course for national certification) Some of the students taking the national exam are in their early 20s, and I think many of them will fail if they try hard alone, so it would be beneficial to target the early 20s demographic in terms of studying.
- Some students may be uncomfortable asking questions on the discussion board, and the learning commons could serve to create ties that would introduce them to a consultation service.

The above opinions can be organized into categories, as shown in Table 1.

Table 1: Required of a learning commons in the metaverse

Category	Code
What are we looking for in learning commons in metaverses?	• A library-like space that displays links to touch physical objects would be nice. • Creating an environment where people can learn without feeling categorized by age. • A device that can turn on a "learning switch." • An environment where people can connect with each other. • An environment where participants can watch videos together in metaverses. • Targeting young people in their 20s and building an environment where students preparing for the national exam can study together with others. • Assignment of support staff who can direct students to the appropriate contact point for their questions and concerns.

The best time for gatherings and discussions.	• Weekday evenings or later.
Selection of a metaverse platform	• Students should be asked through a questionnaire survey which metaverse platforms can be utilized as learning commons.
Design of learning commons in metaverses	• Rules should be established for participating in the learning commons and the provision of training to participants prior to discussions.

From the table, it is clear that learning commons are important as a "function for interaction," such as watching videos or participating in workshops in a metaverse space together with other students, but it is not only a function for interaction.

Bando et al. (2009), who investigated metaverse learning using Second life, pointed out that learning through the experience of being at the same place and time in a virtual space creates a sense of camaraderie and solidarity. **[10]**

However, while the gathering of many students in the learning commons of a metaverse can lead to an increase in the motivation to learn, it also poses a risk of becoming involved in human relationships problems, making the establishment of rules a major issue.

4.2 Construction of a Third Place

Learning commons are spaces that primarily focus on learning. They are places where students who are motivated to learn and wish to discuss their studies and classes can gather freely. Further, they are spaces where students are aware that they are studying at the same place and time and where they can interact with others in the course of their learning, such as by teaching each other about their studies.

Since learning commons are spaces where students with a "serious desire to learn" gather, the main focus when interacting with others is on learning. However, it is thought that some students do not want to study but rather to freely interact with others as on social networking platforms. In other words, students with different purposes must segregate their spaces, and we want to create a place exclusively for interaction. Therefore, we propose the creation of a "third place" in metaverses, where students can interact with each other. The third place concept was proposed by Oldenburg in the 1980s. Third places are "public places that host regular, voluntary, informal, and happily anticipated gatherings of individuals beyond the realms of home and work." **[11]**.

Oldenburg (1999) summarized the characteristics of third places as follows: **[12]**

1. Neutral territory (neutral ground);
2. Equalizing people (leveler);
3. Conversation is the main activity;
4. Accessibility and convenience;
5. Regulars;
6. Playful atmosphere.

According to Soukup (2006), although the core of a third place is a neighborhood-based community, the third place concept can be extended to online settings because an online environment is accessible, has no hierarchy, and allows democratic interaction, which is considered to be consistent with the original concept of a third place. Furthermore, Soukup (2006) defined an online third place as a "virtual third place" in contrast to Oldenburg's traditional third place, which is a neighborhood-based community. **[13] [14]**

Tokyo Online University has a wide range of students of all ages. Although the university has students of all ages, it currently lacks a space for interaction between them, that is, it lacks a third place. We thus propose the construction of a third place in the metaverse as a space that is accessible to everyone and where all students can interact on an equal footing, transcending the age barrier.

4.3 Construction of Student Counseling Rooms

Many traditional universities have "student counseling offices" where students can feel free to seek consultations about problems in their student and daily lives. In a normal student counseling room, students visit the room to talk about their problems and concerns, and school counselors, campus social workers, faculty members, and clerical staff generally respond to them depending on the nature of their concerns. However, since distance learning universities, in principle, do not require students to commute to school and do not have a physical campus, there is often no space where students can seek consultations about problems in their student life or daily lives. Although there is a system for students to seek consultations about classes, coursework, etc., this is essentially a message exchange, and it takes time to obtain an answer. Additionally, some students may prefer to remain anonymous and do not reveal their identities.

Therefore, in this study, we conducted a questionnaire survey of students at distance learning universities to determine how many of them are willing to use student counseling centers. Based on the results of the survey, we propose constructing student consultation rooms in metaverses where students can easily seek consultations about problems in their daily and student lives and where anonymity is preserved.

In this context, there is the issue of how to construct the space itself, that is, the student consultation room in metaverses; hence, we would like to gather opinions from students as we proceed with the construction. In addition, when conducting consultations and interviews in metaverses, it is necessary to consider an environment that makes it easy for students to consult. Moreover, we should consider the avatars of the consulting partners, as students consult through their avatars in metaverses, which may give students different impressions depending on their avatars. Therefore, it is necessary to consider appropriate avatars for student counseling.

5 Summary

Compared with traditional universities, distance learning universities have issues such as students' inability to interact with each other, students' inability to consult with other students and faculty members in real time regarding their studies, being forced to proceed in a solitary environment, the absence of a space for students to consult about their daily lives.

Therefore, this research aims to construct an environment that enables integrated learning support at distance learning universities by building (1) learning commons, (2) a third place where students can casually interact with each other, and (3) a student counseling room in a metaverse

space. In future work, we will continue to further study this issue.

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