

Virtual Simulation Makes Better Global Understanding

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Abstract

Cultural communication between different countries is more and more important with the development of economic globalization. Global Understanding (GU) is an international collaborative community of approximately 45 educational institutions from 25 countries where students can significantly improve their intercultural competence. Use of virtual simulation technologies could help create an immersive situated learning environment to improve the cultural learning experience of GU. We study the approaches on how virtual simulation technologies could be introduced into GU based on the analysis of virtual simulation in teaching and learning as well as on how at Shaanxi Normal University (SNNU), virtual simulation has been incorporated into teaching history and culture.

Keywords: global understanding, virtual simulation, situated learning

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Introduction

Distance learning involving students from different countries in the same course provides an important opportunity for students to learn along with students of different countries. This essentially allows online education to cross the political boundaries of various countries. MOOCs (i.e., Massive Open Online Courses) have been the most successful distance learning pattern in recent years. Besides these open courses, there exist many projects among different universities/colleges around the world through which they share courses. Such courses help students improve their learning sometimes in their specialties and often about how their peers view the world differently from other cultures. There is also a type of collaborative learning project which aims to help students better understand different cultures, learn how to work together on a common goal or project, and improve their intercultural competence.

It is important to understand different cultures in the current era of globalization. People around the world have been pursuing a better understanding of each other for centuries. With the development of information technology, it is much easier than ever before for people from different countries to connect with each other, work together, and study together though they live far away from each other. Global Understanding (GU) is a collaborative community for studying different cultures, which involves approximately 45 universities/colleges around the world from more than 25 countries. Students of GU partner universities study and communicate together mainly through video conferencing, which helps students understand different cultures with the help of their partner students under the direction of teachers. This community provides an important platform for students communicating with students of similar ages from different countries without traveling abroad. The intercultural learning in GU helps students enhance

greater understanding of people from other cultures and form more positive attitudes (Chia, Poe, & Wuensch, 2009).

Learning different cultures is the essential part of GU and the virtual collaborative classroom of GU helps improve the cultural competence of the students. However, the traditional communication approaches such as video conferencing and text chat limit the students' learning experience to a degree. First-hand experience is very important to understanding a foreign culture and learning happens in the context where the knowledge belongs according to the theory of situated learning (Stein, 1998). As we know, it is best to learn a culture by living in the environment for some time. However, it is not easy for students to study abroad and that is one of the reasons why the GU course was developed. Though GU provides a virtual classroom for students to work together from different countries, it is clear that the communication between the two sides is not always as clear and productive as if they were in the same classroom.

Virtual simulation can help to simulate an environment which could be used to show cultural objects and activities to foreign partners in which the students can learn the culture in a more immersive manner. This kind of learning is more appealing to students. The students can gain knowledge while they experience the virtual environment by themselves and through the guidance of their partners who help them understand the culture as if they were actually in the environment. It would outperform the traditional communication which involves oral, video and image demonstration because the knowledge they receive is directly from what they experience. Virtual simulation can make a better situated learning environment (Chang, 2017) for GU and help students better understand foreign cultures. Therefore, it could play an important role in GU in the future. In the next section of this paper, we discuss cultural learning and the virtual

simulation technology. We analyze the methods we could use for virtual reality (VR) and virtual simulation technologies in the following section.

Cultural Learning and Virtual Simulation

Cultural Learning in GU

GU provides students from around the world with a platform for studying different cultures that they know nothing or very little about without going abroad. Existing cultural or traditional events and ceremonies in addition to historical heritages are two important sources for cultural learning. In GU, the cultural information is introduced to the foreign students in the form of words, pictures, and videos. These methods are productive, however, nowadays the students know more about different cultures than before because they have access to more and more methods that they can use to learn about the world. We have to admit that GU is losing its appeal to students. From the very beginning, GU aimed at improving the intercultural competence of students with a virtual global classroom. The teaching pattern and methods of GU have been very successful for more than fifteen years. Cultural/intercultural competence is increasingly important for students around the world. Therefore, GU should provide students with cultural learning using new teaching methods that enhance their interests and help them better understand other cultures.

Virtual Simulation

Virtual environments are created on computers that simulate the real world. They are widely used for education in science, technology and engineering (Potkonjak et al., 2016). Virtual simulation has not been used in the GU course. Virtual simulation could provide an immersive situated learning environment for better understanding cultures. Domingo & Bradley (2018)

considered virtual reality (VR) a learning tool that helps increase meaningful social interactions and reduced social anxiety especially for the online courses:

“That makes it possible for students who live hundreds of miles apart to come together and share the same experience online. This different from a discussion board or video chat in that students are actually seeing and hearing in a shared environment, erasing distance in the virtual space, rather than each being solely exposed to their own immediate surroundings as they sit at their computers. This simulated environment...contributes to a sense of presence.”

Virtual learning environments for cultural and intercultural competence are reviewed in Ogan & Lane (2012). VR games can help teach language and culture as stated in Cheng, Yang, & Andersen (2017). Barakonyi, Fahmy, & Schmalstieg (2004) and Benko, Ishak, & Feiner (2004) proved remote collaboration could be enhanced by VR. In Shaanxi Normal University (SNNU), we have set up a virtual simulation teaching center for history and culture along the Silk Road in which the virtual simulation technologies are used in teaching history and culture. They provide the theoretical and practical basis for incorporating virtual simulation technologies in GU.

VR for Demonstration

There are various VR techniques as well as devices but most of them are for personal experience. For culture communication, VR can be used to create a virtual object or environment in which foreign students could explore and experience by themselves. Interactive VR applications are much better than personally experiencing ones because experiencing a different culture usually needs guidance from local people. This is similar to using a tour guide when we travel to some place and want to understand the culture better. For example, foreign students could meet local students in a virtual simulated environment of an ancient city of China, so we

would construct the ancient city virtually and invite their partners to join them in the virtual city. Our students could introduce the famous architectures and some historical events to their partners. Our students could simulate an ancient ceremony, for example, of how the foreign guests are welcomed in the Daming Palace in Tang dynasty depending on which gate they should enter. Or, they could show how the Spring Festival is celebrated in China.

The students could feel and even touch what is demonstrated using VR (i.e. they are virtually brought into the cultural environment). Though it is not the same as their physical environment, what they can see and feel is even more real compared to the traditional methods (i.e., oral explanations, demonstration by image, videos, etc.). Figure 1 illustrates a famous Chinese historical site, Dunhuang caves. When the students put on the VR helmet, they would feel like they are in the Dunhuang caves, where they can observe the murals on the wall and walk around as shown in Figure 2.



Figure 1. Virtual recreation of Dunhuang Caves.



Figure 2. Virtual experience in the virtually recreated Dunhuang Caves.

Interactive VR environments are mostly related to game platforms, where the interaction between users and the environment is possible. At SNNU, we use virtual simulation technologies mainly in two parts: (1) immersive demonstration of historical sites (existing or non-existing); and (2) game-based interactive virtual environments built by the students.

Minecraft Based Interactive Virtual Simulation

Minecraft is a popular sandbox game and it has been widely accepted as an education tool. In a virtual world, players can build almost anything they want and they can perform some collaborative activities together. Figure 3 is the 1:1 scale replica of the St. Peter Basilica at the Vatican (Rome, Italy) that was created in Minecraft. Huge numbers of buildings as well as cities have been created with different kinds of blocks in Minecraft.

SNNU is located in Xi'an (called Chang'an in the past) which is an ancient city of China and where 13 dynasties made it their capital city. It is difficult for a foreign student who knows nothing about China and Xi'an to fully understand this city even after having discussions in GU class based on our experience of teaching GU. At SNNU, we are working on a project to recreate



Figure 3. St. Peters Basilica created in Minecraft¹.

the Chang'an city in the Tang dynasty. All of the ancient buildings in the city are being built by our students in Minecraft collaboratively. The virtual Chang'an city would be a useful environment for foreign students to walk around because it is being recreated by the students majoring in history at SNNU. Some of the buildings virtually built by the SNNU students are shown in Figure 4.

Virtual Simulation for Global Understanding

Virtual simulation is a method that could potentially promote cultural learning in GU. We need to tailor these technologies to GU according to its topics. There are four main topics that are discussed over the course of a link between partners in the GU class: (1) college life, (2) cultural traditions and family, (3) meaning of life and religion, and (4) stereotypes and prejudices. The first two topics are much easier to apply using virtual simulation.

¹ <https://www.planetminecraft.com/project/lvl-60-special-beautiful-detailed-st-peters-basilica-world-download/>

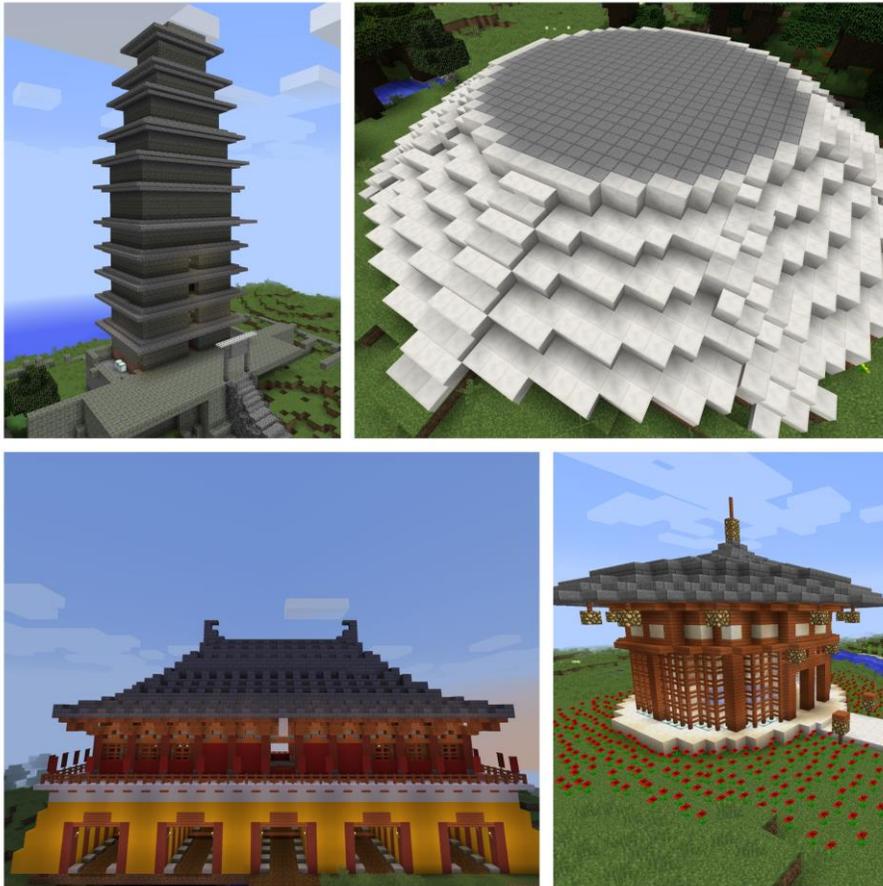


Figure 4. Historical buildings constructed in Minecraft.

“College life” is the first topic discussed by GU students when they tell their partners some information about their universities. For example, they may describe where the university is located, how many hours they spend on studying every day, what do they do in their spare time, etc. They would also show some pictures or videos to their partners. This helps foreign students learn about their college life, though most of these things are abstract in nature so that means it is difficult for them to really understand a foreign university. For college life, most of the discussion is related to the campuses. The students of each partner university can build their virtual campuses in Minecraft. When they talk about college life in the GU class, they can invite their partners to

enter their virtual campuses and show them interesting things such as important buildings. They can also work together to create games that simulate their real college life. They can also work together in Minecraft to build a recreation of their campuses based on their discussion. After working with several partners, they will build a complete campus and figure out how to better introduce them to different partners.

The topic “cultural traditions and family” is important for cultural learning in the GU course. Tradition and culture are closely related to history. New technologies have been applied in many museums and cultural companies. In addition, many historical sites have been virtually recreated and released to the public. Most of them are free and they provide even better experiences than when we physically visit them. In the GU class, teachers and students could collect these kinds of resources and share them with their partners. They could also give them some introduction to these sites as well as some manuals. Though most of them do not support multiple user viewing at the same time, this could be accomplished asynchronously. After their virtual learning experiences, students could discuss this more deeply because they have more knowledge about their partner country’s culture. This technology is developing very fast, therefore, in the near future, teachers and students could have the GU class in a virtual simulated classroom as in the OASIS in the film “Ready Player One”.

Requirements for Using Virtual Simulation in GU

The use of virtual simulation in GU requires extra preparation besides what we do in traditional GU classes. First of all, we need to study the methods how we can make use of virtual simulation in GU because virtual simulation is new to most of the teachers and students. The second thing is acquiring the devices we need to implement the virtual simulation in GU.

Methods and resources. Incorporating the use of virtual simulation in teaching classes is new to most teachers and we lack necessary teaching methods. At first, we could just obtain some VR resources and introduce them to the GU class. With the gradual increase of the use of virtual simulation in GU, we could determine in which components of the GU class we could use VR and how to efficiently use them. Besides the methods, we also lack VR resources. We could collect GU related VR resources as much as possible. We could also produce our own VR resources with some devices. It is difficult for us to reconstruct the disappearing historical sites even with VR technologies, however, we could use some publicly released resources. For example, the virtual Dunhuang caves we use in teaching history are produced and released by a company. For some traditional cultural aspects such as ceremonies and activities, we could use 360 degree cameras to record ourselves in performing these ceremonies and activities.

Devices. We would need some VR devices for the virtual simulation in teaching such as a VR helmet and a 360 degree VR camera. In order to get the full immersive experience, we have to put on the VR helmet to use the VR resources. For some existing famous building or cultural ceremonies, we could use 360 degree VR cameras to take VR videos and the partner students could view them with VR devices with more immersion.

Conclusion

We introduce virtual simulation as a method for cultural learning and the practice of using virtual simulation in teaching history in SNNU. Cultural learning is an essential part of GU and we analyze the possibility of incorporating virtual simulation into teaching GU. We hope virtual simulation technologies such as VR and games could make GU more appealing to students and we hope the GU partner universities could work collaboratively to find a practical virtual simulation based method for GU in the future.

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