



THE VIRTUAL REALITY ROOM

School of Information and Library Science,
The University of North Carolina at Chapel Hill

Final Report

INLS 719, Fall 2019

December 7, 2019

ORIGINAL RECIPE

ogrecipe

Eden Andes
Mariesha McAdoo
Karina Soni
Yuan Wen

EXECUTIVE SUMMARY

The SILS Virtual Reality (VR) Room provided a unique opportunity to better understand how a user's interaction with virtual reality might be enhanced or hindered by the physical space in which it is contained. With the participation of four students from Dr. Capra's INLS 719-001 course, we conducted a usability test of the room to improve SILS students' initial experiences within the space. Though intended to serve as proxies, our participants were some of the real-world users that might typically visit the VR Room on any given day.

Upon completing a pre-test questionnaire and consent form, users were tasked with playing a virtual reality game using either the Oculus or HTC Vive, the two available gaming systems. Using one task allowed us to observe organic interactions with the room, but required flexibility and heterogeneity between tests. At our team's discretion, we simulated a system exit during each test, prompting users to proceed as though they needed to leave for another engagement. A post-test questionnaire and verbal interview then followed.

After assessing the data collected from each test, we found that the location and format of room instructions were severe pain points that created a number of tangential concerns. In some manner, each of our users expressed that VR is "cool," but their interaction with the SILS VR Room was frustrating. Many mentioned having a better experience elsewhere on campus which indicated that, should the room be used to its full potential as an academic and exploratory resource, improvements are crucial.

OVERVIEW AND PURPOSE

The Virtual Reality (VR) Room, or VR Lab, is located in Room 27 on the ground floor of Manning Hall. The room is available to SILS students, faculty, and staff as an immersive, educational VR experience and tool for conducting research. Although the room has been designed for inexperienced users, Help Desk staff members strongly recommend that new visitors be accompanied by a friend or partner. Staff members are also available upon request to walk users through the initial setup and their first few environments. More information about the VR Room can be found on the SILS website at <https://sils.unc.edu/it-services/lab-equipment/virtual-reality>.

The VR Room provides an opportunity for SILS affiliates to try VR in a low-stakes environment. The room presents users with two options for interaction—the Oculus Rift and the HTC Vive. Each system contains a head-mounted display (HMD) and proprietary controllers. Guidance for room use is available through frequently asked questions and room instructions displayed on the walls of the space. SILS IT Help Desk staff are also accessible through a phone located in the room. However, a steep learning curve and lack of experience with VR can deter and frustrate novice users. While staff members are happy to introduce and orient visitors to the room, the process can take upwards of 40 minutes. Being away from the desk for such an extended amount of time is not feasible during the Help Desk's high-traffic periods. Evaluation of the room was a meaningful investigation of what might make a first-time visit to the room more fluid for both visitors and Help Desk staff members. This project was an opportunity for participating team members to engage with usability from the perspective of a physical space, while impacting a valuable resource available to our peers in SILS.

The goal of this evaluation was to assess students' level of ease when interacting with the VR Room unassisted. Specifically, we hoped to better understand the following:

- How well do users understand the instructions for each individual HMD (the HTC Vive and the Oculus Rift)?
- Can users identify the correct computer that is associated with their chosen HMD?
- Can users turn on the monitor and locate the correct game interface?
- Are users able to identify the HMD of their choosing, and its associated controllers?
- Can users locate the phone provided, in case of any questions that may arise, or an emergency?
- Are users able to exit the game interface and disassemble the system successfully?

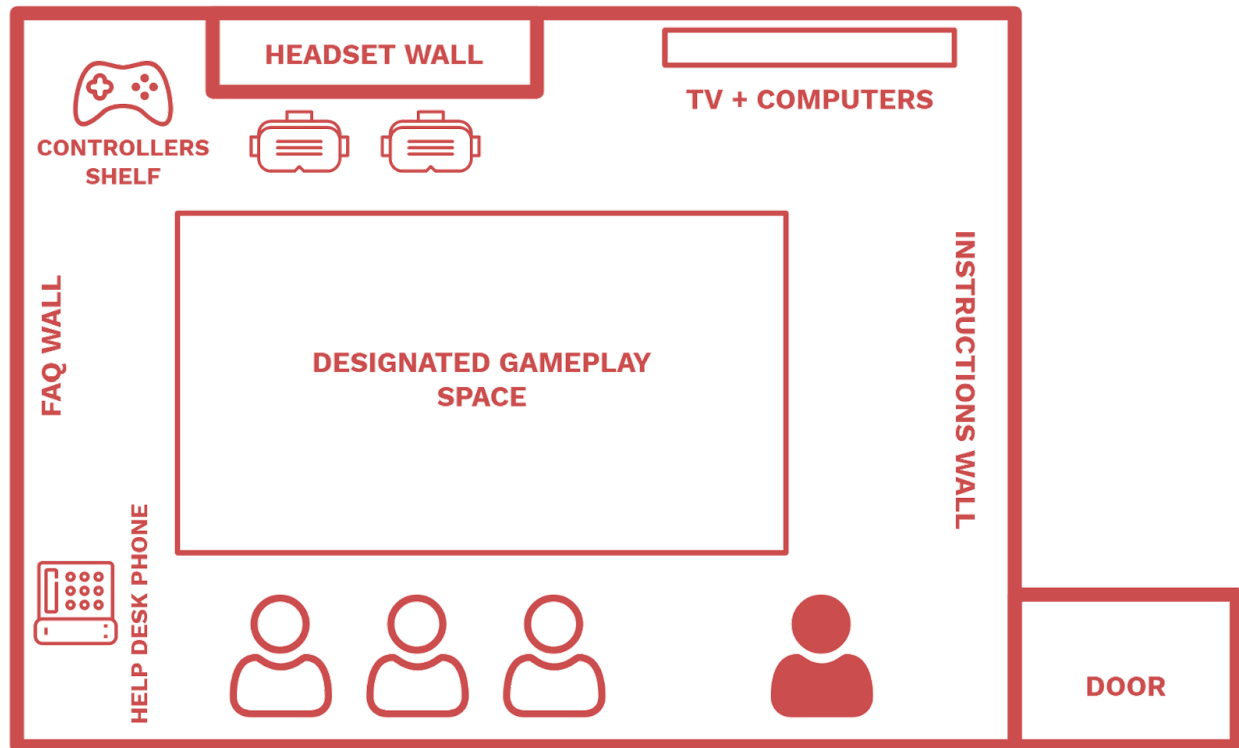
METHODS

DESIGN

To evaluate the use of the VR Room, the team initially structured the test to include a series of tasks that a participant would complete with guidance from a moderator. However, it became

apparent that this would be too disjointed, and would not yield an accurate representation of the usability of the space. In order to create a natural exploration of the space, the test was presented as a single task with designated notable events observed by team members during each session.

ENVIRONMENT, EQUIPMENT, MATERIALS



During each session, the room contained the following:

- *HTC VIVE system*: dedicated computer, keyboard, and mouse; corresponding HMD; one pair of hand controllers; one set of sensors
- *Oculus Rift system*: dedicated computer, keyboard, and mouse; corresponding HMD; one pair of hand controllers; one remote control; one Xbox controller; one set of sensors
- Two small cameras to record sessions
- One TV monitor
- One safety camera used by the Help Desk
- One landline telephone to contact the Help Desk

The gameplay space was outlined using glow in the dark tape on the floor, designating boundaries for the user. Instructions were displayed on the wall adjacent to the computers and monitor. Across from the instructions, a whiteboard featured several FAQs, and flyers on the wall beside it recommended introductory games and environments. Chairs in the space were meant for visitors and guests, but were occupied by team observers during each session. Test

session notes were taken on individual laptops, and the consent form and questionnaires were administered on an iPad.

TASK LIST AND DESCRIPTION

Due to the unconventional nature of the space and experience, the test was administered as one large task. Realizing that each participant's path would not be linear, ideal steps and notable events were established beforehand. Observers made note whether or not the participants followed or accomplished them and in what order they did so. The task was articulated to participants as follows:

Your task is to choose a virtual reality system and, using the appropriate hardware, play a virtual reality game.

Ideal steps and notable events were:

1. Read the directions
2. Turn on the TV
3. Launch the appropriate system
4. Launch the appropriate game platform
5. Put on the headset and hold the controllers correctly
6. Enter gameplay
7. Simulate room exit

MAIN SEQUENCE OF EVENTS

1. Meet the participant at a designated spot and led them to the space.
2. Administer orientation, pre-test questionnaire, and consent form outside of the VR Room.
3. Begin the testing session as soon as the participant enters the VR Room.
4. Allow participant to run through the task.
5. Prompt user to simulate an exit of the game and space.
6. End the task.
7. Administer the post-test questionnaire and final interview questions.
8. Allow participant to add any additional comments or ask any additional questions.
9. Thank participant and conclude testing session.

PEOPLE/ROLES

For each testing session there were:

- Two qualitative data recorders
- One quantitative data recorder
- One moderator

One team member also functioned as a technical support person in addition to their role as either a qualitative data recorder or moderator, depending on the session.

DATA COLLECTION

Data was collected from three primary sources throughout the test:

1. **Pre-test questionnaire.** The consent form was presented at the beginning of the questionnaire. Two questions then asked, "How familiar are you with virtual reality?" and "Have you ever used the SILS VR Lab?". If the subject selected "yes" to the second question, two following questions were asked: "How familiar are you with SILS VR Lab?" and "What is your overall impression of the SILS VR Lab?" The questionnaire is listed in the "Appendix" section.
2. **Task observations.** During the test, the notetakers collected quantitative data and qualitative data. The participant was asked to think-aloud during the test, and the process was video recorded by two cameras. The specific measures used will be elaborated on in the "Evaluation Measures" section below.
3. **Post-test questionnaire.** A post-test questionnaire and short interview captured the subject's overall opinion towards the experience. The questionnaire was adopted from the System Usability Scale (SUS). The scale is slightly modified to fit the VR Lab context. The questionnaire will be listed in the "Appendix" section. The final interview questions included: "Please tell us about your overall experience", "What did you like most about the VR Lab?", and "What did you like least about VR Lab?" Responses were recorded down by the qualitative note takers.

The data generated during the test was collected by notetakers using Google Docs and Google Sheets. All data was then stored in a Google Drive with access limited to the four members of our team.

SAMPLE

One pilot test followed by four participants were used in this study. All four participants are SILS students enrolled in INLS 719. The participants were assigned by Dr. Capra and scheduled through emails.

Because we thought previous experiences in VR and the SILS VR Room would lead to different user behavior in the VR Room, we asked about previous experiences in VR and the SILS VR Lab during the pre-test questionnaire. The results showed that one participant was extremely familiar with VR, one participant was slightly familiar with VR, and two participants were moderately familiar with VR. Only one participant used the SILS VR Lab before and was only slightly familiar with the SILS VR Lab. Visualizations of these results can be seen in Figure 1 of the Appendix.

EVALUATION MEASURES

Because we opted for one extended task with limited interjections throughout, there were a number of events to observe and lots of data to collect. Participants were asked to think-aloud during the test, and their comments were recorded as they navigated different aspects of the space. Ensuring adequate and appropriate data was collected proved to be a challenge, prompting a need for multiple note takers. As such, we had three notetakers collect different data; two were responsible for collecting qualitative data, and one was responsible for quantitative data.

QUALITATIVE DATA

The varied test lengths and think-aloud protocol prompted qualitative notetakers to transcribe different phases of the process, noting verbal comments and physical expressions. Combined with the quantitative data, qualitative data informed some of the thought processes that led to different user behaviors throughout the test. In addition, as mentioned above, a short interview was conducted after each test to collect the participant's overall impression of the VR lab.

QUANTITATIVE DATA

We used a Google sheet to collect quantitative data. Events that we cared about most during the test included the time spent on tasks, the sequence of actions performed, task completion, and users' emotional responses. As a result, our Google sheet included three main sections: the timestamps when different events occur, the completion of different tasks, and expressed frustrations. A sample quantitative data collection form can be accessed at the following location:

<https://docs.google.com/spreadsheets/d/1SR2PGvelxcXRI2w14Zky2uu5OJibvD8sNfpgSwa4MgI/edit?usp=sharing>

After each test, we used our modified SUS to evaluate the participant's overall experience of the VR Lab.

Timestamp

We listed all the possible actions or events during the test. For example, "Start to turn on the TV", "Start play game", etc. When the event occurred, we recorded the current time. After the test, we listed the sequence of actions based on the timestamps and calculated the time spent on different tasks.

Task completion

Despite approaching the test as one large task, we had predetermined events that users might need to complete during the test such as "Read the instructions on the wall", "Turn

on the TV", "Get the system started", "Put on the headset", "Switch system", "Play the game", and "Exit the game". We recognized that users may only complete some of the tasks during the test. For each small task, the notetaker recorded "complete," "fail to complete," "skip," or "do it wrong"(partially complete) depending on the user's actions. In addition, the notetaker also recorded if the technical support team member helped with the task. The reason why the participant didn't complete the task and errors were briefly noted.

Frustrations

We classified different expressions of frustrations into three categories:

1. "Not sure". For example, when the participant says something like "I'm not sure if I'm doing it in the right way".
2. Signs. When the participant made a voice expressing annoyance, disappointment, or distress.
3. Expression of difficulty. For example, when the participant says something like "This is confusing/complicated..."

Based on different small tasks, the notetaker recorded the categories of different emotional responses and counted the number of expressions of frustrations.

RESULTS

CASE STUDY ONE: "I want this to work."

The participant during our first session (P1), indicated prior to their test session that they were moderately familiar with virtual reality but had never used the SILS VR Room before. Upon walking into the room, P1 headed immediately to where the headsets were placed and stated that they would like to try using the HTC Vive.

P1 tried to turn on the television screen by touching the mouse to wake up the computer, but then realized that the television needed to be turned on. The participant struggled with this task and spent about a minute before succeeding. From there, P1 realized that the television input was set to display the Oculus Rift environment and then tried to use the remote to change it to the other input corresponding to the HTC Vive. The participant struggled with this task for almost three minutes and stated both verbally and nonverbally that they were frustrated. P1 eventually gave up on changing the inputs and proceeded to use the Oculus Rift instead. The participant went back and forth between the headset and the desktop computer, eventually selecting a random game on the Oculus Home using the desktop. P1 then grabbed the controllers, slid on the headset without adjusting the straps and the earpieces, and began playing a game. During gameplay, P1 mentioned "hitting the wrong buttons" on the controllers but seemed to be enjoying the game nonetheless.

Although P1 had trouble starting and exiting the VR environment, they still had a favorable opinion about the room as a whole and tried their best to successfully play a game. To them, the

SILS VR room “was definitely cool” despite having been frustrated by the difficulties with turning on the TV and switching the input to the HTC Vive environment. P1 stated during the session and in the post-session interview that they would have enjoyed a tutorial to learn the basics of VR and the corresponding hardware, however they never reviewed the FAQ wall or the instruction wall in the room.

CASE STUDY TWO: “I want to be done.”

Participant two (P2) reported being slightly familiar with virtual reality but had no experience with the SILS VR room prior to our study. Similar to P1, P2 entered the room and proceeded directly to the VR headsets. However, unlike P1, P2 immediately put on the Oculus Rift headset and began to play the game that was already running in the device due to the last user of the SILS VR room not turning it off. P2 did not read the instructions, check the corresponding desktop computers or turn on the television screen. P2 did not pick up the handheld controllers and instead tried to interact with the system by putting out their hands. They started to get increasingly frustrated and voiced their discontent by saying things like “I’m putting my fingers up, but it does nothing.”

After a few minutes, the moderator told P2 that there were controllers to use with the device. P2 slightly removed the headset, picked up one of the two controllers and put the headset back on. However, P2 again removed the headset to take a closer look at the buttons on the controller. After putting the headset back on, they tried to interact with the system with the one controller but ultimately failed. The moderator prompted them to pick up the second controller, but they fumbled while holding the two controllers and the headset. They pressed a few buttons on both of the controllers, but could not successfully play a game and gave up. At the end of the session, P2 described that they felt a need to “get [the headset] off of me” and be done with the program.

CASE STUDY THREE: “I’m going to try my best.”

Participant three (P3) noted two systems and their names after they entered the space. They also noted the directions on the wall for each system and was able to identify the color coding applied to each step. However, they were overwhelmed and confused by the labeling. P3 looked at the computer and the screen, and noted that the system wasn’t on. They weren’t sure how to turn on the monitor, so they read the instructions provided. However, they said that the instructions for the remote control were too dark, hard to read, and unclear. They weren’t sure where the remote should be placed under the TV.

P3 was required to enter a password, which they started looking for. They looked at the instructions on the wall and around the area of the monitor and the computer, but they could not find the password. P3 said they would ask for help at this point because there was no password. The moderator helped the user with switching the inputs for the systems, since there was no password available at the time of testing. P3 noted there was nothing to signify that switching

inputs was necessary, and they had a hard time switching the cables. Moderator provided additional assistance during this phase.

After the inputs were switched, P3 scrolled through the game selection on the Oculus gaming platform before putting on the headset. They chose a game, put on the headset, then took it off again to find the controllers. P3 had a hard time seeing things, due to eyesight, not the system. P3 was able to get out of the app and the headset, and they replaced all hardware when prompted to simulate exiting the room.

CASE STUDY FOUR: “I find this very confusing”

Participant four (P4) described themselves as “comfortable with the Vive because [they] work with it.” They walked into the space, and asked which system they should play. They did not look at the instructions on the wall when they walked in. They were confused by the placement of the equipment and whether or not it was already on. They put the Vive headset on first before trying the computer and were confused that it wasn’t working. P4 then put the Vive headset back and looked at the computers to read which were affiliated with each headset. When they tried to turn on a computer nothing happened, and the monitor remained dark. When P4 asked for help, the moderator asked them what they would do if they were alone. P4 responded, “Leave”. After this interaction, P4 noticed the instructions on the wall and began reading them. They weren’t sure why the headset wasn’t working, voiced concern, and then picked up the remote, turning on the TV with ease.

P4 needed a password in order to play the Vive. They looked around for the password on the computer and the instructions but did not see it. P4 then tried to log in as a guest, but that didn’t work. They also tried to use their onyen and password, which also didn’t work. P4 commented that the instructions were confusing by saying that you need to double click on the icon to open the desktop when there isn’t a password provided to get there in the first place. They also commented that the information architecture of the instructions wasn’t great and that they wanted to start in the middle rather than the top of the instructions.

At this point, the moderator corrected the computer. P4 read the instructions about disabling the Oculus in order to run Steam. They weren’t sure these instructions applied to them, but they did regardless. They then got the controllers for the Vive and brought them back to the computer. They mentioned they have a Steam account, but they didn’t want to log in with their credentials. They opened Viveport and chose a game. The system then said it needed an update, so P4 went through with the update. P4 commented at this point that they didn’t believe this VR was made for first-time users, and that they would just leave the space and not interact with it at all. After the update, they chose another game and wait for it to load. They mentioned that they were fed up with the process, so for the sake of the test, the moderator instructed P4 to switch to the Oculus. P4 put the Vive back and retrieved the Oculus, and then read the instructions on the wall. They mentioned again that the instructions aren’t great or decipherable, then clicked on an icon on the screen, opened the game platform for Oculus, chose a game, and put on the

headset before obtaining the controllers. They mentioned that the Oculus wasn't as good as the Vive, entered the game, and began playing. After several minutes of gameplay, the moderator told the user to end the game and exit the application. P4 exited the game using the in-game menu, replaced the headset and the controllers in the appropriate places, and walked over to the computers. At first they said they were going to log out of everything, but then decide they would call the Help Desk to turn everything off because they struggled with the computer earlier in the session.

CASE STUDY SUMMARY

Each participant was evaluated as a separate case study to compensate for the heterogenous state of the space for each session and the non-linear paths each took. In order to better assess trends and patterns, summaries of each participant were created and coded. Commonalities were more easily identified, and several existed, despite each participants' disparate experience with the space.

Each participant was able to put on the headset and hold the controllers correctly. While the purpose of this test was not to evaluate the usability of the equipment itself, this spoke to the accessibility and location of the headsets within the space.

Two of the four participants struggled with the computer monitor and choosing which input for the headset. One tried to turn the computer on, without realizing that it was already on and the monitor was off. The remaining two participants didn't notice the computers at all, and went straight to the headsets.

Two of the participants noted the instructions on the wall. They both commented on their lack of clarity, with one stating that the color coding didn't help, and the other stating that they seemed more tailored to "engineering students" or those who already have experience with VR in that space. The other two participants did not notice the instructions on the wall until they were asked about them after the testing session was complete.

Three participants made comments about leaving the space due to frustrations with getting the system started or asking for help. The remaining participant commented on the difficulty of getting the system started, but made no mention of wanting to leave the space. All four eventually reached gameplay, and seemed to enjoy it. The experience in VR itself helped to frame the struggles with getting the VR systems set up and make it more worthwhile to participants.

How long each participant interacted with the VR Room as a whole varied, as well as what tasks each participant was successful with. This shows that the experience of VR Room differs from person to person and that the room should account for differences in experience level and comfort with virtual reality. See Table 1 and Figure 2 in the Appendix for more details.

RECOMMENDATIONS

Our evaluation of the space indicated a tremendous need to improve the way instructions exist in the VR Lab. Having clearer instructions would help with the variability of the space and give each person who uses the room a clear way to get started. Most of our participants didn't notice the wall of instructions when they first entered the space, and half of them did not notice them at all during their session. It would be beneficial to move the instructions to an area where they might be viewed when a user first enters. Above the headsets could be a more noticeable location considering most of our participants ventured to that area first. For those who did take note of the wall directions, many noted that they were hard to read or outdated. Another simple improvement to the VR Room would be to update the directions and make the pictures and diagrams more succinct and clearer. An instructional video introducing users to the room could also be made available on each of the computers in the VR Room, as well as on the SILS website. Simple directions could also be formatted as a picture and used as the desktop image on both the Oculus and Vive computers.

Additionally, we believe it would be helpful to clearly label and indicate the introductory games and environments. Currently in the VR Room, a list of introductory games are posted in the corner, which most of the participants did not notice. Having a clear list of introductory games would help make the experience more seamless for those who have little experience with VR.

REFLECTIONS

Overall, our usability evaluation answered many of the goals we established prior to the tests. We discovered some significant pain points in the VR Room, particularly as they relate to the instructions and users' ability to operate hardware and equipment. The following are additional considerations for further testing:

1. Due to the flexibility of interaction with physical space, data collection during the test was very challenging. We used three notetakers to record different data during the test, but we believe there was useful information that might have been missed or ignored. Compared to the various techniques for data collection in digital interfaces, like screen recording and eye tracking, there are limited tools for data collection while observing interactions in a physical space.
2. Having three notetakers and one moderator in a small room observing the participant can be very stressful, especially as they think-aloud. In future studies, it may be beneficial for note takers to observe interactions remotely.
3. Because we only had four participants, we weren't able to relate different user behaviors to our quantitative data as it pertained to users' previous VR experience. Including more participants in the future might help us obtain additional useful observations.

Our participants repeatedly mentioned that experiencing VR is, as they articulated, very cool. However, the complexity prevents them from trying it out. For VR designers, our test shows that

the digital interfaces and hardware may be important, but the design of the physical space also contributes to the overall user experience.

APPENDIX | Images of the VR Room



Panorama view of the VR Room.

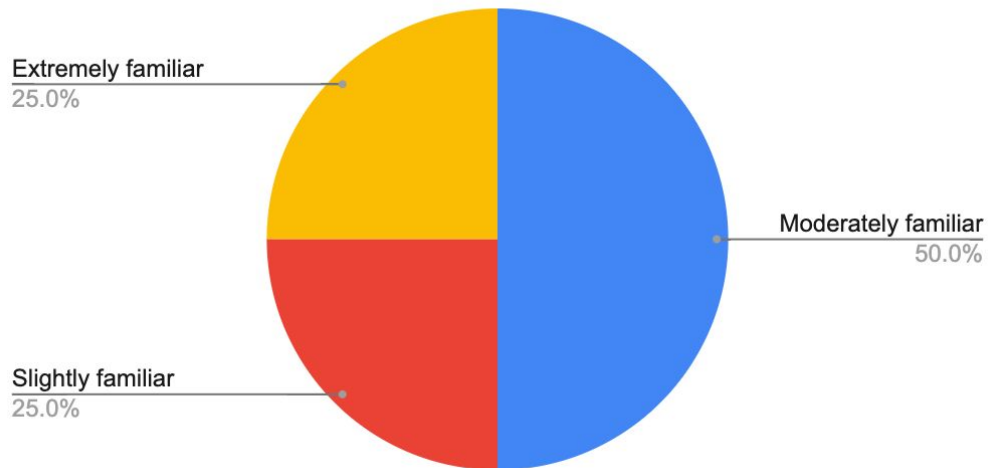


View of VR Room from room entrance.

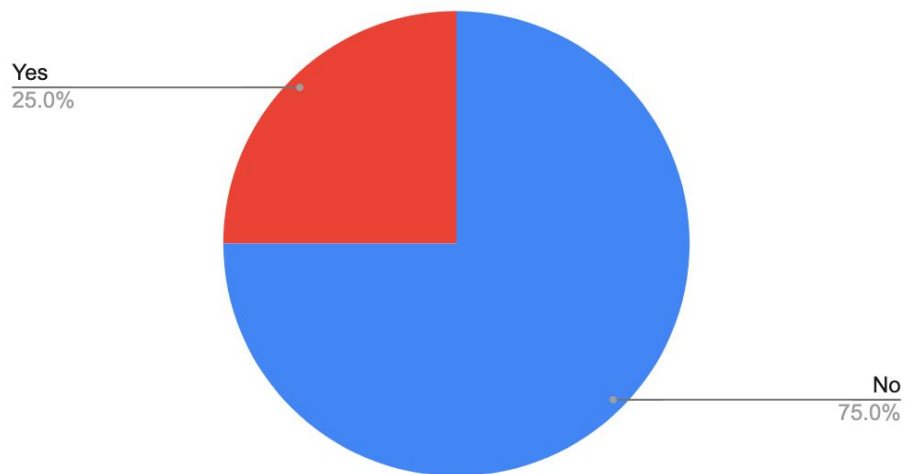
APPENDIX | Figures and Tables

Figure 1. Results of the pre-test questionnaire

How familiar are you with virtual reality?



Have you ever used the SILS VR Lab?



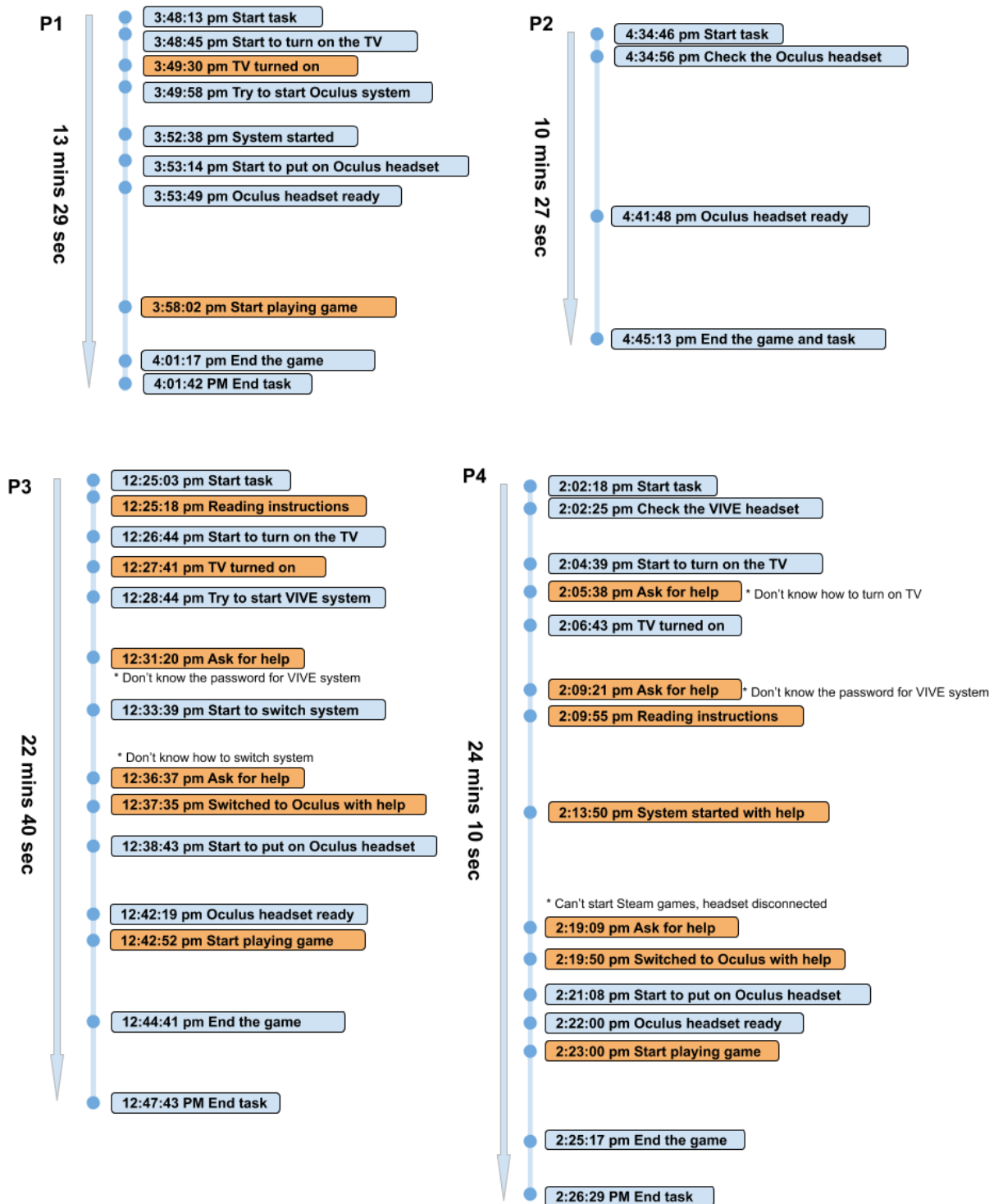
APPENDIX | Figures and Tables

Table 1. Task Completion Table

	Participant 1	Participant 2	Participant 3	Participant 4
Reading the instructions on the wall	Skipped	Skipped	Completed	Completed
Turning on the TV	Completed	Skipped	Completed	Completed
Getting the system started	Completed	Skipped	Failed (Completed with help)	Failed (Completed with help)
Putting on the headset and controllers	Completed	Completed	Completed	Completed
Switching systems	Failed	Skipped	Failed (Completed with help)	Failed (Completed with help)
Starting the game	Completed	Did it wrong	Completed	Completed
Exiting the game	Failed	Failed	Completed	Completed

APPENDIX | Figures and Tables

Figure 2. Participant timelines



APPENDIX | Evaluation Sequence of Events

1. Team set up the space and positioned cameras for recording. Observers sat inside the room while moderator awaited participant outside.
2. Moderator met participant at location determined during initial participation contact.
3. Moderator led participant to the space if it was their first visit.
4. Moderator welcomed participant, explained the task, and administered online pre-test questionnaire and consent form in the hallway outside of the Virtual Reality Room.
5. Task began as soon as the participant entered the room. Moderator followed.
6. Moderator executed game exit simulation, prompting participant to proceed as though they needed to leave the room.
7. Participant verbally indicated when they felt they had completed the task.
8. Moderator administered online post-test questionnaire and asked final interview questions.
9. Participant was given the opportunity to ask questions prior to moderator thanking them for their time and concluding the testing session.

APPENDIX | Moderator Guide

Hello **[PARTICIPANT NAME]**. Thank you for volunteering to participate in this study. My name is **[NAME]** and I will be walking you through our testing session today. **[NAME OF ADDITIONAL MEMBER]** and **[NAME OF THIRD MEMBER]**, are seated inside and will be taking notes during the test. During our session, I will mostly read from a script to ensure our testing sessions are consistent across participants.

Our objective today is to observe you using the Virtual Reality, or VR, Room. We are interested in better understanding how SILS students use the space. Through this study, we will evaluate how users interact with the VR Room to identify ways we might improve the experience. Our results will be shared with the SILS IT Help Desk staff members who oversee the room in the form of suggestions for improvement. While some quotes may be used to illustrate particular issues, no personal, identifying information will be attached to our results.

I want to emphasize that we're testing the room, not you. You can't do anything wrong in this session, so you don't have to worry about making a mistake. Your input is very valuable to our research so please be honest when providing feedback. If you have any questions as we proceed, don't hesitate to ask.

Do you have any questions for me so far?

[WAIT FOR QUESTIONS]

During the session, you'll be working on your own. If you encounter a problem during this process, try to solve it as best as you can. We are available to help if you feel you absolutely cannot proceed, but we encourage you to approach the situation as if it were a real-world scenario. Please be aware of your physical surroundings while interacting with the VR system, and please let us know if you experience any mental or physical discomfort. We will pause the test and intervene if we feel you might harm yourself or damage the equipment.

We would like to record video and audio of your session to ensure that our research team does not miss important interactions and to allow team members absent today to observe your session.

If you consent to participating in this study, we ask you to complete the online consent form and answer a few questions about yourself before we begin. If you would like to proceed with the test, I will provide the questionnaire for you now. Please let me know when you have completed the consent form and questionnaire.

[HAND THEM IPAD WITH QUALTRICS PRE-TEST QUESTIONNAIRE OPEN AND WAIT FOR THEM TO FINISH]

Thank you. Let's begin.

Once you enter the room, your task is to choose a virtual reality system, and, using the appropriate hardware, play a virtual reality game. Please feel free to explore the space and equipment as if you were here to use the space on a normal day, outside of a testing environment. The testing session will begin when you enter the room, and I will be seated after you have entered. We will start observing and

recording as soon as you begin. Please think out loud as you interact with the space so that we understand your thought process as you navigate through the task.

When you feel you have successfully played a game, please say aloud “I’m done”. The task will conclude once you express that you are done or when I ask you to stop the task.

After you have finished, we will ask you to complete an additional questionnaire.

Do you have any questions before we begin?

[ANSWER ANY QUESTIONS THE PARTICIPANT MAY HAVE]

The test will begin as you enter the room. Please remember to think aloud.

[RECORD ALL RELEVANT INTERACTIONS, STATEMENTS, QUESTIONS, PAIN POINTS, BREAKDOWNS, OR WHERE AND WHEN A MODERATOR IS ASKED FOR HELP]

[START ADDITIONAL TIMER WHEN PARTICIPANT HAS ENTERED GAMEPLAY AND ENVIRONMENT IS DISPLAYED ON THE EXTERNAL SCREEN OR AT MODERATOR DISCRETION]

[LOUDLY, TO BE HEARD OVER HEADSET]: At this time, we would like for you to imagine that you have another obligation and must leave the VR Room. Please demonstrate how you would exit the game and leave the room. When you are ready to leave the room, please say, “I’m done.”

[WAIT FOR PARTICIPANT TO SAY THEY ARE DONE]

Great. That concludes the testing session. We have one more questionnaire we’d like you to complete and a few more questions we would like to ask before we conclude.

[HAND PARTICIPANT LAPTOP WITH POST-TEST QUESTIONNAIRE OPEN AND WAIT FOR THEM TO FINISH]

At this time, please tell us about your overall experience.

What did you enjoy, if anything, about using the VR Room?

What did you like least, if anything, about using the VR Room?

Do you have additional questions or comments?

Thank you for your time and willingness to participate in our test today. Have a great day.

APPENDIX | Consent Form

Presented to participants through an online Qualtrics survey.

Informed Consent for Research Participation! Based on a form provided by the OJR

Purpose of the project:

The researcher(s) (Eden Andes, Mariesha McAdoo, Karina Soni, Yuan Wen) are conducting a usability study to evaluate the Virtual Reality Lab at the University of North Carolina's School of Information and Library Science. The results will be used to help improve the VR Lab.

Procedures:

As a subject you will be asked to:

- 1.) Fill out a pre-test questionnaire.*
- 2.) Be observed as you spend a specified amount of time completing a specified task. 3.) Complete a specified task at the testing site.*
- 4.) Complete a post-test questionnaire. The whole session will be video recorded by a camera in the room for later analysis.*

Potential Risks

There is limited risk associated with participating in this usability study. However, there is a possibility that participants may cause themselves physical harm through the use of the room. Participants may also experience mild discomfort associated with motion sickness.

Confidentiality:

Participation in this usability study is voluntary. All information will remain strictly confidential. The descriptions and findings may be used to compile a report about the site's effectiveness. However, at no time will your name or any other identification be used. You are at liberty to withdraw your consent to the experiment and discontinue participation at any time without prejudice. If you have any questions after today, please contact

Eden Andes: ejoelle@live.unc.edu

Mariesha McAdoo: rosalita@live.unc.edu

Karina Soni: karina@unc.edu

Yuan Wen: yuanwen@live.unc.edu

I have read and understood the information on this form and had all of my questions answered

- ☐ I consent, begin the study
- ☐ I do not consent, I do not wish to participate

APPENDIX | Pre- and Post-Test Questionnaires

Presented to participants through online Qualtrics surveys.

PRE-TEST QUESTIONNAIRE

How familiar are you with virtual reality?

- ☐ Not familiar at all (1)
- ☐ Slightly familiar (2)
- ☐ Moderately familiar (3)
- ☐ Very familiar (4)
- ☐ Extremely familiar (5)

Have you ever used the SILS VR Lab?

- ☐ Yes (1)
- ☐ No (2)

How familiar are you with SILS VR Lab?

- ☐ Not familiar at all (1)
- ☐ Slightly familiar (2)

- ☐ Moderately familiar (3)
- ☐ Very familiar (4)
- ☐ Extremely familiar (5)

What is your overall impression of the SILS VR Lab?

POST-TEST QUESTIONNAIRE

I think that I would like to use the VR lab frequently.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Somewhat disagree
- ☐ Neither agree nor disagree
- ☐ Somewhat agree
- ☐ Agree

☐ Strongly agree

I found the VR lab unnecessarily complex.

☐ Strongly disagree

☐ Disagree

☐ Somewhat disagree

☐ Neither agree nor disagree

☐ Somewhat agree

☐ Agree

☐ Strongly agree

I thought the VR lab was easy to use.

☐ Strongly disagree

☐ Disagree

☐ Somewhat disagree

☐ Neither agree nor disagree

- ☐ Somewhat agree
- ☐ Agree
- ☐ Strongly agree

I think that I would need the support of a technical person to be able to use the VR lab.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Somewhat disagree
- ☐ Neither agree nor disagree
- ☐ Somewhat agree
- ☐ Agree
- ☐ Strongly agree

I found the various devices and instructions in the VR lab were well integrated.

- ☐ Strongly disagree
- ☐ Disagree

- ☐ Somewhat disagree
- ☐ Neither agree nor disagree
- ☐ Somewhat agree
- ☐ Agree
- ☐ Strongly agree

I thought there was too much inconsistency in the VR lab.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Somewhat disagree
- ☐ Neither agree nor disagree
- ☐ Somewhat agree
- ☐ Agree
- ☐ Strongly agree

I would imagine that most people would learn to use the VR lab very quickly.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Somewhat disagree
- ☐ Neither agree nor disagree
- ☐ Somewhat agree
- ☐ Agree
- ☐ Strongly agree

I found the VR lab very cumbersome to use.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Somewhat disagree
- ☐ Neither agree nor disagree
- ☐ Somewhat agree
- ☐ Agree

☐ Strongly agree

I felt very confident using the VR lab.

☐ Strongly disagree

☐ Disagree

☐ Somewhat disagree

☐ Neither agree nor disagree

☐ Somewhat agree

☐ Agree

☐ Strongly agree

I needed to learn a lot of things before I could get going with the VR lab.

☐ Strongly disagree

☐ Disagree

☐ Somewhat disagree

☐ Neither agree nor disagree

☐ Somewhat agree

☐ Agree

☐ Strongly agree