

## A 3D Virtual World Journey through the 5 Stages of Culture Shock in Minecraft

Casey Bales  
Learning Design and Technology  
College of Education  
University of Hawaii at Manoa  
cbales@hawaii.edu

**Abstract:** This paper reports on a usability study on the design and evaluation of an instructional simulation in Minecraft on the five stages of culture shock for American students preparing to study abroad in Japan. The virtual world learning environment (VWLE) begins in a suburban American town where the participants travel to a Japanese city that borders the countryside. The simulation within the virtual world (VW) was designed to be evaluated by having participants navigate a linear journey while performing certain usability tasks. The analysis involved examining their verbal and written feedback concerning the in-game content and experience. The results indicated that game-based learning in a VWLE is a promising method for engaging students and delivering content over traditional classroom orientation.

### Statement of the Problem

The cultural benefits of studying abroad are numerous; the opportunity to spend time in a foreign country opens one's eyes to a wide variety of human activities that we wouldn't otherwise be exposed to in our home country (Berdan, Goodman, & Taylor, 2013). The investigator of this study experienced study abroad in his past and is now working in the International Programs department of a junior college where he creates study abroad programs for students. Although feedback from these students indicated that they had a fulfilling experience, there were often comments suggesting that more could have been done to prepare them beforehand that would make the study abroad experience more worthwhile and meaningful. One of the major issues that surfaced from post-program surveys developed by the school seemed to be the difficulty in adjusting to the host culture and readjusting to their home culture after an extended stay. This was evident in the many testimonials from students who have experienced study abroad and pointed out that no matter how prepared students think they are, experiencing it firsthand reveals the truth (Berdan et al., 2013).

In order to deliver meaningful instruction to students preparing for study abroad, it is first crucial to understand how individuals perceive the phenomenon of culture shock and how they think they should prepare for it. Oberg (1960), a Canadian anthropologist, defines culture shock as the psychological disorientation people experience when they suddenly enter a cultural environment that is radically unfamiliar to their own. Interestingly, one study by Goldstein and Keller (2015) found that students tend to attribute difficulties in intercultural adjustment to external factors relating to the foreign environment rather than internal or individual differences that they feel from within. The idea of hardship found in

intercultural adjustment ties into culture shock since both concepts relate to external factors and how it affects the person. In turn, this has led researchers to believe that students assume little can be done prior to their study abroad experiences. However, this may not be the case as experts on intercultural relations agree that pre-study abroad training programs are beneficial to students before traveling to foreign countries (e.g., Cohen, Paige, Shively, Emert, & Hoff, 2005; Deardorff, 2008; Paige & Vande Berg, 2012).

According to the U.S. Department of State (USA Study Abroad, n.d.) and the National Association of Foreign Student Advisors (NAFSA, n.d.), approximately 325,000 American students studied abroad in the academic year 2015/2016, and the number has since increased by more than 2% to over 332,000 in the academic year 2016/2017. Furthermore, Japan is among the top ten destinations for these students (USA Study Abroad, n.d.). When college students begin their study abroad experience in a foreign country, they are met with a phenomenon known as culture shock. As a result, these students experience a variety of symptoms which could negatively affect their studies and overall persona (Xia, 2009); these might include depression, anxiety, and feelings of helplessness (Mio, 1999). Although not every student will experience all negative effects of culture shock, as long as they are in an unfamiliar cultural environment, they are bound to encounter some symptoms during their study abroad experience (Xia, 2009).

Among the many universities that provide pre-departure training programs, the methods they use are insufficient in preparing students (Berdan et al., 2013) especially in terms of delivering a holistic discernment of cross-cultural understanding (LaBrack, 1993). A possible solution could be developing a virtual simulation where students will be hypothetically immersed in the target culture and learn about the stages of culture shock before departing. It is suggested that culturally immersive experiences allow students to obtain the necessary knowledge through observation, participation, experiential, and engaging activities within a virtual simulation (Shih, 2015). Despite this, there seems to be a lack of studies involving a method to teach cultural awareness through a VWLE. This study aims to demonstrate that an immersive training experience about culture shock is usable, and that it serves as an effective training tool for students preparing to study abroad.

### *Purpose Statement*

The purpose of this usability study was to evaluate the navigation, efficiency, and user motivation of a 3D virtual world simulation that prepares 18 to 22 year-old American college or university students going on their first study abroad to Japan by informing them about the five stages of culture shock.

## Literature Review

### Understanding the 5 Stages of Culture Shock

As mentioned earlier, culture shock itself is defined as the confusion travelers encounter when placed in an unfamiliar cultural environment. This phenomenon can be broken down further into several stages. Adapted from Yale (2017), the five stages of culture shock can be summarized into the honeymoon, culture shock, adjustment, adaptation, and reverse culture shock stages. The honeymoon stage is viewed as an exciting time, similar to one that tourists feel when visiting a new country. During this time, individuals will likely explore various aspects of the new culture ranging from food, places, and customs. Although this period of time is fun and pleasant, it typically lasts a few weeks. Once the initial euphoria wears off, the culture shock stage sets in. Individuals will experience irritation and frustration between the new culture and their home culture. Cultural differences in emotional expression and communication will take a toll on the travelers and may even lead to a period of isolation. In the adjustment stage, the individuals will slowly come to terms with the differences and realize what internal changes need to take place. Although they may still feel biased toward their home culture, a gradual comprehension and deeper understanding behind unfamiliar cultural norms will develop. The adaptation stage is referred to as “adaptation,” because it typically comes after one and a half years. One aspect to keep in mind is that, depending on the duration of the experience abroad, some people may never get to experience all of the stages of culture shock. Here, individuals find that they can openly accept the new culture and no longer feel like an outcast due to cultural differences. They may feel very comfortable taking part in social interactions with natives of the foreign culture and may even recall aspects of their own culture that may seem strange or foreign. Although it may be brief, the final stage, reverse culture shock or re-entry shock, may bring about similar feelings to culture shock as when they initially arrived in the foreign country. Friends and family may not be as excited about the travelers' experience as they hoped. This can be mitigated by using technology to connect often with friends and family back home and share the growing experience. If the study abroad duration is long, individuals may also feel frustration or discomfort from the new cultural values and mannerisms they have developed. However, after some time, they will likely get back into a familiar routine but still retain a newfound perspective of the world as they move forward through life.

### Teaching and Training Students about Culture Shock

While some studies have different titles for each of the stages, the experience within each stage is synonymous. Familiarity with these concepts and the host country's cultural environment prior to departure is crucial to alleviate some symptoms of culture shock (Xia, 2009). Inevitably, students will go through an adjustment process that includes emotional, psychological, behavioral, cognitive, and physiological impacts, which makes it imperative that effective training be done before they begin their sojourn (Goldstein & Keller, 2015). Indeed, studies have shown that cross-cultural training before departing for a foreign country makes a very big difference in the success students will achieve during the study abroad experience (Berdan et al., 2013). While higher education institutions have

established programs to help students learn and cope with culture shock, commonly through a one-time orientation, experts have called for a more proactive approach (Presbitero, 2016).

Concerning the phenomenon of culture shock, while it was originally known to follow a U-shaped curve, Gullahorn and Gullahorn (1963) suggested that reverse culture shock is just as important and thus would mean revising the concept into a W-shaped curve. Adopted from Hoffenburger, Mosier, and Stokes (1999), a chart (see Figure 1) has been constructed by the investigator to help illustrate the stages of culture shock. Although there have been different interpretations of the stages, this W-shaped premise is widely accepted to illustrate the periods in which individuals will face. Moreover, it was due to a lack of resources on repatriation (Brown, 2016) that led to more focus on teaching students about the entire roundtrip experience of study abroad.

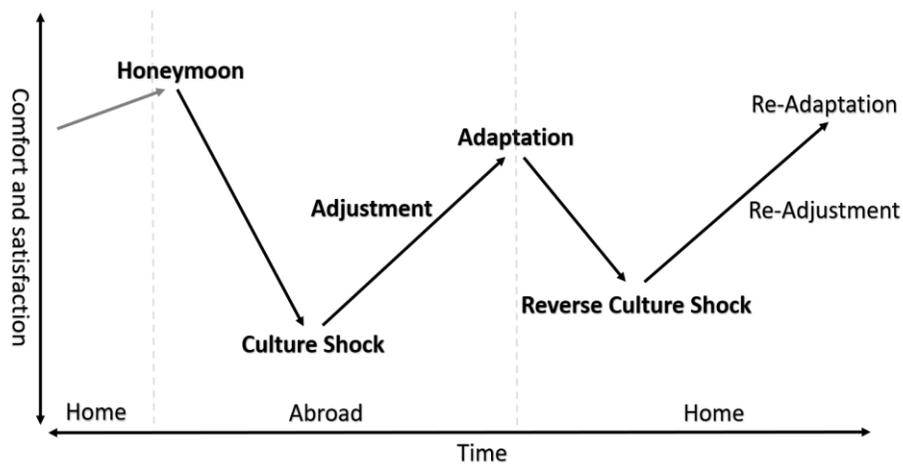


Figure 1. Chart representing the five stages of culture shock in bold font adapted from Hoffenburger, Mosier, and Stoke (1999).

### Learning/Training in Virtual World Environments

There is still debate regarding how well an online virtual world experience compares to the real-world experience; however, it is agreed that, theoretically, authentic materials can be delivered through virtual cultural experiences (Shih, 2015). On the other hand, Situated Learning, described as learning that takes place in a comparable context to learning in the real world (Lave & Wenger, 1991), was used in a study put forth by Falconer (2013). In her study, participants took part in a virtual learning simulation, and despite comments portraying it as an ‘artificial world,’ the learners still felt authenticity in the virtual simulation. The claim that virtual environments provide better retention of learning is also mentioned in Scopes (2009), highlighting that VWs can be designed to support situational learning and perhaps act as a ‘surrogate’ environment for learners and match the context.

### Usability in 3D Virtual World Learning Environments

It is argued that although various usability methods exist for virtual environments, many have limitations (Gabbard, 1997). Upon reviewing several theories, the investigator found that Norman's seven-stage action cycle (Norman, 2013) was appropriate for organizing the methodology of the evaluation criterion. The framework consists of seven stages summarized into execution (plan, specify, and perform), the evaluation (perceive, interpret, and compare), and finally, the (goal). The stages consist of user activities that involve user-based performance around certain tasks. Gaddard (1997) found this framework to be vital in developing his taxonomy of usability in virtual environments. Furthermore, Gaddard (1997) suggests that Norman's core theory allows for innovative and non-traditional usability studies, and is particularly well-suited for evaluating the interaction between users and virtual environments.

While traditional usability approaches can be easily adapted to measure the effectiveness of a website or mobile app, applying these to a virtual world learning environment presents certain challenges. This is due to the fact that most usability methods are applicable for certain types of user interfaces (e.g., websites) and have little to no use in improving non-routine interfaces such as those found in VWLEs (Gabbard, 1997). In combination with teaching material that centers around attitudes and values, gauging the usefulness of a virtual simulation requires developing a usability task protocol to fit the instructional lesson. In developing the task protocol and script, much of the structure was influenced from the guide, "Rocket Surgery Made Easy" (Krug, 2010).

### Minecraft and Education

The concept of designing an immersive simulation about the five stages of culture shock for college students arose from the personal experience of the investigator and his desire to create a more engaging method of instruction through Minecraft in hopes of improving traditional means of delivery. With more than 176 million copies sold to date (Persson, 2019), Minecraft is one of the most successful games to ever be created and is enjoyed by youth as well as adults around the world. Although there appears to be no literature on Minecraft teaching cultural subjects, there is a plethora of literature highlighting the efficacy of the game being used in instruction around other subjects, especially science, technology, engineering, and mathematics (STEM). Due to its high level of engagement, the sandbox-like environment nurtures learners to take ownership of their learning which yields positive learning outcomes (Roberts-Woychesin & Warren, 2015).

## **Methodology**

### Research Questions/Goals

The following research questions were developed to guide the evaluation process of the usability study and target audience.

1. How easily do college/university students navigate their avatar through the virtual space within the simulation?
2. How efficiently do college/university students perform tasks within the virtual simulation?
3. What is the level of user motivation (appeal, relevance, confidence, satisfaction) to use a simulated world to learn about the five stages of culture shock?

The research goal of this usability study was to assess whether the Minecraft simulation can be usable in informing participants about culture shock and its stages. To determine the effectiveness, three areas were measured by focusing on navigation, efficiency, and motivation. Navigation was chosen for the virtual simulation as a way to evaluate the learners' exploratory journey through several different areas that include foreign cities and towns. Efficiency was selected because time is always limited, and this exercise is meant to simply inform participants about culture shock. Finally, user motivation was assessed on the appeal, relevance, confidence, and satisfaction that the simulation conveys.

### Content Analysis

Since the project was a usability study, the assessment was not centered around the instructional content, but rather the usability of the method of delivery. To help visualize how the virtual world would be set up, a wireframe (Figure 2) was developed to outline where the content would be located, and how the tasks would be facilitated. For larger images of the wireframe, see Appendix A.

The goal of the study was to assess the usability of the virtual simulation; for this reason, the content was limited to only the essential items which are the five stages of culture shock, their significance, possible symptoms, and examples that would trigger a reaction. With this in mind, the study focused on navigation, efficiency, and user motivation of the virtual simulation. The instructional method was broken down into the five stages of culture shock within the virtual world and included the honeymoon stage, culture shock stage, adjustment stage, adaptation stage, and reverse culture shock stage. Each stage was indicated by a yellow circle within the wireframe. Within the game itself, these areas were labeled as 'stages' where learners needed to ascertain content.

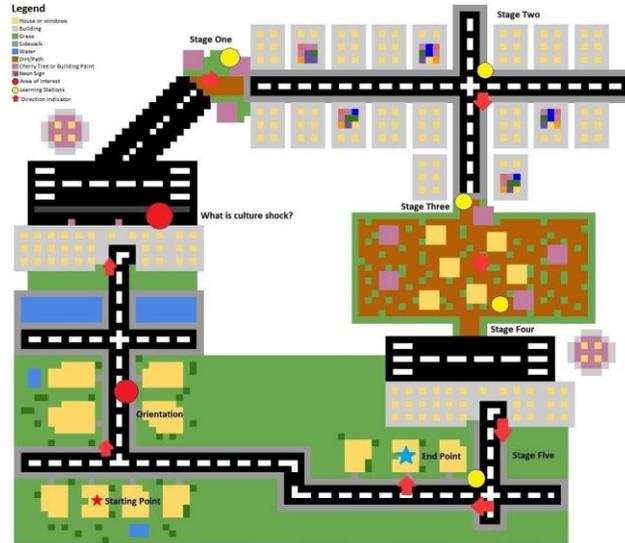


Figure 2. Top-down wireframe of the virtual simulation.

When learners made their way through the simulation, it was expected that they would learn about culture shock and its stages. Although the first red circle (bottom left) simply represented a navigational tutorial area, the second red circle contained a definition of culture shock. A signboard located at that location stated that the phenomenon of culture shock is the psychological disorientation when moving to a new, unfamiliar cultural environment.

The first stage represented the honeymoon stage and contained information about what to expect when first arriving in a foreign country. The learner discovered common reactions such as feelings of excitement and the urge to explore new places, food, and customs. Pictures of these types of cultural aspects were included in the area to illustrate the fun new discoveries a student might find when coming to Japan.

The second stage, culture shock, taught the learner about the hardships and difficulties students might face when the honeymoon stage wears off. A signboard at the station mentioned how individuals can feel frustrated about cultural differences and feel homesick for their native culture. Common symptoms such as depression, anxiety, and feelings of helplessness were also covered. Additionally, a question asked about what happens when a person fails to overcome the symptoms of culture shock. The answer revealed that individuals can become hostile to host nationals, thus leading to greater difficulty in developing interpersonal relationships with locals.

The third stage, adjustment, instructed learners on how they can overcome the shock stage by encouraging them to seek a deeper understanding of the host culture. Signs included tips on how to cope with differences since learning what to expect beforehand can drastically lower the shock. Some tips suggested establishing a high degree of self-confidence and optimism, accepting that other cultures are not good or bad but simply different, and urging individuals to seek social support from new friends, faculty members, or

counselors at the host institution.

The fourth stage, adaptation, was presented as a goal for which individuals should strive. This station informed learners on what they can expect when they achieve this stage in their study abroad experience. Travelers discovered that in this stage, the negative symptoms of culture shock will disappear largely and personal identity will begin to shift to the point where the person may forget that they were from a different country.

The last stage representing reverse culture shock taught learners about the struggles of leaving the host country and reentering their home country. The signboard here explained that friends and family back home may not be able to comprehend the journey the student underwent and will likely expect the person to re-adjust quickly. This frustration can lead to a feeling of alienation but is typically short depending on the duration of the study abroad experience. The final station informed learners that the best way to deal with re-entry shock is to remember the experience they initially had adjusting to the host culture and apply the same mentality. Students who undergo extended study abroad experiences typically feel enlightened and more confident by their broadened perception of the world.

The information was delivered via text and visual elements in-world with the aid of Minecraft modifications (mods) integrated into the server (see Appendix Q). For the most part, the affective domain of learning was utilized for the simulation; however, the cognitive domain was also an important component as learning about culture shock and its symptoms will better prepare students for their study abroad experience. Research has shown that students should aim to be emotionally ready because the affective process and stress from culture shock are associated with the action of moving to an unfamiliar location; and furthermore, will usually have an unfavorable effect on the psyche and emotional aspects of the person (Presbitero, 2016).

### Participants

The intended audience for this study was 18 to 22-year-old American college/university students who were preparing for their first study abroad experience in Japan. The scope was limited to this audience so that an accurate assessment of the virtual simulation could be established for this particular group of individuals. Although target participants of the study were American college/university students at Hawaii Tokai International College (HTIC) and University of Hawaii–West Oahu (UHWO), the investigator encountered difficulty recruiting participants from this group. Students from these two colleges were targeted due to the fact that the investigator's place of employment is HTIC, while UHWO is the neighboring campus.

Recruitment of participants was handled by the investigator verbally, through email (See Appendix C), and through the use of social media such as Facebook. In total, twelve ( $n = 12$ ) participants were selected and successfully completed the usability study over three iterations, 4-4-4 respectively. The demographics table of the participants can be seen in the appendices (see Appendix Q).

To take part in the study, participants needed to have administrative access to a computer, stable WiFi, a keyboard, and preferably a mouse. To ensure students met the criteria to participate, a list of requirements was included in the recruitment material to act as a screening checklist (see Appendix D). No former knowledge of Minecraft, Japan, or culture shock was necessary. Before and during the simulation orientation, basic instructions for navigating Minecraft were provided. Furthermore, the level of the instruction within the simulation was aligned to the age of the target audience to ensure a holistic understanding of the content and materials.

### Evaluation Instruments

**Users and demographics.** It makes sense that having different users in your study will have a profound effect on the performed task and outcomes (Gaddard, 1997). In order to effectively evaluate the use of VWLEs, it becomes necessary to identify the differences and the implications of having various users involved in a study. For this reason, a pre-survey (see Appendix J) was developed and administered prior to the usability study. The survey gathered information on user characteristics and perceptions regarding the content and method of the study.

**Usability checklists.** Several checklists were created to ensure all instruments were correctly set up and operational prior to the study and to also ensure that the usability study's protocol functioned as intended during the session. The checklists (See Appendix K) were designed to ensure that the participant and facilitator were ready to begin the usability test.

**Usability task protocol.** An important aspect of the study was the task protocol as it was essentially the script and lists detailed tasks (see Appendix L) that were conducted during the simulation with the participant. The usability study's script and tasks went hand in hand with the observational instruments and heuristic evaluation. This portion was expected to last 50 minutes and prompted the participant to perform various tasks within the virtual simulation. During the first ten minutes, learners were prompted to navigate the orientation area, thereafter, individuals spent about 40 minutes attempting to complete five tasks initiated by the investigator. These tasks were designed to evaluate how usable the virtual simulation was and identify issues to address for the next iteration. Participants were allowed to ask questions during the study, however, it was mainly expected for them to think out loud and navigate/interact with the environment. With the participants' consent (See Appendix I), each session was recorded in Zoom (i.e., a cloud platform application for video and audio conferencing with recording capabilities) and subsequently stored securely offline for analysis.

**Usability issues and heuristic evaluation.** Since identifying issues of the virtual simulation is the core of the usability study, a heuristic evaluation (see Appendix M) was developed to classify the problems discovered. Possible issues were coded and categorized by the investigator into various usability criteria based on the Quality in Use Integrated Measurement (QUIM) model (Seffah, Donyaee, Kline, & Padda, 2006) which represents a consolidated hierarchical model of usability measurement. Each identified usability issue

was organized into categories following the themes of the research questions and ultimately coded by the investigator during the usability test following a 1 - 5 likert scale based on the level of severity.

**Post-study informal interview.** This informal ten-minute interview was meant to give the participant a chance to speak candidly about their experiences in the virtual simulation. Several prompt questions (see Appendix N) were prepared so the facilitator could gain further insight into the study and identify areas needing improvement for the next iteration. This interview was also recorded using Zoom and then stored securely offline for later analysis. This helped ensure accurate notes (see Appendix O) were written down in the observation form.

**Post-study survey.** Upon completing the usability study and post-interview, a 10-15 minute survey via Google Forms was administered to the participant. The questions prepared were designed to gain additional insight into the three research questions (see Appendix P).

### Project Design

During the initial design, Keller's (1987) ARCS (Attention, Relevance, Confidence, Satisfaction) model played a crucial role in developing the foundation for the virtual journey within the simulation. Since students preparing for study abroad might not think culture shock will be an issue, getting their 'Attention' at the beginning of the instruction was deemed necessary. Utilizing game-based learning techniques through Minecraft was the first step in engaging the learners. The 'Relevance' of the content would soon become apparent as users progressed through the simulation and became aware of the symptoms of culture shock that they would inevitably experience. It was assumed that the more users comprehended through the virtual simulation, the more they would build 'Confidence' against the challenges of culture shock. Finally, by the end of the simulation, it was hypothesized that they would achieve a high level of 'Satisfaction' through their accomplishment of completing the intercultural journey.

In addition to the ARCS model, the design of the virtual simulation drew on the Successive Approximation Model (SAM; Version 1) by Allen and Sites (2012) as well as Gagne's nine events of instruction (Gagné, Wager, & Rojas, 1981). SAM<sub>1</sub> model advocated for a lightweight design that can be quickly developed through several quick iterations for a usability study of this scale. More specifically, SAM<sub>1</sub> is a cyclical model including three familiar iterations of instructional design steps of analysis/evaluation, design, and development. At the same time, Gagne's nine events of instruction aligned well with the ARCS model and provided valuable insight on how to design the instruction within the Minecraft virtual simulation. The steps included in the external instructional events from Gagne coincide closely with the ARCS model and outlined the framework of the design.

Although it is impossible to have learners experience culture shock first-hand in a virtual setting, a simulated learning environment was hypothesized to be the first step in gaining

the attention of students and informing them of the content importance. The virtual world itself followed a linear path by having learners navigate their avatar through seemingly realistic areas associated with the cultural experience. The first area as seen in the wireframe (see Appendix A), was an American suburban town. Individuals navigated their avatar through this area and into an airport which flew them to an Japanese urban city. Moving through the city, the users found themselves leaving the skyscrapers environment by subway and arriving into a more rural scenery of Japan. After completing this area, a taxi waited to take them to another airport which brought them back to the American suburban town where the path of the simulation ended.

Prior to designing the world, the investigator searched online for previous Minecraft build designs shared by other users in order to develop an idea for the type of architecture that would need to be constructed. One website, planetminecraft.com, includes a multitude of user-submitted designs which made browsing for inspiration quick and easy (see Appendix R). From here, the investigator started building in the world with the aid of a Minecraft modification known as MCWorldEdit which enabled more efficient building commands. As for the content within the simulation, the instruction was delivered through the use of text and visual components using a Minecraft mod called Banner Board. The mod allows external jpeg or png files to be inserted directly into the virtual world and was essential in the development.

### Procedures

In February 2020, the investigator reached out to potential participants verbally, by email, and through social media. Participants who showed interest were followed up with an official email including a screening checklist (see Appendix D) that indicated requirements for taking part in the study. Those who met the checklist requirements were requested to reply to the email indicating when they were available to take part in the usability study. The researcher then confirmed the session and provided a consent form (see Appendix I) for the individual to sign, a link to the pre-study survey, and further instructions for the upcoming session. The pre-study survey took approximately ten minutes and aimed to learn the characteristics of the learners (see Appendix J).

On the day of the usability test, the investigator met with the participant online via Zoom. To help illustrate the procedure of each session, a flowchart (see Figure 3) was created. The items within the green box represent what took place during the 1-on-1 session between the investigator and the participant.

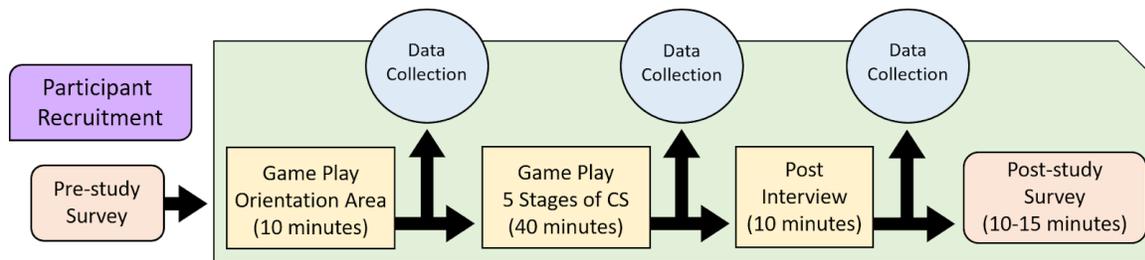


Figure 3. Diagram representing the procedure before and during the usability study sessions.

Testing the virtual simulation took approximately 50 minutes and was recorded by using Zoom from the investigator's computer. In total, five tasks were given during the cognitive walkthrough. The participant was first given 10 minutes to navigate through the orientation area. After which the investigator issued five tasks, one by one over the course of 40 minutes for the user to complete. During this time, the facilitator asked the participant to think-aloud while making their way through the simulation (see Appendix L). Lastly, 10 minutes was reserved for the end where users were asked to answer several interview type questions to gain more insight into the user experience of the simulation. After this portion, the recording was stopped.

At this point, a post-study survey was provided via a link in the Zoom chat to the participant to complete. The survey aimed to gain further understanding into the participant's experience (see Appendix P). Upon providing the post-survey link, the investigator thanked the participant for their time and ended the Zoom call. The entire timeline of events for this project can be seen in appendix S.

## Analysis & Results

The data collected contained a sample size of twelve ( $n = 12$ ) participants over three iterations. Even though the participants were not entirely from the target audience, the results from the cognitive walkthrough seemed to offer a broader variety of feedback. This is due to the fact that some of the older participants already had experience traveling abroad and going through culture shock. Concerning the results, the usability study relied heavily on qualitative data compared to quantitative data as much of the feedback during the simulation was verbal. Furthermore, the post-interview and post-survey mainly contained questions requesting participants to provide additional verbal and written feedback. The investigator analyzed the results of study by first organizing the data into categories that correlated to the research questions. Upon creating large tables in excel to organize the data, it was analyzed for trends and ultimately displayed via charts for a more comprehensive format for assessment.

Although improvements were made between iterations, there were no issues regarding functionality. The feedback mainly stated that the simulation was lacking in various areas in terms of content and stimulation. Pointing out that even though the participants are traveling to Japan virtually, they don't feel the sense of culture shock nor do they feel that



difficulty, the average rating for the simulation was an eight out of ten (one being very difficult & ten being very easy) including comments such as, “*Some places were confusing but I was able to manage. Even if I was going the wrong way, the layout guided me back to the pink path.*” Interpreting these results, it was thought that the simulation may have been too easy and that an overall 6 or 7 would have been ideal. This sentiment stemmed from the logic that a lower rating would mean that the simulation was challenging and stimulating.

For efficiency, the total duration of the in-world usability test, as well as the five tasks were all timed to measure how long users would take to complete the virtual journey. A chart showing the time taken for each task can be seen in Appendix T. Below are two tables indicating time taken to complete the simulation. Table 1 shows the amount of time taken for each round or version of the simulation, while table 2 shows the amount of time taken by the Minecraft user level. Interpreting the results, it is evident that the average time taken to complete the simulation was between 70 - 80 minutes. Round 2 & 3 took more time as additional content was added, and we can see that Minecraft user level clearly showed fluency in the game navigation when comparing the novice user to an advanced user. Although the intermediate user took an unusual amount of time, we can treat this result as an outlier since the individual spent considerable time exploring off the guided path within the simulation.

Round	<i>n</i>	Total	Avg.	Min.	Max.
1	4	287	71.75	40	100
2	4	322	80.5	57	98
3	4	315	78.75	50	106

*Table 1.* Represents time taken to complete the simulation by rounds (in minutes).

User Level	<i>n</i>	Total	Avg.	Min.	Max.
Novice	4	343	85.75	70	106
Beginner	5	352	70.4	40	98
Intermediate	1	100	100	100	100
Advanced	2	129	64.5	50	79

*Table 2.* Represents time taken to complete the simulation by Minecraft user level (in minutes).

As for user motivation, the chart seen in Appendix U was made to illustrate the participants' feedback regarding the simulation. Eleven out of twelve (92%) of participants in the last round of testing strongly agreed that the virtual world was appealing. Nine out of twelve (75%) of participants in the last round of testing strongly agreed that the virtual world was relevant. Ten out of twelve (83%) of participants in the last round of testing strongly agreed that the virtual world built confidence. Ten out of twelve (83%) of participants in the last round of testing strongly agreed that the virtual world was satisfying. Overall, results suggest that the simulation was visually appealing, was relevant to the context, built confidence in the user, and was generally satisfying to go through.

Lastly, there were several questions related between the pre-survey and post-survey that asked the participants about their perception towards using virtual worlds and game-based learning. A chart (see Figure 5) was constructed comparing results side by side. In every instance, it is clear that the participants felt more confident about virtual worlds and game-based learning as a whole.

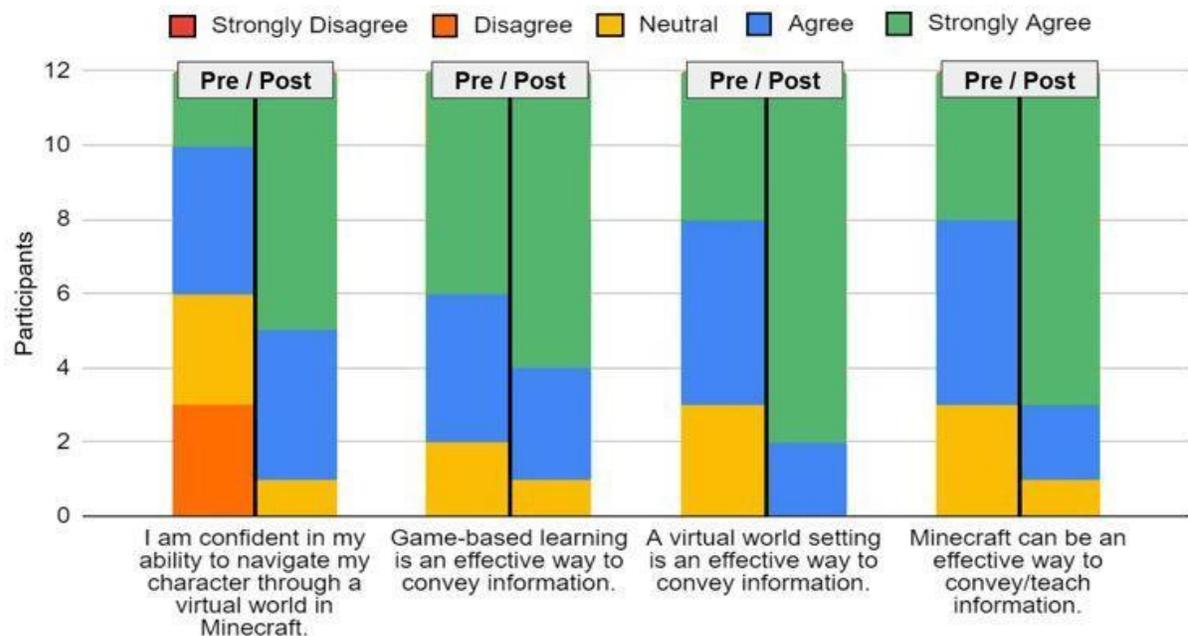


Figure 5. Chart comparing virtual world perception between pre and post-survey.

## Discussion

Results from the participants indicated potentials for using a virtual simulation to allow students to obtain the necessary knowledge before embarking on study abroad. The simulated world, while hypothetical, can act as a surrogate environment for students to experience what might entail in their sojourn. Although the results seem favorable, much needs to be done before this product would be suitable for real-world use. With that said,

the study's data suggests that virtual world learning environments have a potential for being used as a method of instruction. Drawing on the literature, this claim is supported by Scopes's (2009) theory that VWs can be designed to support situational learning and provide better learner retention.

Initially, the investigator was unsure of how to approach building the virtual simulation, but following proven instruction design steps led the initial design process. One of the critical first steps was wireframing out the landscape of the virtual world and then attempting to create one section at a time. By following this approach and utilizing some in-game code, a seamless virtual experience was created. Concerning content, taking on a specific issue of pre-departure training for students and converting it into a completely different format with several iterations pose challenges but also instill an appreciation for the multiple steps required in instructional design.

During the three iterations of the virtual simulation, it became apparent that numerous improvements could and would need to be made. However, what stuck out the most was the realization that different users have contrasting learning curves and expectations of what the virtual simulation contained. Because of this, the received feedback pulled the investigator in different directions when deciding on what aspects to revise. At the same time, there was a plethora of positive comments that helped to identify what worked within the simulation and these aided in deciding what in-game aspects to focus on for further development.

Lastly, looking back at the study as a whole, the question "was it worth it?" needs to be asked. Despite this method of content delivery taking many hours to develop, it stands as a unique and extremely engaging way of delivering information to the user. For this particular simulation, it is clear that much more work and testing need to be done for real-world use; however, the data collected from the twelve participants would serve as a great starting point for further development. Some points to consider for improvement would be adding more cultural aspects of the target culture by adding more signs, infographics, and culturally specific builds. Another point would be implementing interactive features such as having the user use in-game money to purchase common items in that country. In Japan's case, this could be prepaid smart cards for transportation and common snacks/drinks. Lastly, adding a quiz component in the game was another suggestion that would work well as it would give the user a chance to reflect on the content learned throughout the virtual simulation. The investigator anticipates that even though the world continues to evolve into a more digital age, the experience of physically travelling to another place will always be sought after and thus the number of students studying abroad will continue to increase. As long as this holds true, there will be a need for pre-departure training that sufficiently prepares students before their study abroad adventure.

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## APPENDICES

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- Appendix B: [Screenshots of Virtual Simulation](#)
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- Appendix D: [Screening Checklist for Participants](#)
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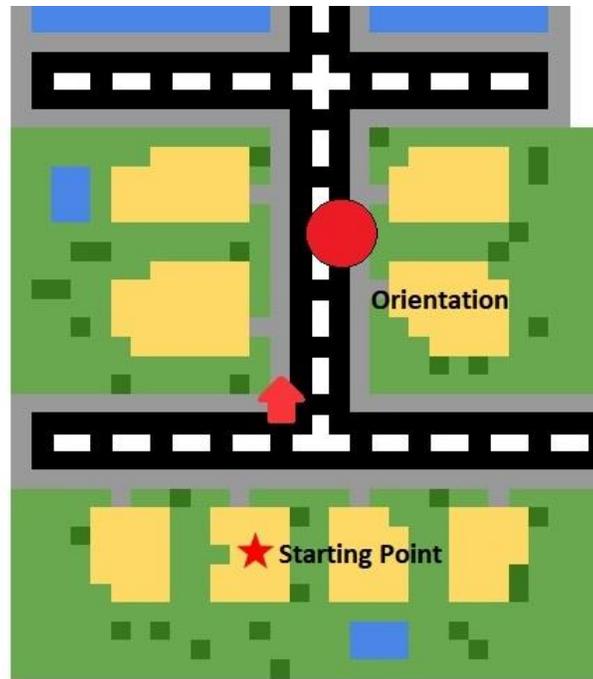


Figure A3. Top-down view wireframe of the virtual simulation in Minecraft: Segment 1 showing starting point and orientation area in order to familiarize navigation

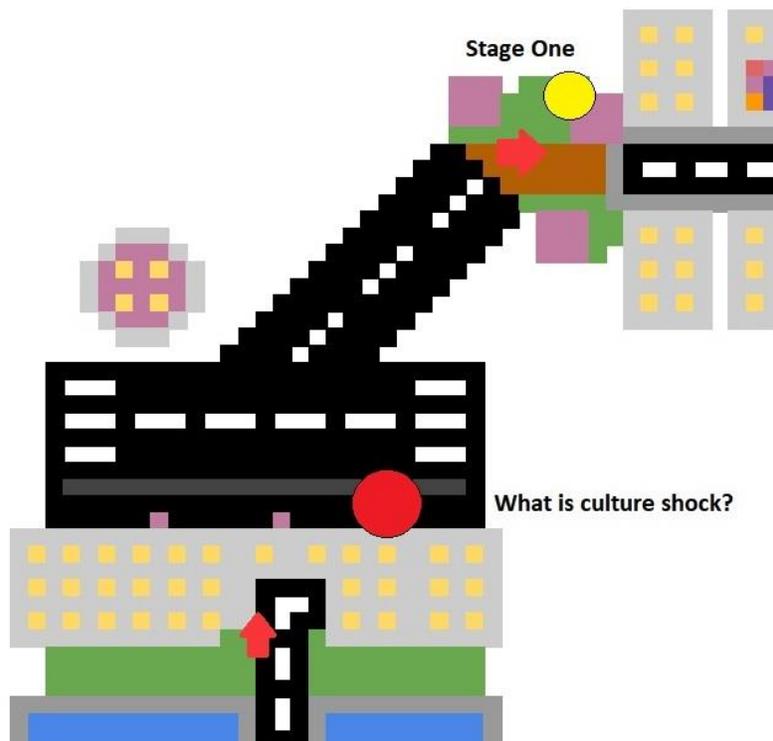


Figure A4. Top-down view wireframe of the virtual simulation in Minecraft: Segment 2 showing definition area of 'culture shock' and first learning stage 'honeymoon'

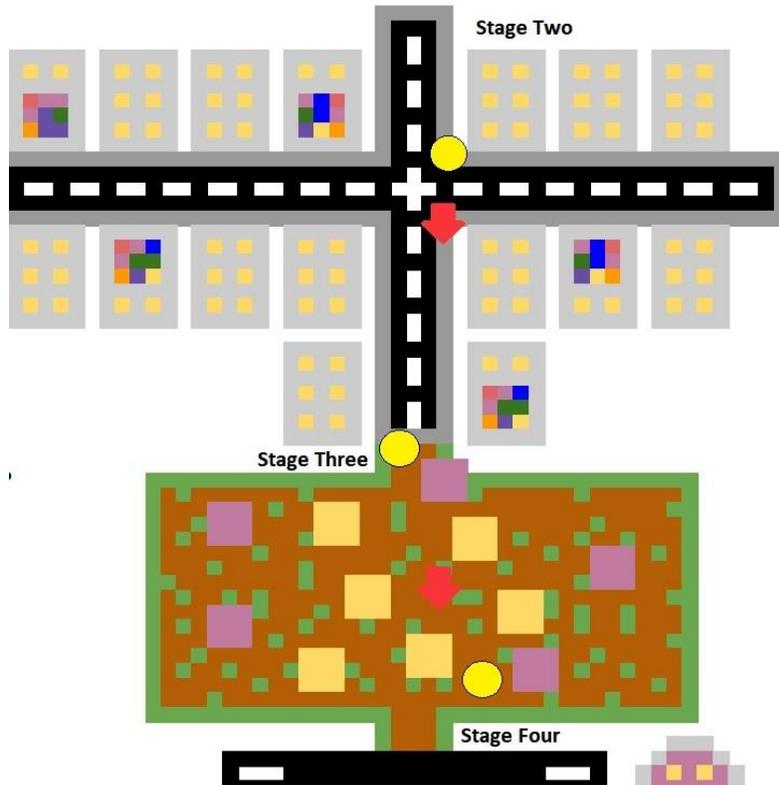


Figure A5. Top-down view wireframe of the virtual simulation in Minecraft: Segment 3 showing learning stage 2 ‘culture shock’, stage 3 ‘adjustment’ and stage 4 ‘adaptation’

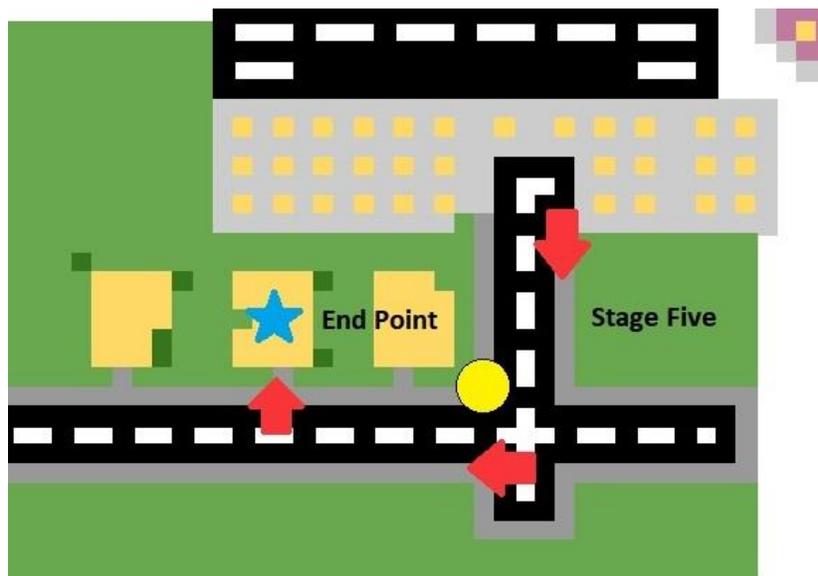
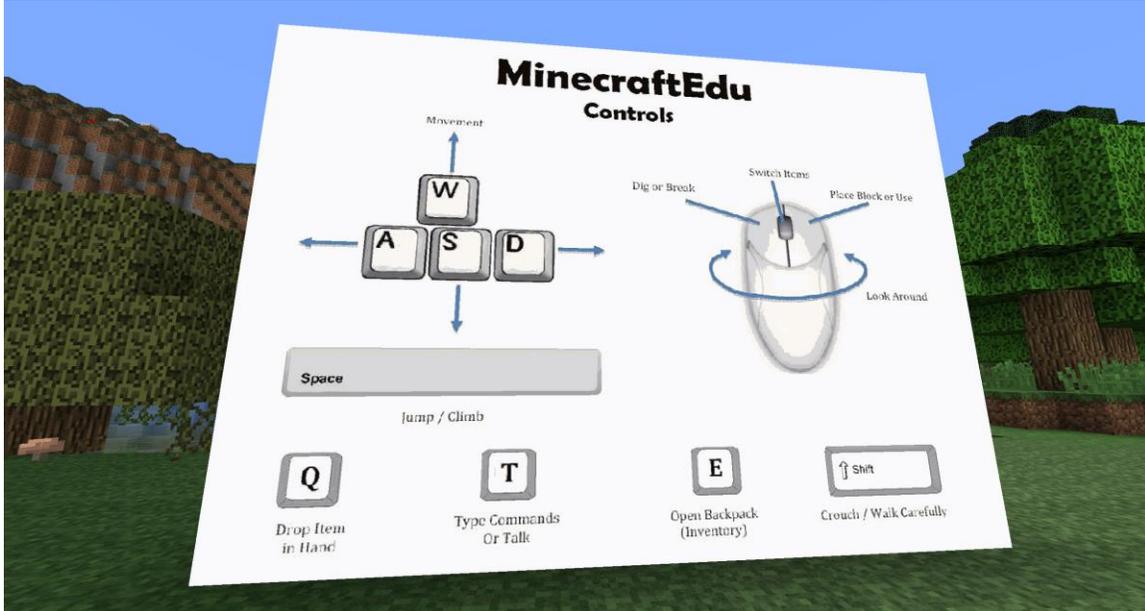


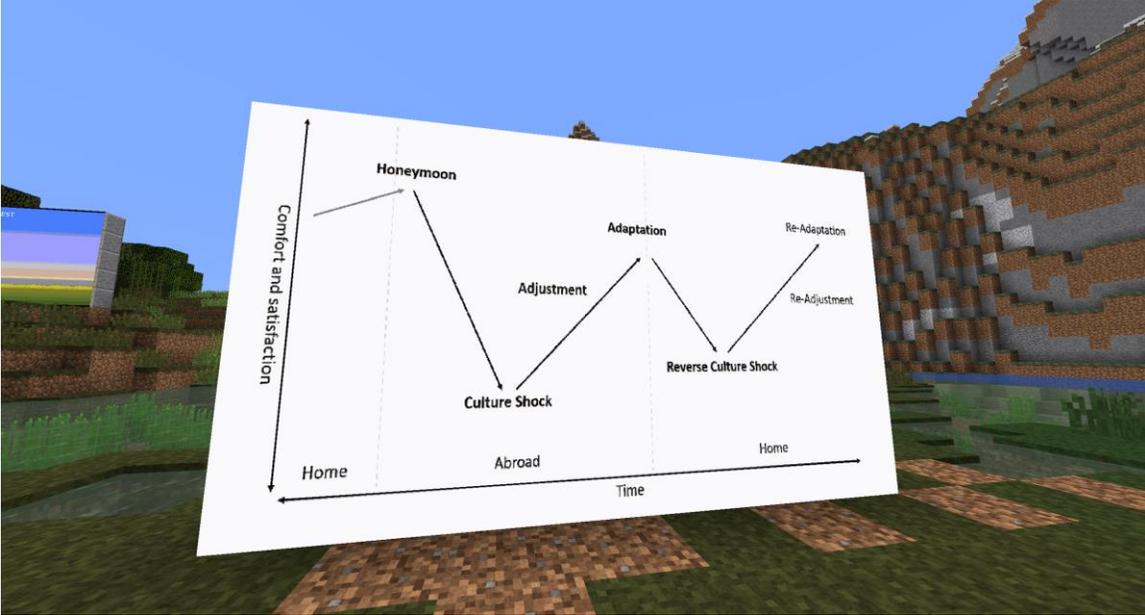
Figure A6. Top-down view wireframe of the virtual simulation in Minecraft: Segment 4 showing learning stage 5 ‘reverse culture shock’ and End Point

Appendix B  
Screenshots of Virtual Simulation









Appendix C  
Recruitment Materials for Email & Social Media

Invitation to Participant regarding the  
Minecraft Usability Study on the 5 Stages of Culture Shock

From: [cbales@hawaii.edu](mailto:cbales@hawaii.edu)

To: <Participant's email>

Aloha <Name of Participant>,

My name is Casey Bales and I am a Master's student in the Learning Design and Technology Department at the College of Education, University of Hawai'i at Manoa. I am reaching out to because I am doing a usability study on a virtual simulation that targets American university students who are interested in studying abroad. If you are available I would like to invite you to participate in my study by entering a virtual simulation of Minecraft and test the simulation for navigation, efficiency, and user satisfaction. Your feedback would be most appreciated and invaluable to the evaluation and further development of the simulation.

Your participation in this usability study is strictly voluntary and will incur no cost to you. The study itself will take no more than 1.5 hours and will be conducted in an online 1-on-1 interview style over the internet. The session will be conducted utilizing Zoom, an online communication application, and the game Minecraft Java. The session will involve a 5-10 minute pre-study survey/questionnaire (Online Google Form); 50 minutes of simulation testing; 10 minute informal post-interview; and a 10-15 minute post-study survey/questionnaire (Online Google Form).

There will be three rounds of testing following these dates below:

- Round 1: January OO, 2019
- Round 2: February OO, 2019
- Round 3: February OO, 2019

After each round of testing, alterations/improvements will be made to the simulation based on your feedback. If you are willing, available, and meet the requirements of the attached checklist, it would be my pleasure to have you participate in one or more rounds of this usability study. If interested, please reply back to this email with which date(s) you are available and also indicate that you meet the requirements of the attached checklist. I will then follow up with a confirmation email and a Consent to Participate form. Thank you very much for your time and consideration.

Kind regards,  
Casey Bales

Learning Design and Technology, UHM  
Project Investigator

*Figure C1.* Above is an example recruitment email which will be sent to potential participants to take part in the usability test. Along with the email, the screening checklist from appendix D will also be included.

Update/Reply to Participant regarding the  
Minecraft Usability Study on the 5 Stages of Culture Shock

Aloha <Name of Participant>,

Thank you very much for your response and consideration to participate in the usability study. I know your time is valuable and do appreciate having you take part in this session with me concerning the Minecraft simulation. As this session is strictly voluntary, you are free to end your participation in this study at any time. Attached is the Informed Consent form which simply requests that you give your consent to participate in this usability study. Please read through the form as it offers more details about the contents of the study. If you still agree to participate, please sign and date the form and return a scanned copy to me via email or in person. If you have any other questions or concerns, please do not hesitate to contact me.

Kind regards,  
Casey Bales

Learning Design and Technology, UHM  
Project Investigator

*Figure C2.* Above is an example of the reply email which will be sent if the participant meets the requirements and agrees to sign up for one or more of the usability testing rounds. It also contains the attached consent form (see appendix I).

Thank You to Participant regarding the  
Minecraft Usability Study on the 5 Stages of Culture Shock

Aloha <Name of Participant>,

Thank you so much for taking part in the Minecraft Usability Study on the 5 Stages of Culture Shock. I really do appreciate your willingness to participate and your feedback has been extremely valuable in helping to improve the simulation. Please note that any records of our session and such will be deleted and/or destroyed following the completion of the study. Should you have any questions or would like to see the results of the study after it has been completed, please let me know and I will be happy to share them.

Kind regards,  
Casey Bales

Learning Design and Technology, UHM  
Project Investigator

*Figure C3.* Above is an example of a thank you email sent to the participant once they have completed the usability test.

### Social Media Invitation to Participant regarding the Minecraft Usability Study on the 5 Stages of Culture Shock

Aloha everyone! Are you or do you know someone who is interested in culture shock and the experience of studying abroad? Would you like to test out a Minecraft simulation that teaches the user about the 5 stages of culture shock and provide valuable feedback for its improvement? If so, please check out the flyer below and email me!

*Figure C4.* Above is an example of a recruitment announcement that will be utilized to find potential participants on social media platforms.

### Verbal Invitation to Participant regarding the Minecraft Usability Study on the 5 Stages of Culture Shock

Hi (name), <if they don't know me: my name is Casey and I am a Master's student at the College of Education, at UH Manoa>, I wanted to talk to you because I am doing a study on game-based learning that targets college students who are thinking about study-abroad and wanted to see if you would be interested in testing it out.  
(see if they want to hear more)

Cool! So, I have made a Minecraft simulation that teaches the user about the 5 stages of culture shock. The testing would all happen online, and you would simply just have to play through the world and give me feedback. Still sound okay?  
(see if they want to hear more)

Your participation in this usability study would be strictly voluntary and will incur no cost to you. The study itself will take no more than 1.5 hours and will be conducted in an online 1-on-1 interview style over the internet. The only requirement is that you have a computer, ability to install programs, internet access, headphones, mic, and hopefully a mouse.

If you are down to do it, would any of the following dates work for you?

Round 1: January OO, 2019

Round 2: February OO, 2019

Round 3: February OO, 2019

Great! Thank you so much (name). Can I also get your email so I can follow up with details? (receive their email address)

Awesome, I will be in touch soon. Thank you!

*Figure C5.* Above is an example of a recruitment script that will be utilized to find potential participants verbally.

## Appendix D Screening Checklist for Participants

Below is the screening checklist outline that will be utilized in the recruitment process. Regardless of verbal invitation or by online text, potential participants of the study will be asked to review these points before agreeing to participate.

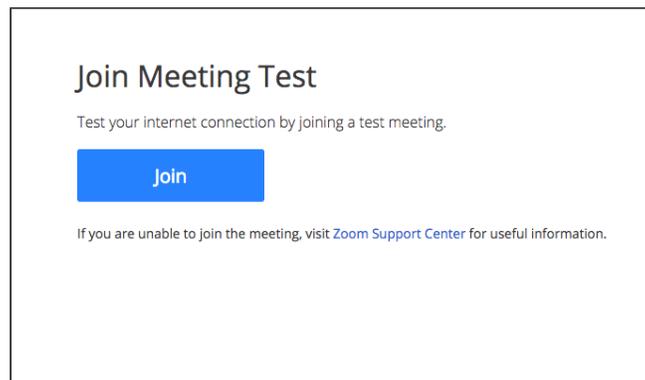
- I am at least 18 years old or older
- I am able to communicate in English verbally and by text
- I am willing to follow directions from the facilitator conducting the study
- I am aware and comfortable with cultural differences between countries
  
- I am comfortable with using a computer
- I have access to a working personal computer
- I have a stable internet connection on the computer
- I have the ability to install programs
- I have computer peripherals such as:
  - keyboard
  - Headphones (optional)
  - Microphone
  - Mouse (optional)
  
- I am willing to play a game called Minecraft even though I have no prior experience
- I am willing to learn about culture shock
- I am willing to install Minecraft Java and Zoom on my computer temporarily (at no cost)
- I understand that my participation is completely voluntary and have the right to stop participation at any time.

*Figure D1.* Screening checklist that will be included in the recruitment process.

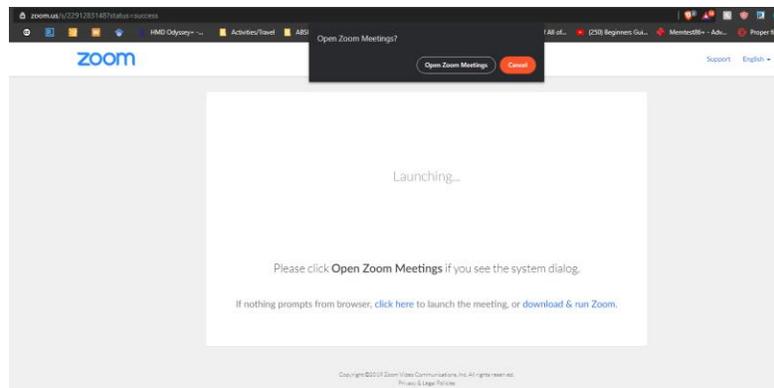
## Appendix E Zoom Set-up Instructions

Casey's [Zoom Room Quick Link](#)

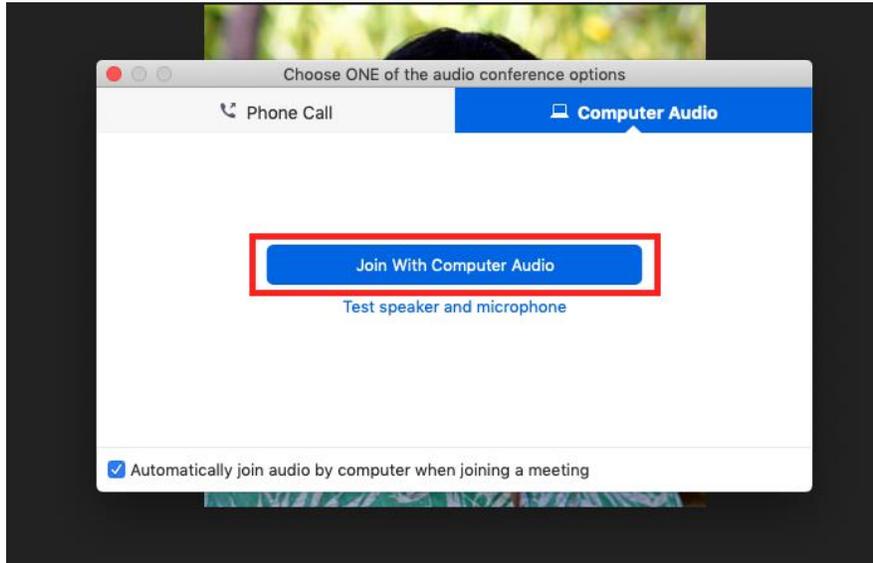
1. Be sure to use the latest version of [Google Chrome](#) or [Mozilla Firefox](#) for the best experience. For your reference, [Getting Started on Windows and Mac](#) & [Zoom Video Tutorials](#) are also good resources.
2. To join a zoom meeting, make sure your preferred audio device is connected, then simply click the host's zoom personal ID link: <https://zoom.us/j/2291283148>
3. If you are a new user, you will be prompted to download the Zoom installer. To do this before the scheduled meeting, go to [zoom.us/test](https://zoom.us/test). You will be prompted with the image below. Simply click join and you will be guided to install Zoom.



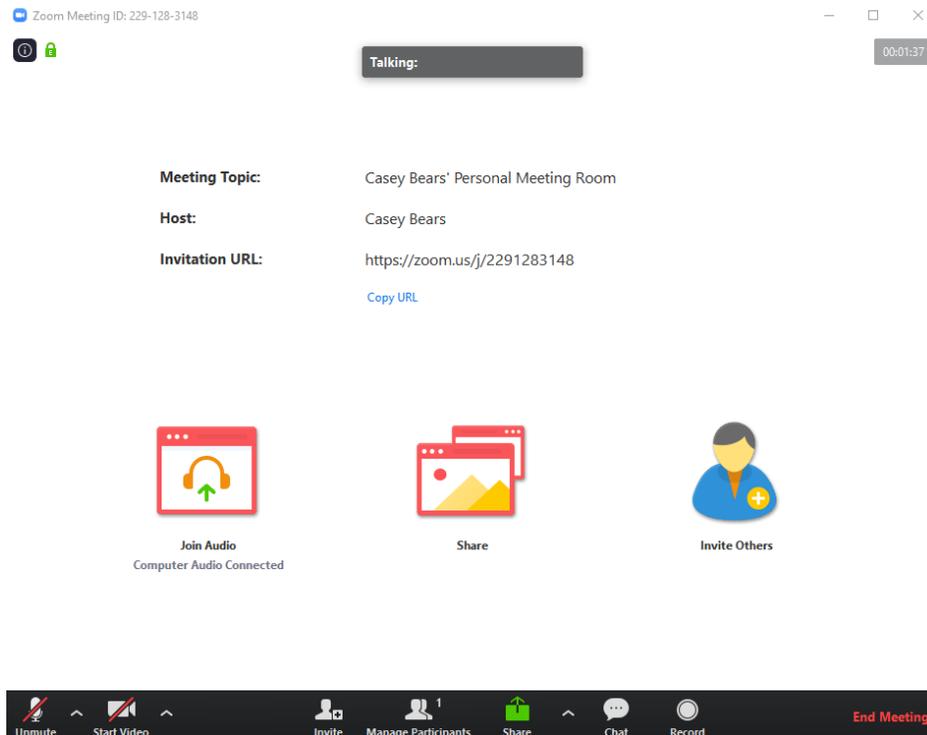
4. Once you click on the host's zoom room link, your browser will prompt you to open Zoom meetings. If you have ad blockers installed as an extension to your browser, you may need to disable them before.



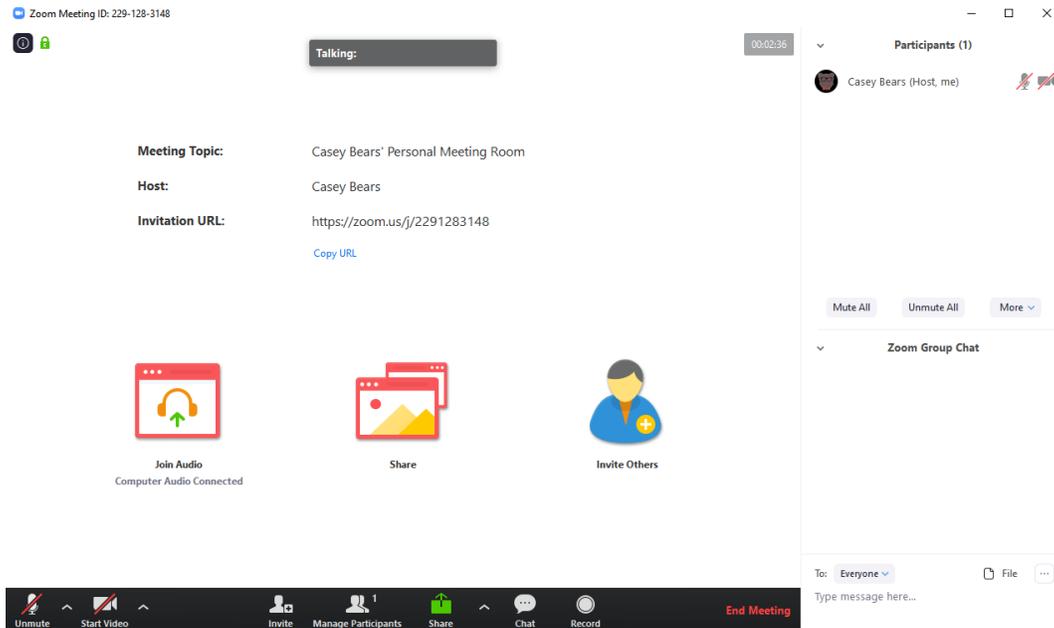
- 5. Next you should be presented with a window that asks how you would like to connect in terms of audio.



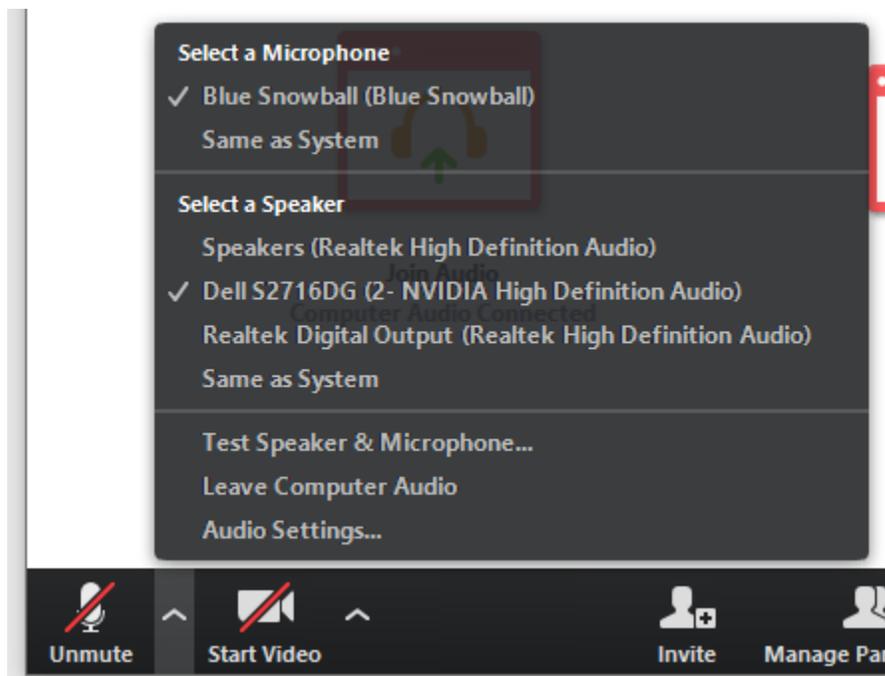
- 6. Once connected you will see a similar window as below.



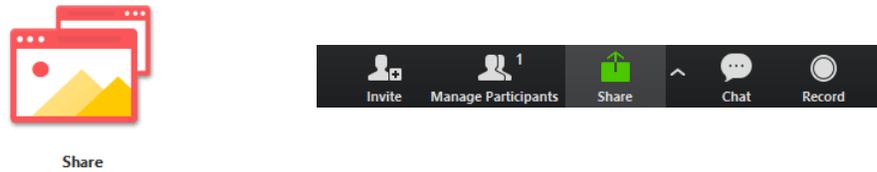
- By clicking on the “participants” and “chat” icon at the bottom. You can open the right hand pane that shows who is in the meeting and enable the chat function.



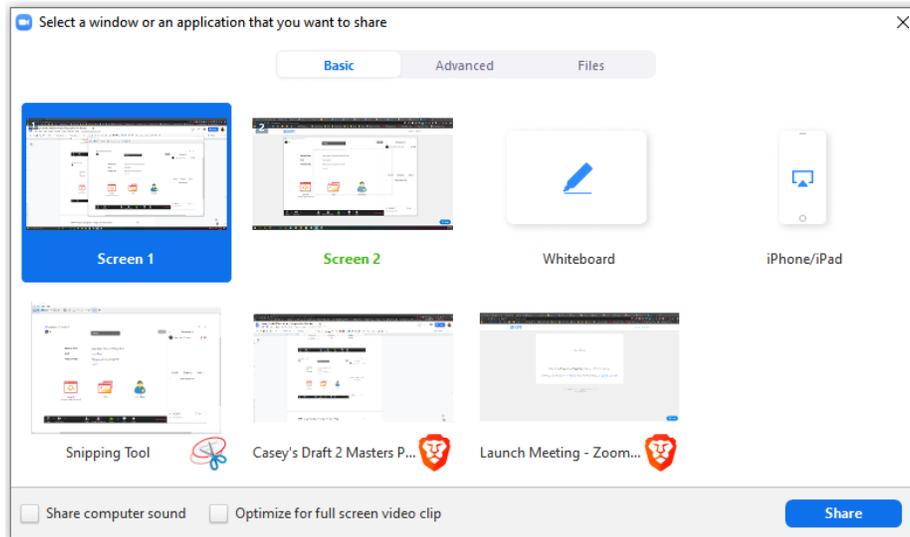
- Choose the lower left-hand icons to mute/unmute and start video/stop video. If you are having trouble, be sure you have the right speaker/microphone selected.



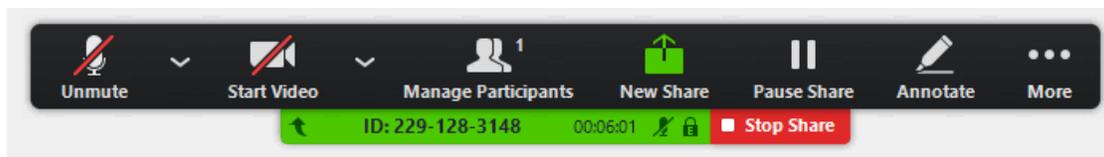
9. To begin sharing your screen, click on the “Share” icon in the center or the green one at the bottom.



10. Upon clicking share, you will be presented with a window like this. First be sure to check “Share computer sound” at the bottom left, then click “Screen 1.”



11. While you are sharing your screen, you will have the functionality bar at the top of your screen as shown here. It will auto hide when not in use. When finished, click “Stop Share,” and you will return to the previous Zoom window.



12. Again, please try to test out your microphone and audio prior to the usability interview. If you have any issues, please feel free to email Casey at [cbales@hawaii.edu](mailto:cbales@hawaii.edu).

## Appendix F Minecraft Set-up Instructions

In order to participate in the usability study, you must have access to Minecraft Java. There are **three** options available as follows:

1. You already own your own Minecraft account. If this is the case, move on to the directions in Step 2.
2. You would like to use my extra account for free. In Step 2 below, there is the login info for the spare account. Please use that AFTER you have downloaded Minecraft Java from Step 1.
3. You want to purchase an account. The current price to purchase is (\$27) at [Minecraft Java](#) -or- you can buy a digital keycode from [Amazon](#) if you are living outside of the United States. While you can play Minecraft Java for free, it is only a demo version. You will need the full version functionality for this study.

### Step 1:

**To download** Minecraft Java: Click <https://minecraft.net/en-us/download/>  
OR <https://www.minecraft.net/en-us/download/alternative/>

If you need some additional help, see the customer service instructions to [install Minecraft Java](#) on your computer. If your computer does not have good enough hardware you might have to run Minecraft in *windowed mode* and turn all of the graphics settings to a minimum for it to function well. See [here](#) for performance settings tips if you do not have a high end computer.

Once you open the program, you should see the Minecraft Setup Wizard. Click next and follow the instructions for installing it to your computer. If you are going with option 2 from above, this is where you will need to input the provided username and password located in step 2 below. If you have purchased your own, you will need to register and create a login name and password. Your login name will be visible as your avatar name.

As of 1/30/2020, the most recent version of Minecraft Java is 1.15.2.

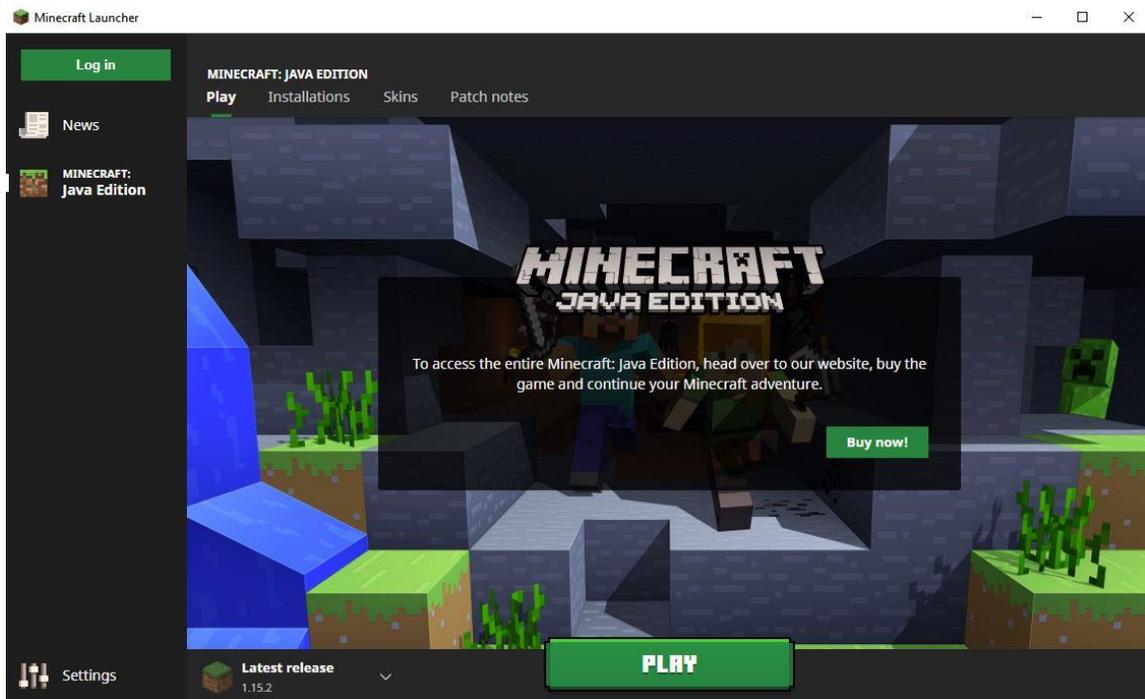
**Step 2:**

Once you have installed Minecraft, launch the game and you should be presented with a screen as shown below. If you do not have your own login information, please use my secondary spare account.

Email: hawaiiancasey@hotmail.com

Pass: Temp@2020

Once you login to the account, there will be one more set. Although the latest version as of now is 1.15.2, the world on the server is made in version 1.15.1. Please click on the Installations tab on top, then click the '+ New...' button, select the 1.15.1 version and click create.

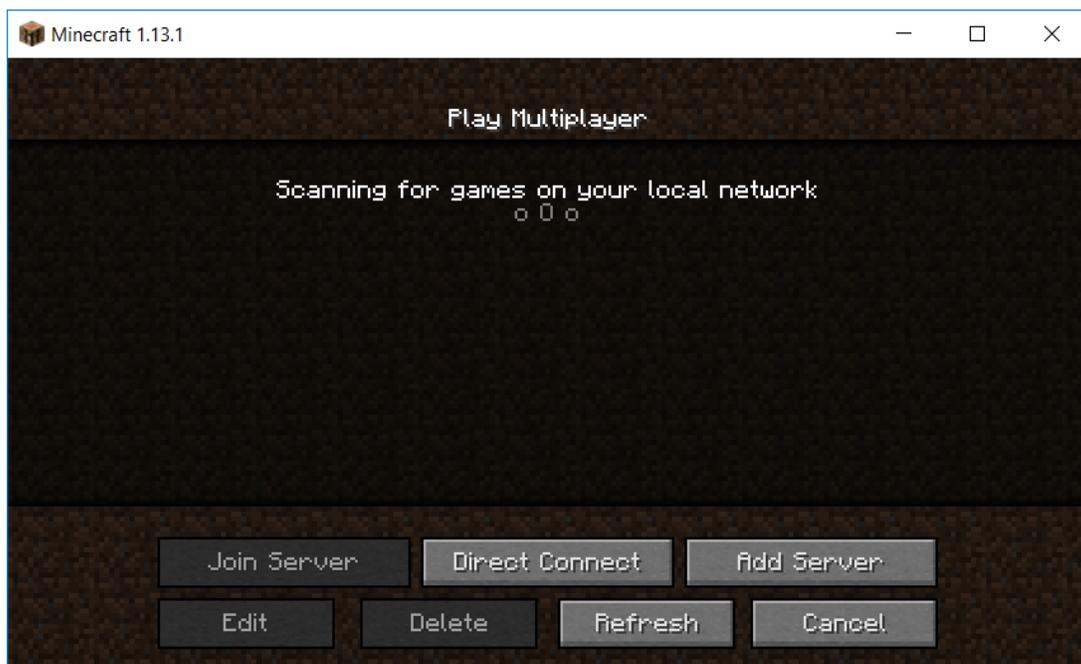


Check to make sure your version (1.15.1) and then click the big green PLAY button to download any remaining updates.

Your screen will change to something similar to this:

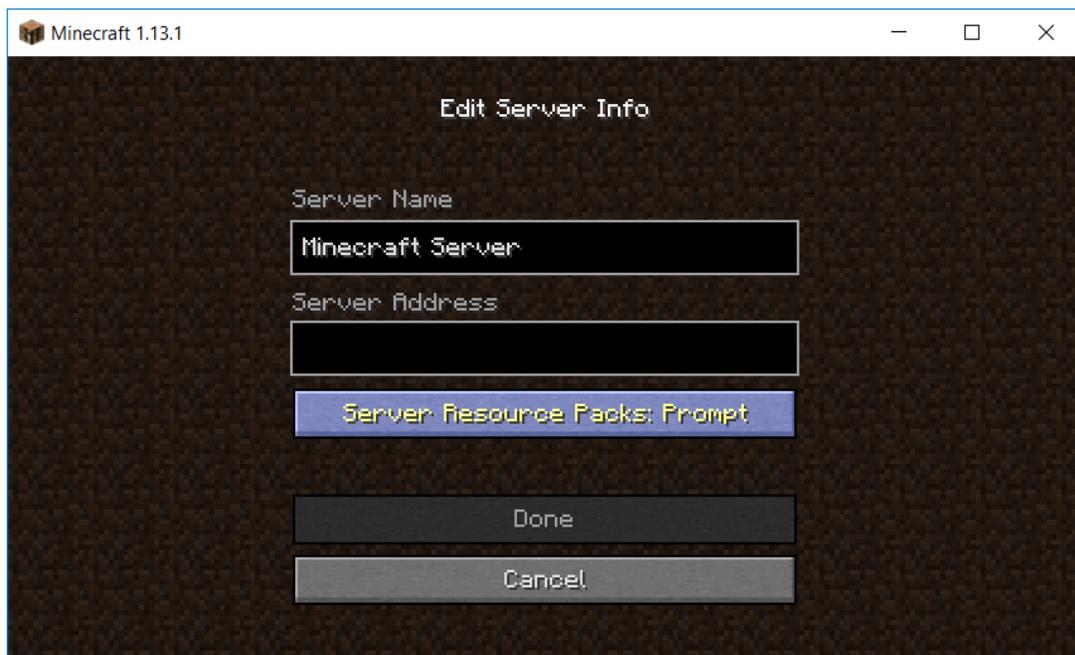


By selecting **Multiplayer**, your screen will then change to this:



If this is your first time playing multiplayer in Minecraft, you will have no servers showing. Click on **Add Server**.

Your screen will look like this:



Your server name and address will need to be filled in:



In **Server Name** you may type anything you like to remember the name of the server. The example shown here is “Anything you want!”

For **Server Address** fill in: [cultureshock.g.akliz.net](http://cultureshock.g.akliz.net) When you are finished, click **Done**. This will bring you back to the Multiplayer Server Page.

Now you should have the server name you typed in showing as a choice to join. If you see a red X, try hitting refresh at the bottom until you see an image as shown below. If you still have trouble joining, it may be because you are not on version 1.15.1.

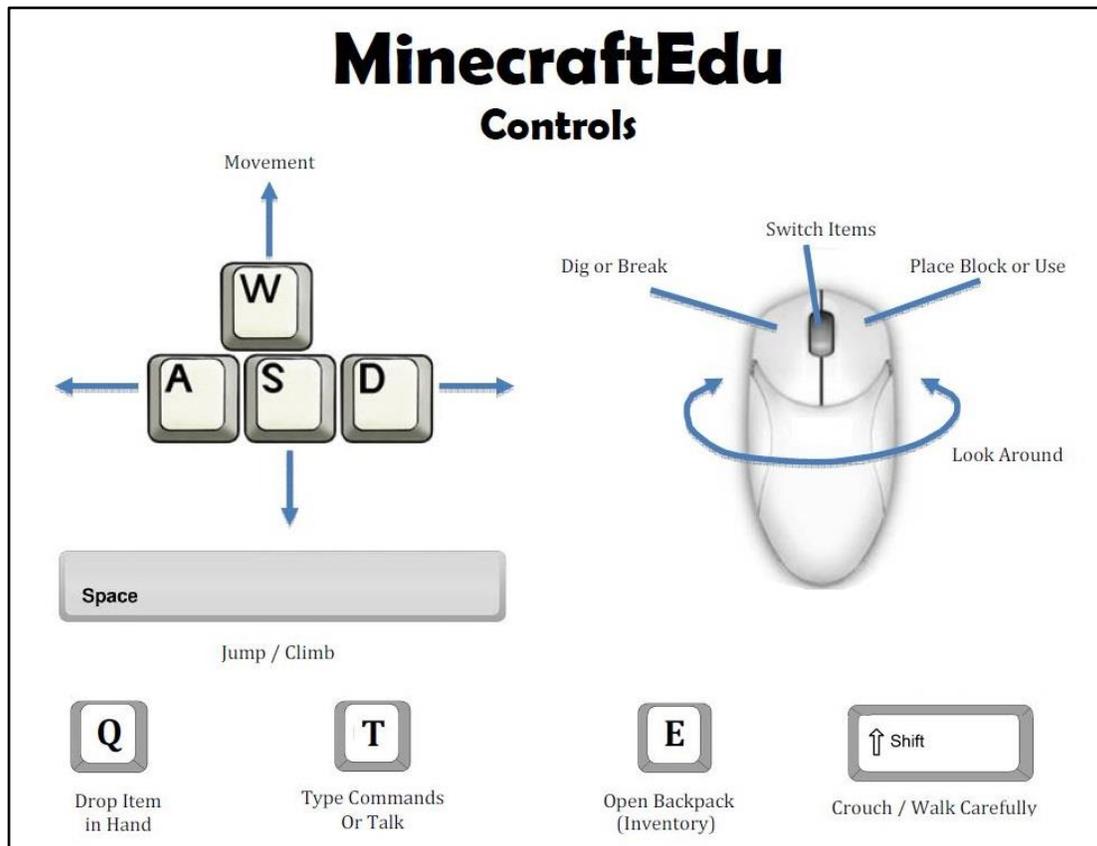


Click on the server name and then click **Join Server** (or the ) and your avatar will be teleported into the world server. Once you are able to enter the world, please press ESC to bring up the options and click **Disconnect**. This is all you will need to do for the setup. If you like, feel free to play in single player mode if you want to familiarize yourself with the controls.

If you have any questions at all, please do not hesitate to reach out and send me an email.

## Appendix G Minecraft Instructional Materials

Minecraft is a sandbox indie game in which you can build (craft), dig (mine), fight monsters, collect resources (block/items), survive, and explore. Basically, it is a three-dimensional world where you control an avatar (character). If you have never used the WASD keys to play a game before, this might take a little getting used to. Please see the image below as a quick start guide on how to navigate your avatar in the game.



- W = Walk forward
- S = Walk backward
- A = Walk to the left
- D = Walk to the right
- Space bar = jump
- Mouse = Face direction
- Double tap + hold W = Run
- T or / = Open chat dialogue
- F2 = Take screenshot
- F5 = Toggle between first person and third person camera angle
- ESC = Options

### Additional resources:

[Mastering Minecraft Controls Video Tutorial](#)  
[Minecraft for Parents Guide](#)

### Appendix H CITI Training Certificates

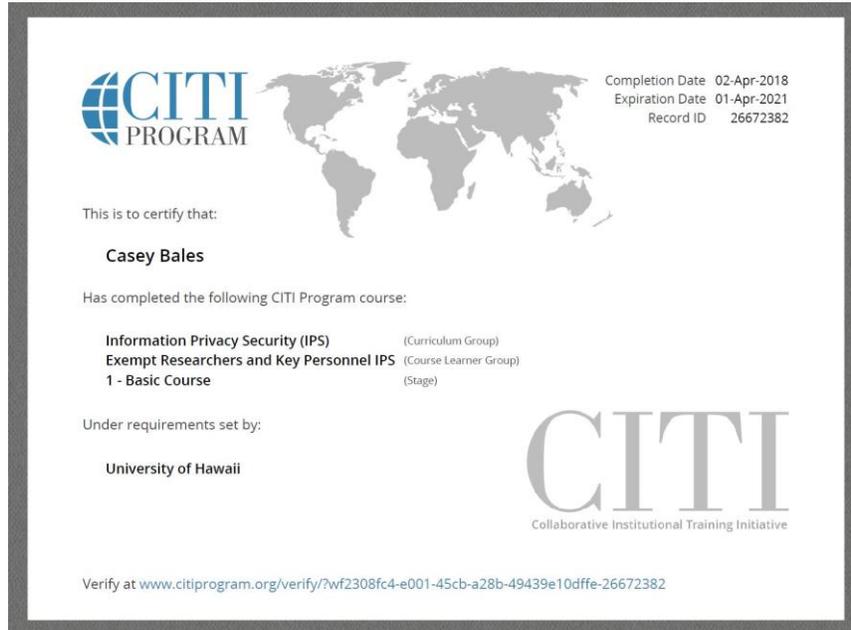


Figure H1. Information Privacy Security (IPS) Exempt Researchers and Key Personnel IPS  
Verify at [Link](#)

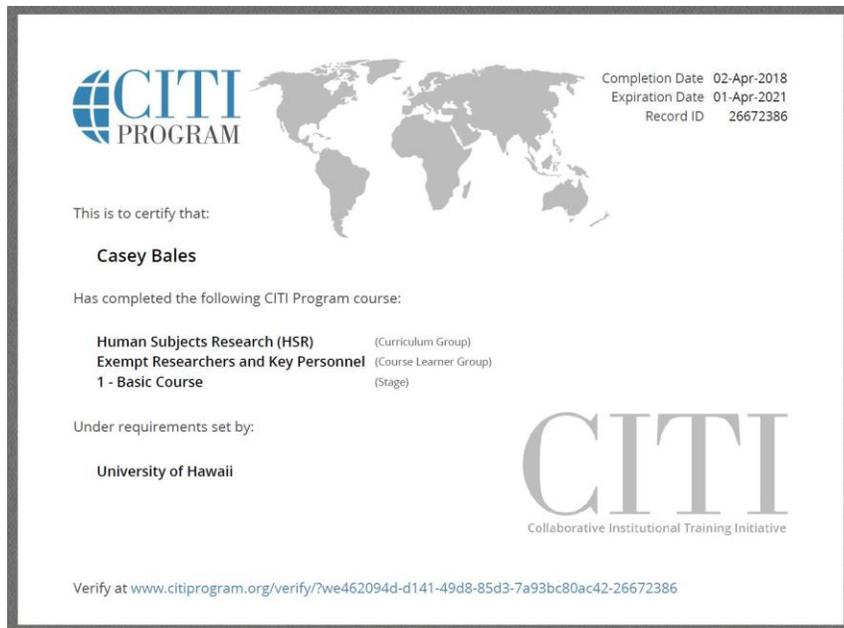


Figure H2. Human Subjects Research (HSR) Exempt Researchers and Key Personnel  
Verify at [Link](#)

## Appendix I Consent Form



### University of Hawai'i Consent to Participate in a Research Project

Dr. Dan Hoffman, Principal Investigator  
Casey Bales, Co-Investigator

*Project title: A 3D Virtual World Journey through the 5 Stages of Culture Shock in Minecraft*

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Aloha! My name is Casey Bales and I am a Master's student in the Learning Design and Technology Department at the College of Education, University of Hawai'i at Manoa. I am doing a usability study on a virtual simulation that targets American university students who are interested in studying abroad. As part of the requirements for earning my graduate degree, I am doing a research project and would like to invite you to take part in my research study.

***What am I being asked to do?***

If you participate in this project, I will meet with you for an interview online and time convenient for you. During the interview, I would like to ask you to participate in my study by entering a virtual simulation of Minecraft and test the simulation for navigation, efficiency, and user satisfaction. During which you would provide invaluable feedback for evaluation and further development of the simulation.

***Taking part in this study is your choice.***

Your participation in this project is completely voluntary. You may stop participating at any time. If you stop being in the study, there will be no penalty or loss to you.

***Why is this study being done?***

The purpose of this usability study is to evaluate the navigation, efficiency, and user satisfaction of a 3D virtual world simulation that prepares 18 to 22 year-old American college or university students going on their first study abroad to Japan by informing them about the five stages of culture shock.

***What will happen if I decide to take part in this study?***

The entire study will take approximately 2 hours. Prior to the interview, you will receive an email with a link to fill out an online pre-study survey which will take around 10 minutes. Additionally, the email will contain directions on how to setup Minecraft and the online conference application, Zoom.

On the day of the usability test, you will meet online via Zoom for approximately 90 minutes where the facilitator will prompt you to log into Minecraft. You will tend be prompted to try various tasks within the virtual simulation. During this time, you will be asked to think-out-loud while you move through the world. This portion is expected to last 50 minutes. Only you and I will be present during the interview. With your permission, I will ask that you share your screen so that I may record your avatar's movement within the virtual simulation as well as your voice through Zoom so that I can analyze the results. Once the 50 minutes is up, you will be asked to exit Minecraft and stop sharing your screen.

After the virtual world testing, there will be a 10-minute post-informal interview where you will be asked a few questions regarding your experience in the Minecraft simulation. The interview will include questions like, "Did you feel that the simulation was usable in teaching a student about culture shock?" "Do you think the simulation is too difficult or too easy for the target audience?" As soon as these questions are answered, the audio-recording will be stopped. Finally, a link to a post-study survey will be given through Zoom that should take 10 – 15 minutes to complete. You are asked to complete this during the session to ensure accurate results are collected. Upon completion of the survey, the interview session will be concluded.

***What are the risks and benefits of taking part in this study?***

I believe there is little risk to you for participating in this research project. You may become stressed or uncomfortable navigating a virtual simulation and answering questions. If you do become stressed or uncomfortable, you can skip the question and/or take a break. You can also stop the interview or you can withdraw from the project altogether. There will be no direct benefit to you for participating in this interview. The results of this project may help to improve the virtual simulation on the 5 stages of culture shock which in turn could be developed further and utilized for future study abroad students.



**University of Hawai'i**  
**Consent to Participate in a Research Project**

Dr. Dan Hoffman, Principal Investigator  
 Casey Bales, Co-Investigator

*Project title: A 3D Virtual World Journey through the 5 Stages of Culture Shock in Minecraft*

---

**Privacy and Confidentiality:**

You will be one of about 12 people I will interview for this study. All recordings and data will be securely stored in a password-protected computer. Only my University of Hawai'i advisor and I will have access to the information. Other agencies that have legal permission have the right to review research records. The University of Hawai'i Human Studies Program has the right to review research records for this study. Once the data has been analyzed, I will permanently erase all recordings. When I report the results of my research project, I will not use your name. I will not use any other personal identifying information that can identify you. I will report my findings in a way that protects your privacy and confidentiality to the extent allowed by law.

**Compensation:**

You will receive a 2-hour volunteer guarantee for your participation in this study once your interview session has been completed.

**Questions:**

If you have any questions about this study, please feel free to email me at [cbales@hawaii.edu](mailto:cbales@hawaii.edu). You may also contact my advisor, Dr. Dan Hoffman, at [dan.hoffman@hawaii.edu](mailto:dan.hoffman@hawaii.edu). You may contact the UH Human Studies Program at 808.956.5007 or [uhirb@hawaii.edu](mailto:uhirb@hawaii.edu) to discuss problems, concerns and questions; obtain information; or offer input with an informed individual who is unaffiliated with the specific research protocol. Please visit <http://go.hawaii.edu/iRd> for more information on your rights as a research participant.

If you agree to participate in this project, please sign and date this signature page and return it to: [cbales@hawaii.edu](mailto:cbales@hawaii.edu)

Keep a copy of the informed consent for your records and reference.

**Signature(s) for Consent:**

I give permission to join the research project entitled, "*A 3D Virtual World Journey through the 5 Stages of Culture Shock in Minecraft.*"

Please initial next to either "Yes" or "No" to the following:

Yes       No      I consent to be audio-recorded for this study.

**Name of Participant (Print):** \_\_\_\_\_

**Participant's Signature:** \_\_\_\_\_

**Signature of the Person Obtaining Consent:** \_\_\_\_\_

**Date:** \_\_\_\_\_

Mahalo!

## Appendix J Pre-Study Survey

### Part 1: Welcome and Electronic Consent

# Pre-Study Survey for 3D Virtual World Journey through the 5 Stages of Culture Shock

Aloha,

Thank you very much for taking part in this usability study for testing out the Minecraft world simulation. As previously mentioned, this 3D virtual world learning environment aims to teach the user about the 5 stages of culture shock. During the study, you will be asked to complete several tasks which include navigating your avatar through the world and locating specific areas of interest. By testing the virtual simulation, you will be providing valuable feedback that will help to improve the functionality for future users.

Concerning this pre-study survey, your responses will be completely anonymous. All questions are designed to help understand the demographics of the participants and no personally identifiable information will be collected.

The questionnaire should take you between 5 - 10 minutes. Please complete the survey to the best of your ability.

Mahalo,  
Casey Bales

\* Required

### Electronic Consent

By selecting the following "Agree" option below, you indicate that you are at least 18 years old and that you voluntarily agree to participate in this study. \*

- Agree
- Disagree

By selecting the following "Agree" option below, you indicate that you have access to a personal computer, a microphone, internet access, and the ability to install programs (administrative access). \*

- Agree
- Disagree

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## Part 2: Demographics Questions

## Pre-Study Survey for 3D Virtual World Journey through the 5 Stages of Culture Shock

\* Required

### Participant Demographics & Information

**Gender \***

- Female
- Male
- Prefer not to say
- Other: \_\_\_\_\_

**Age \***

- 18 - 20
- 21 - 22
- 22 - 26
- 27 +

**What would best describe you? \***

- Asian
- Black or African American
- Hispanic or Latino
- Native American or American Indian
- Pacific Islander
- White
- Prefer not to say
- Other: \_\_\_\_\_

What is your highest qualification? \*

- Less than high school diploma
- High school diploma or equivalent degree
- Bachelor's degree
- Master's degree
- No degree
- Other: \_\_\_\_\_

Which of the following best describes you (check all that apply)?

\*

- Student
- Unemployed
- Part-time employment
- Full-time employment
- Home-maker
- Self-employed
- Other: \_\_\_\_\_

Will you be using a mouse with your computer during the Minecraft simulation? \*

- Yes
- No, I will use my laptops track-pad
- Not sure

I consider myself tech-savvy. \*

1    2    3    4    5

Strongly Disagree                        Strongly Agree

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## Part 3: Cultural Familiarity Questions

## Pre-Study Survey for 3D Virtual World Journey through the 5 Stages of Culture Shock

\* Required

### Cultural Familiarity

Are you familiar with the phenomenon known as Culture Shock?

\*

- Never heard of it
- I have heard of culture shock
- I understand what culture shock is
- I have experienced culture shock

Do you know the various stages of culture shock? \*

- Yes
- Maybe some of them
- No

How many stages of culture shock do you think there are? \*

1 2 3 4 5 6 7 8 9 10

- 
- 
- 
- 
- 
- 
- 
- 
- 
- 
- 

Are you interested in study abroad? \*

- No, I am not interested in study abroad
- Yes, I want to take part in study abroad if I have the chance
- Yes, I am actually planning on going on a study abroad experience
- I have already completed a study abroad experience
- Other: \_\_\_\_\_

How familiar are you with Japanese culture? \*

- Not at all
- I know a little bit about Japan and its culture
- I have visited Japan and/or quite comfortable with my knowledge of Japan.
- I've lived there between 6 months to 2 years
- I am native or near native in terms of Japanese culture

Please rate the next few questions on a scale from 1-5

1- Strongly Disagree 2-Disagree 3- Neutral 4 - Agree 5 - Strongly Agree

It is important for people to learn about different cultures. \*

1 2 3 4 5

Strongly Disagree      Strongly Agree

Learning about different cultures makes the world a better place. \*

1 2 3 4 5

Strongly Disagree      Strongly Agree

Learning about the host culture before departure makes the experience of visiting that country more pleasurable. \*

1 2 3 4 5

Strongly Disagree      Strongly Agree

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## Part 4: Game-based Learning Familiarity Questions

## Pre-Study Survey for 3D Virtual World Journey through the 5 Stages of Culture Shock

\* Required

### Game-based Learning

Have you played computer games before on a computer or console? (Besides mobile games) \*

- Never have
- Just a few times
- Many times
- I consider myself a gamer

How familiar are you with virtual worlds (VWs)? \*

- Never heard of it
- I've heard of VWs, but never interacted in one before
- I've tried playing around with a VW before
- I am quite familiar with VWs
- Other: \_\_\_\_\_

Have you played Minecraft before? \*

- Never heard of it
- I've heard of it, but never tried it
- I've played it a bit
- I am quite adept at the game
- I am an expert at Minecraft

Have you tried game-based learning (learning through games) before? \*

- Yes
- No
- Not sure

If you answered "yes" or "not sure" to the above question, please describe.

Your answer

Please rate the next few questions on a scale from 1-5

1- Strongly Disagree 2-Disagree 3- Neutral 4 - Agree 5 - Strongly Agree

I am confident in my ability to navigate my character through a virtual world. \*

1 2 3 4 5

Strongly Disagree      Strongly Agree

Game-based learning is an effective way to convey information. \*

1 2 3 4 5

Strongly Disagree      Strongly Agree

A virtual world setting is an effective way to convey information. \*

1 2 3 4 5

Strongly Disagree      Strongly Agree

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Appendix K  
Protocols of Equipment & Software Checklist

### **Checklist for the Usability Test Session**

#### Before the simulation testing

1. Email participant the Zoom link to access meeting room before scheduled session time
2. Ensure personal computer is turned on and is connected to a power outlet and has stable internet connection
  - a. Test computer's audio through headphones and microphone
3. Login to Minecraft Server
4. Login to Zoom account
  - a. Test Zoom by clicking on 'host a meeting' on top right of the account page
  - b. Check if headphones and microphone are properly selected in Zoom room
5. Launch Zoom room at least 15 minutes before the session, wait and connect with usability study participant
6. Welcome and explain the test to the participant
  - a. Check with participant for:
    - i. if their computer is connected to a power outlet
    - ii. Stable internet connection
    - iii. Is using mouse or not
7. Inform participant that the recording will begin. START Zoom recording
8. Direct participant to start Share Screen in Zoom and ensure that they share their entire desktop, then their Minecraft software
9. Begin working through the usability study task protocols

#### During the simulation testing

1. Remind participant to "think out loud" during the cognitive walkthrough portion
2. Be ready to perform any technical support as needed

#### After the simulation testing

1. Direct participant to close down their Minecraft software, and stop Share Screen in Zoom
2. Thank participant for taking part in the simulation session, and provide them a break before proceeding to the questionnaire
3. Perform the short post interview then STOP Zoom recording
4. Provide link to post survey and allow participant 10-15 minutes to complete
5. Thank participant and ask if they have any further questions
6. End Zoom for all participants (Archived Zoom recording will be stored as a video in "My Documents" called "Zoom")

## Appendix L Usability Study Script and Task Protocols

### **Technology Checklist** (Refer to Checklist Protocols of Equipment & Software)

1. Facilitator to ensure personal computer is up and running and go through the [Protocols of Equipment & Software Checklist](#)
2. Remind participant through email to check if their computer is set up/ready, Minecraft is installed, and provide [link](#) to facilitator's Zoom room

#### Once participant is ready:

1. Participant to join Zoom room through provided link
2. Ensure both participants can hear each other properly
  - a. Troubleshoot if necessary using the Protocols of Equipment & Software Checklist
3. Have participant test Zoom screen-share
  - a. Troubleshoot if necessary
  - b. Ask participant to stop screen share
3. Facilitator invites participant to join the Minecraft Server by providing secondary login credentials and the server address through Zoom chat
4. Ensure participant can screen-share Minecraft
  - a. Troubleshoot if necessary
  - b. Check functionality of Minecraft and Zoom running together
  - c. If participants computer cannot handle both applications, plan B is for the facilitator to follow the participant's avatar in game and screen-share for recording purposes
5. Once both participant and facilitator are ready, begin Zoom recording from facilitators account

### **Facilitator Script**

#### **Welcome**

- (START the Zoom session recording)

Hello, <Name of participant>!

My name is Casey, and I'm going to be walking you through this usability session today.

Before we begin, I will be going over some information, and I'm going to read it to make sure that I cover everything. I have created simulation in Minecraft Java that attempts to teach the user about the 5 stages of culture shock and ideally better prepares them for a study abroad experience in Japan. I would like to see if it works as intended. The session should take approximately 1.5 hours including a post-interview and survey.

The first thing I want to make clear right away is that I'm testing the **simulation**, not you. You can't do anything wrong here, so don't worry about making any mistakes.

As you use the simulation, I'm going to ask you as much as possible to try to **think out loud**. This means, say what you're looking at, what you're trying to do, and what you're thinking. This will be a big help to me. Also, please don't worry about being polite or hurting my feelings. I'm doing this to improve the simulation, so I need to hear your honest reactions.

If you have any questions as we go along, just ask them. If I can answer them I will, however, since I am testing the simulation, I'm interested in how people do when they don't have someone who can help. But if you still have any questions when we're done, I'll be happy to answer them then as well.

Do you have any questions so far?

### **Preliminary questions**

Alright, before we enter the simulation, I'd like to ask you just a few warm up questions.

1. Before taking part in this study, had you heard of Minecraft?
  - a. If yes - Have you played Minecraft before?
    - i. If yes - How much have you played?
2. What is your general perception of online games?
3. Do you have any experience with game-based learning such as through virtual worlds or other platforms? If so, please elaborate.

Awesome. We're done with the questions, and now we can start testing out the Minecraft simulation.

Please launch Minecraft if you have not done so already.

(Remind participant to maximize their Minecraft window view format)

Before we begin the simulation testing, would you like to take a bio-break?

Great. Now, please go ahead start screen share by clicking on the green 'share' icon on the toolbar at the bottom of your Zoom window.

Perfect. Now go ahead and click on multiplayer and enter the server.

(If participant hasn't gone through the Minecraft setup instructions, provide server address <cultureshock.g.akliz.net> through Zoom chat and walk participant through the process)

### **Simulation**

Alright here we go. First I'd like to ask that you look around this starting area and tell me what you think about it. What is your initial reaction, what do you think it's for, what do you think you can do here. Just look around and do a little narrative. You can walk your avatar around if you want to. Please remember to **think out loud**.

Thank you! You did a good job. Now, I'm going to ask you to try doing some specific tasks such as finding certain places and interacting with various components throughout the simulation. And just as another reminder, it will help me if you can try to **think out loud** as you go along.

1. Please take your avatar through the orientation town by following the pink path.

*Great. What do you think about this task in terms of difficulty. On a scale from 1 to 5, with 1 being very difficult and 5 being very easy, how would you rate this task? Why?*

2. Please stay on the path while reading signs along the way, then enter the airport and board Flight #808.

*Great. What do you think about this task in terms of difficulty. On a scale from 1 to 5, with 1 being very difficult and 5 being very easy, how would you rate this task? Why?*

3. Please make your way to the first station, "Stage 1 of Culture Shock: The Honeymoon Stage." Follow the instructions and learn about this stage.

*Great. What do you think about this task in terms of difficulty. On a scale from 1 to 5, with 1 being very difficult and 5 being very easy, how would you rate this task? Why?*

4. Please make your way through the next 4 stations and learn about each stage by following the instructions.

*Great. What do you think about this task in terms of difficulty. On a scale from 1 to 5, with 1 being very difficult and 5 being very easy, how would you rate this task? Why?*

5. Please locate the end point and obtain a book and quill item from the material dispenser and read the instructions.

*Great. What do you think about this task in terms of difficulty. On a scale from 1 to 5, with 1 being very difficult and 5 being very easy, how would you rate this task? Why?*

*Note: If the participant gets stuck or is silent, use the follow phrases from the chart.*

WHEN THIS HAPPENS:	SAY THIS:
You're not sure you know what the participant is thinking.	“What are you thinking?” “What are you looking at?” “What are you doing now?”
Something happens that seems to surprise them. For instance, they click on something and say “Oh” or “Hmmm.”	“Is that what you expected to happen?”
The participant is trying to get you to give him/her a clue. (“Should I _____?”)	“What would you do if I wasn't here?” “I'd like you to do whatever you think makes sense.”
The participant makes a comment, and you're not sure what triggered it.	“Was there something in particular that make you think that?”
The participant suggests concern that he/she is not giving you what you need.	“No, this is very helpful.” “This is exactly what I need.”
The participant asks you to explain how something works or is supposed to work.	“What do you think?” “How do you think it works?” “Sorry, I can't answer that just yet.”
The participant seems to have wandered away from the task.	“What are you trying to do now?”

*Above table is modeled after Krug (2010), Rocket Surgery Made Easy*

### **After Simulation**

Thank you so much for your help. I know some of the tasks might have been challenging or confusing, but you did a great job. Now that we are finished with the simulation testing portion, go ahead and exit Minecraft by pressing the ESC key and quitting, then stop your screen share by clicking on the “share screen” button on the top right-hand side of your screen.

Great. Do you have any questions at this time? Next, I would like to ask you some questions regarding your experience today, however, would you like to take a quick bio-break?

READ FROM [Post Interview Prompt Script](#)

That's the last question, I will be stopping the recording now.

(STOP the Zoom session recording)

**Conclusion & Post-survey**

Alright! We are just about done. For the last portion of today's session, I have a post-survey I would like you to complete for some more in-depth questions regarding your experience in the simulation. If you could complete it right away while everything is fresh in your mind, that would be best. Let me send you the link through Zoom chat now. (Send [link to post-study survey](#)) Are you able to access the survey?

Great! So, this all I have today, and want to thank you so much for your time and willingness to be a participant in this study. I will stick around if you want to complete the survey while staying on the call and chat, otherwise you are welcome to sign off. If you think of any other questions, always feel free to email me.

Thank you!

Appendix M  
 Observation Instruments: Task Protocol Response Form

Prototype Version \_\_\_\_ (1, 2, or 3)      Date of Usability Study Session: \_\_\_\_\_

Participant # \_\_\_\_\_      Minecraft User Level: Novice/Beginner/Intermediate/Advanced

Duration of usability study/session: \_\_\_\_\_

<b>Preliminary Script Questions and Responses</b>	
1. Before taking part in this study, had you heard of Minecraft?  If yes - Had you played Minecraft before?  If yes - How much have you played?	
2. What is your general perception of online games?	
3. Do you have any experience with game-based learning such as through virtual worlds or other platform? If so, please elaborate.	

## Task Protocols

<b>1. Please take your avatar through the orientation town.</b>			
Time to complete task:		Difficulty Rating (1 - 5)	
Cognitive Walkthrough:		Why?	
<b>2. Please take your avatar through the orientation town.</b>			
Time to complete task:		Difficulty Rating (1 - 5)	
Cognitive Walkthrough:		Why?	
<b>3. Please take your avatar through the orientation town.</b>			
Time to complete task:		Difficulty Rating (1 - 5)	
Cognitive Walkthrough:		Why?	

<b>4. Please take your avatar through the orientation town.</b>			
Time to complete task:		Difficulty Rating (1 - 5)	
Cognitive Walkthrough:		Why?	
<b>5. Please take your avatar through the orientation town.</b>			
Time to complete task:		Difficulty Rating (1 - 5)	
Cognitive Walkthrough:		Why?	

Difficulty Rating:

1 - Very Difficult

2 - Difficult

3 - Just right

4 - Easy

5 - Very Easy

## List of problems

ID#	Problem description	Severity	Reason for rating
Free Roaming and Open World Area			
Navigational			
Efficiency			
Content (Text and images)			
Aesthetics			

### Severity Rating Scale

0: No specific usability problem identified

1: Cosmetic problem only -- need not be fixed unless extra time is available on project

2: Minor usability problem -- fixing this should be given low priority

3: Major usability problem -- important to fix, so should be given high priority

4: Usability catastrophe -- imperative to fix this before product can be released



Appendix N  
Post Interview Prompt Script

Thank you very much for sticking around to discuss the Minecraft simulation in an informal post interview. Your feedback is greatly appreciated and will be used to further improve the navigation, efficiency, and user motivation of the simulation. I will now ask you several questions to gain some insight on how you perceived the virtual simulation.

How did you feel about the visual aspect of the simulation?

How did you feel about the use of space?

What were some positive aspects you noticed?

What were some of the most difficult things you found in the simulation?

On a scale of 1 to 10, with 1 being very easy and 10 being very difficult, how would you rate the simulation experience?

Do you think the virtual simulation would be useful in preparing American college students for study abroad in Japan? Why or why not?

What do you think would help make the simulation more easier to use?

Do you have any other thoughts concerning the simulation or the content?

Any other comments?

(Input answers from here to the Post Interview Analysis Form)

Appendix O  
 Observation Instruments: Post Interview Response Form

Prototype Version \_\_\_\_ (1, 2, or 3)      Date of Usability Study Session: \_\_\_\_\_

Participant # \_\_\_\_\_      Minecraft User Level: Novice/Beginner/Intermediate/Advanced

Informal Post Interview Response Form	
How did you feel about the visual aspect of the simulation?	
How did you feel about the use of space?	
What were some positive aspects you noticed?	
What were some of the most difficult things you found in the simulation?	

<p>On a scale of 1 to 10, with 1 being very easy and 10 being very difficult, how would you rate the simulation experience?</p>	
<p>Do you think the virtual simulation would be useful in preparing American college students for study abroad in Japan? Why or why not?</p>	
<p>What do you think would help make the simulation more easier to use?</p>	
<p>Do you have any other thoughts concerning the simulation or the content?</p>	

Additional Comments:

Appendix P  
Post-Study Survey

Part 1: Descriptive Feedback concerning experience

## Post-Study Survey for 3D Virtual World Journey through the 5 Stages of Culture Shock

Thank you very much for going through the Minecraft simulation. Your feedback through the session and answers in the post-interview session will be extremely valuable in analyzing the simulation and to make revisions for the next iteration.

To conclude your session with me, I would like to kindly ask that you go through this post-survey and answer all questions to the best of your ability. This survey should take no more than 15 minutes and will provide further valuable feedback in evaluated the virtual simulation.

Please try to complete this soon after your session with the facilitator to ensure everything is fresh in your mind. Lastly, don't forget to press submit when you are done.

\* Required

Please describe the virtual world experience in one paragraph. (Please use descriptive adjectives, i.e. difficult, fun, confusing, educational, etc) \*

Your answer

---

What was your overall impression of navigating the simulation? Easy or difficult? Why? Can you give me some examples? \*

Your answer

---

Would you recommend this simulation to your friends? Why or why not? \*

Your answer

---

Do you have any suggestions to improve the simulation? \*

Your answer

---

## Part 2: Navigation, Efficiency, &amp; User Motivation

**Navigation, Efficiency, & User Motivation**

How easy or difficult was it to navigate your avatar (game character) through the virtual world? \*

1      2      3      4      5

Very Difficult                        Very Easy

How easy or difficult was it to find/locate certain places in the virtual world? \*

1      2      3      4      5

Very Difficult                        Very Easy

Do you feel that you were able to efficiently get through the virtual world? \*

1      2      3      4      5

Strongly Disagree                        Strongly Agree

Did you feel that the virtual world simulation was too short, too long, or just right in length? \*

1      2      3      4      5

Too Short                        Too Long

Relating the question above about length, please describe why you thought it was too short or too long. \*

Your answer

---

How motivated did you feel to progress through the virtual world simulation to learn about culture shock? \*

	1	2	3	4	5	
Not Motivated	<input type="radio"/>	Very Motivated				

How appealing was it to use this simulated world to learn about culture shock? \*

	1	2	3	4	5	
Not Appealing	<input type="radio"/>	Very Appealing				

How relevant would it be using this simulated world to learn about culture shock before a study abroad trip to Japan? \*

	1	2	3	4	5	
Not Relevant	<input type="radio"/>	Very Relevant				

How confident would you feel about going on a study abroad trip to Japan after going through this simulated world to learn about culture shock? \*

	1	2	3	4	5	
Not Confident	<input type="radio"/>	Very Confident				

How satisfied would you be after using this simulated world to learn about culture shock before going on a study abroad trip to Japan? \*

	1	2	3	4	5	
Not Satisfied	<input type="radio"/>	Very Satisfied				

## Part 3: Virtual Worlds &amp; Cultural Learning

**Virtual Worlds**

I am confident in my ability to navigate my character through a virtual world in Minecraft. \*

1      2      3      4      5

Strongly Disagree                    Strongly Agree

Game-based learning is an effective way to convey information.

\*

1      2      3      4      5

Strongly Disagree                    Strongly Agree

A virtual world setting is an effective way to convey information.

\*

1      2      3      4      5

Strongly Disagree                    Strongly Agree

Minecraft can be an effective way to convey/teach information.

\*

1      2      3      4      5

Strongly Disagree                    Strongly Agree

## Culture & Learning

It is important for people to learn about different cultures. \*

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	Strongly Agree				

It is important for college students to learn about culture shock before departing on a study abroad experience. \*

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	Strongly Agree				

Culture shock can be mitigated by learning about it prior to traveling abroad to a foreign country. \*

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	Strongly Agree				

## Part 4: Overall impression

# Post-Study Survey for 3D Virtual World Journey through the 5 Stages of Culture Shock

\* Required

Overall, how was the Minecraft virtual simulation on the 5 stages of culture shock? (1 - Bad, 2 - Poor, 3 - Fine, 4 - Good, 5 - Perfect)

\*

	1	2	3	4	5	
Bad	<input type="radio"/>	Perfect				

Additional Comments \*

Your answer

---

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Appendix Q  
Participant Demographics

*Participants Gender, Age, and Education Level.*

Characteristics	Number	Percent
<b><i>Gender</i></b>		
Male	<b>9</b>	<b>75%</b>
Female	3	25%
<b><i>Age</i></b>		
18 - 20	<b>4</b>	<b>33%</b>
21 - 22	1	8%
23 - 30	<b>4</b>	<b>33%</b>
31 - 40	2	17%
41 +	1	8%
<b><i>Education</i></b>		
Some College Education	<b>6</b>	<b>50%</b>
Associates Degree	1	8%
Bachelor's Degree	5	42%
<b><i>Minecraft User Level</i></b>		
Novice	4	33%
<b>Beginner</b>	<b>5</b>	<b>42%</b>
Intermediate	1	8%
Advance	2	17%

Appendix R  
Screenshots of User-Submitted Designs via Planetminecraft



*Figure 1.* Suburban landscape in Minecraft by Beetle1512 titled 'Suburban house.'



*Figure 2.* Urban city landscape in Minecraft by ingram3212ds titled 'KYOKEI CITY.'

Appendix S  
Timeline/Sequence of Events

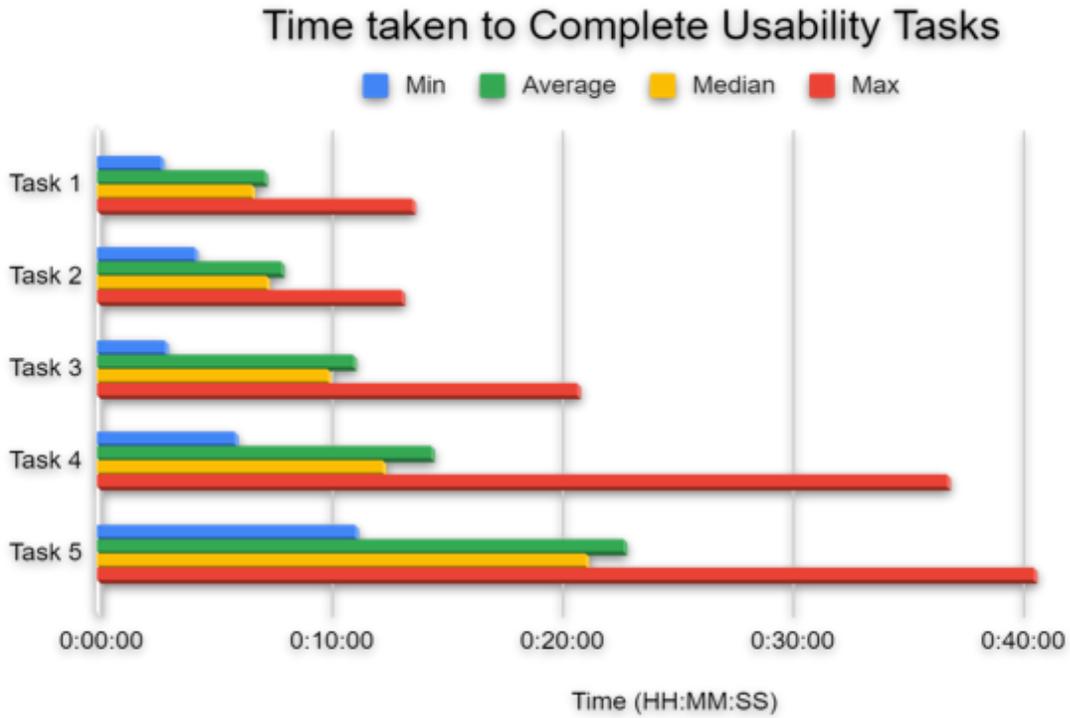
The table below indicates the projected timeline developed for the virtual world usability study.

Date	Task
October	<ul style="list-style-type: none"> <li>● Begin writing detailed project plan</li> <li>● Begin the IRB approval process</li> <li>● Create data collection tools such as surveys, record sheets, evaluation/notes templates</li> <li>● Begin researching build models for Minecraft Simulation</li> </ul>
November	<ul style="list-style-type: none"> <li>● Continue drafting and revising project plan</li> <li>● Begin design on the Minecraft multiplayer server world</li> <li>● Begin building the simulation within Minecraft</li> </ul>
December	<ul style="list-style-type: none"> <li>● Finalize project plans for IRB approval</li> <li>● Submit application for IRB approval (12/02/19 deadline)</li> <li>● Continue design on Minecraft simulation</li> </ul>
January	<ul style="list-style-type: none"> <li>● Upon IRB approval begin project implementation</li> <li>● Begin recruitment by sending invitations to target audience</li> <li>● Schedule sessions for iteration #1 #2 #3</li> <li>● Finalize design on Minecraft simulation</li> </ul>
February	<ul style="list-style-type: none"> <li>● Usability study round #1</li> <li>● Implement improvements on project design</li> <li>● Usability study round #2</li> <li>● Implement improvements on project design</li> <li>● Usability study round #3</li> </ul>
March	<ul style="list-style-type: none"> <li>● Analyze data and write analysis</li> <li>● Create TCC Presentation Slides</li> </ul>
April	<ul style="list-style-type: none"> <li>● Finalize TCC Presentation Slides</li> <li>● Conduct TCC Presentation (4/14/20)</li> <li>● Submit final paper draft with results (4/17/20 deadline)</li> </ul>
May	<ul style="list-style-type: none"> <li>● Complete and submit final paper for Master's project</li> </ul>

*Figure 1.* Action research project goals and timeline (Saragosa, 2014).

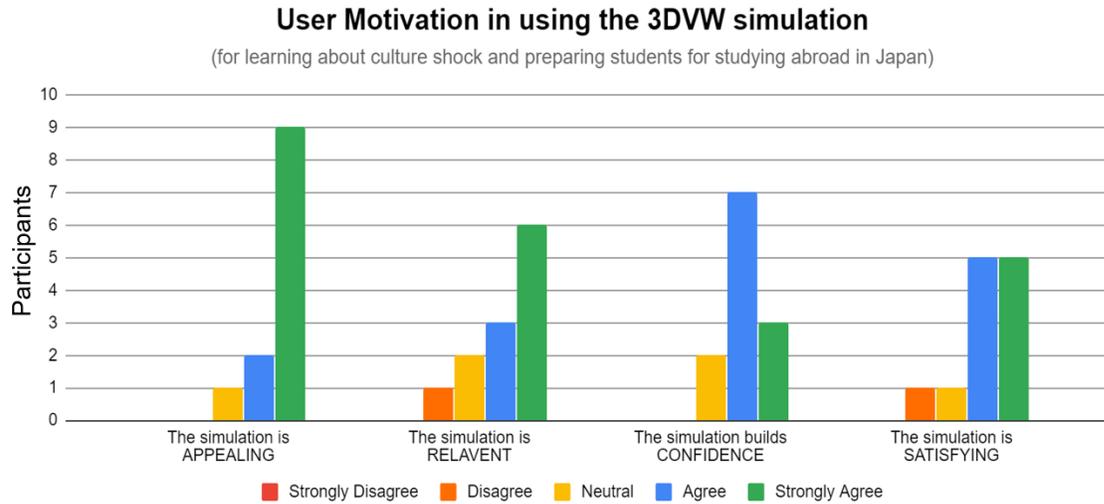
Appendix T  
 Chart of Task Efficiency

The chart below indicates the time taken to complete each of the five tasks. Each task shows four different times including, minimum, average, median, and max time.

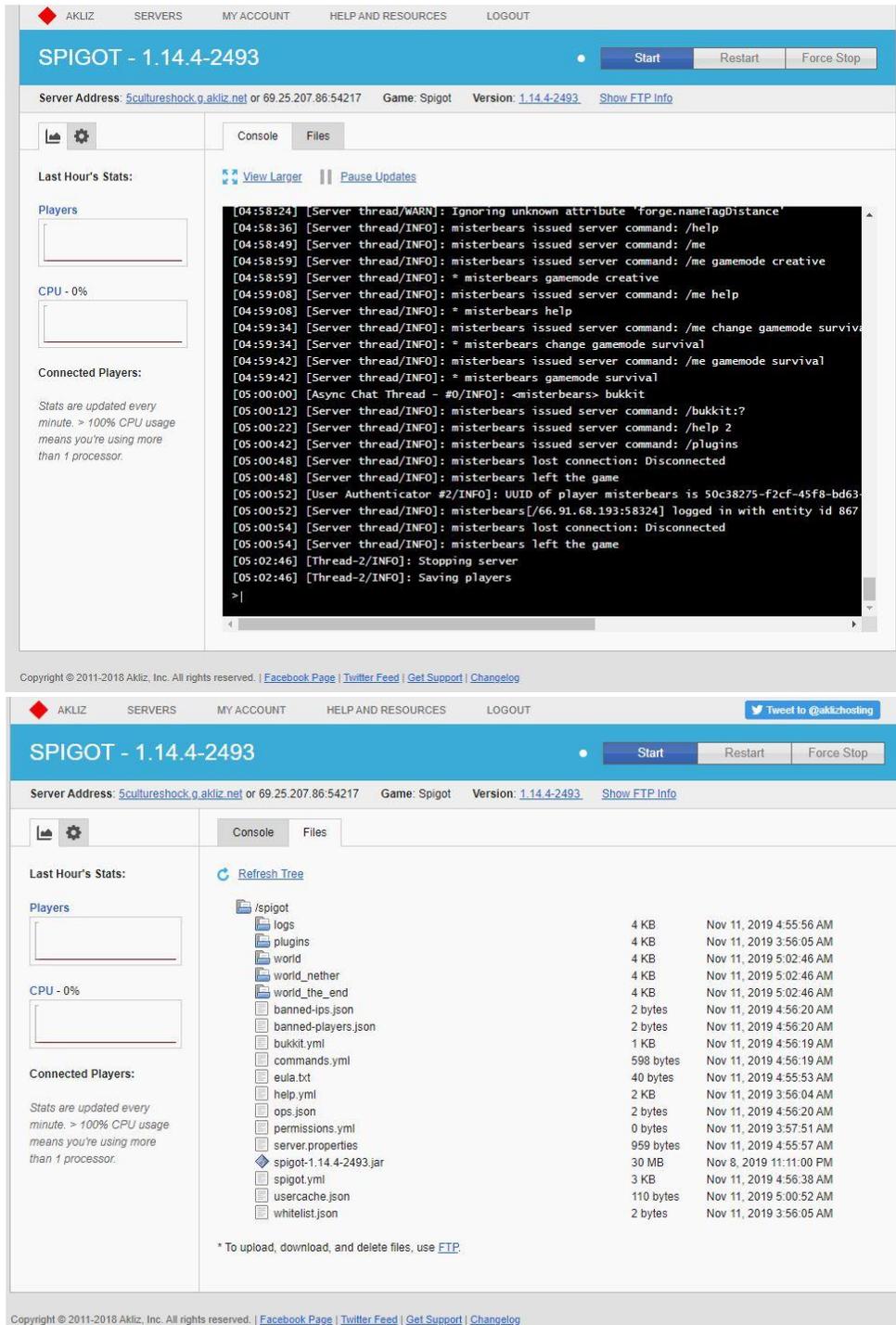


### Appendix U Chart of User Motivation

The chart below shows the user’s motivation in regards to appeal, relevance, confidence, and satisfaction they felt towards the virtual simulation.



## Appendix V Screenshots of Server & Modifications



*Figure R1&R2. Screenshots of the Spigot server hosting the Minecraft virtual simulation: 5 stages of culture shock*