COMP 3450

Phase Five: Project Testing and Evaluation

THOMPSON RIVERS UNIVERSITY

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Usability goals and UX goals

First and foremost our program has to be fully functional. Every knob must work as intended, and alter the sound appropriately. The tool-tips provided should be explicit and clearly indicate what the knobs do, especially regarding the less intuitive features. We understand how difficult learning audio synthesis is; it is why we chose this project in the first place. Visually, we want our interface to be approachable, intuitive, and minimal. When we undergo testing, we will be looking for not only reactions to the interface itself, but the time it takes the users to navigate through it. We plan to derive some information using Fitts' Law. Are our knobs large enough? Are they spaced far enough apart? These evaluation techniques should give us enough insight to drastically improve our user experience.

Based on our UX goals we came up with specific usability goals. First and foremost, the product should be easy to learn and interact with. The program's functions should be memorable and straightforward for the user to remember and identify. The program should introduce transferable concepts that the user can apply to other synthesizers. Finally, the user should be able to figure out what to do or how to perform a certain action from the programs intuitiveness.

Tasks to be performed by users:

Task 1:	ID Master volume and then change the pitch down 2 octaves
Task 2:	Change the filter
Task 3:	Change the oscillator to a square wave
Task 4:	Increase the oscillators pitch
Task 5:	Can you tell me what the Filter attack does

user__	Time (sec)	# and type of errors	# times need of help	Successfully completed?
Task 1				
Task 2				
Task 3				
Task 4				
Task 5				

Results gathering form: https://forms.gle/YioBrGzCg5BjxgkRA

Types of data that you collect

We are collecting both quantitative and qualitative data. We are measuring the time it takes users to perform specific tasks, how many errors they perform, the number of times they needed help, and whether or not the task was successfully completed. We can compare this against earlier data that we gathered on other interfaces.

Additionally, by videotaping the tests, we can get a general idea of how people feel, their first reactions, and their in-the-moment reactions to the synthesizer.

We are also gathering user satisfaction data in the form of Likert scales.

Performance recording method and why

Previously, we assumed that people want and like to learn through experimentation. So, we came to the conclusion that the best way to testing our product is getting users to interact with the freedom of exploring, experimenting and doing whatever they wanted.

We registered performance through video and manual observation. We recorded the users interacting with the interface, letting them explore and discover all the options and sounds. Later on we asked them to perform a few tasks to see if the interface was simple enough and not frustrating. To have quantitative data to record and analyse we timed the tasks and number of errors made. For our qualitative data we documented reactions, body language, random comments and actions the users performed during the usability testing.

Informed consent form

See appendix A

Pilot study

Our pilot study consisted of the evaluation of the critical components of our prototype design. During the test, we identified key problems based on the feedback received from our test users. Our pilot study can be broken down into three main aspects:

1. **Process** (e.g. Where the feasibility of the key steps in the main study is assessed)

Our pilot study process:

Greeting → Signed consent form → Collect demographic data → Perform typical tasks → collect satisfaction questionnaire → Exit

We went through this process each and every time with our volunteers. The process itself was quite simple and easy to streamline. Our time spent with each volunteer was no longer than 20 minutes and in that time we were able to capture all of the data we needed.

2. **Resources** (e.g. whether the forms of evaluation selected for the main study are as good as possible)

The evaluation methods we used for the previous phases all provided enough information. We had to keep in mind that the final prototype did not require as deep of information as a fully functional synthesizer would require. If we had to do the data gathering again, we would use the same methods.

3. **Management** (e.g. The problems our team encountered while data gathering)

The data gathering methods we used were adequate for the depth of information that we needed. Compiling the data and discerning more clear insights could have gone more smoothly but considering that was the first time our group had to compile documents together it went well.

Satisfaction questions

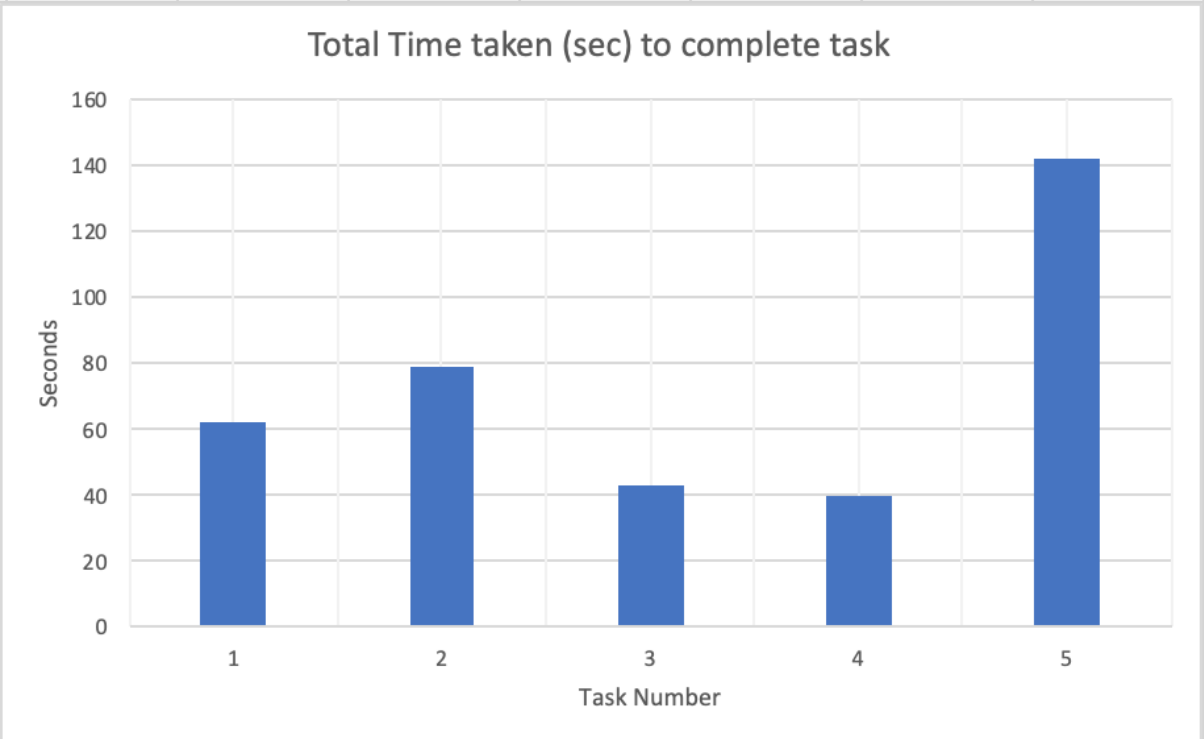
1. How approachable did you find the product? (Threatening . . . Approachable)
2. How easy was it to find and use parameters? (Difficult . . . Easy)
3. How has your understanding of synthesizers changed after using this product? (I am more confused that before … My understanding has not changed … My understanding has improved)
4. How has your interest in synthesizers changed after using this product? (I am less interested … My interest has remained the same … I am more interested)
5. How responsive did you find this product? (Unresponsive … Responsive)
6. How satisfying was using this product? (Unsatisfying … Very Satisfying)

https://forms.gle/RmKnkYNhMVMy7c7ZA

Data Analysis
Statistics of Results of user testing

	Total		
Task	Time Taken (sec)	Number of errors	Number of times need of help
1	62	0	0
2	79	4	3
3	43	0	0
4	40	0	0
5	142	5	6

	Average		
Task	Time Taken (sec)	Number of errors	Number of times need of help
1	5.17	0.00	0.00
2	6.58	0.33	0.25
3	3.58	0.00	0.00
4	3.33	0.00	0.00
5	11.83	0.42	0.50



From the results provided above we can see that most users did not have any trouble exploring and interacting with the program. On average users took 6.10 seconds to perform a task. We can observe, the absence of error throughout the tasks. Task 2 and 5 where the only ones where users had “problems” however we discovered this was due to lack of knowledge and it could be improved with better labelling.

From the results we can see that users overall interacted very easily and smoothly with the product. It’s important to take into account the fact that the target users where a combination of people with and without musical/synthesizer knowledge.

Task 2
Type of errors
Chose ADSR filter didn't know which one to change
Selected wave oscillator and then resonance
Changed wrong thing
Hesitated on choice

Task 4
Type of errors
went to resonance and then read the "filter"

Task 5
Type of errors
Changed attack of amplifier
Changed amp attack first
chose wrong attack first
Was changing Amp Attack at first
This describes the Amplifier attack, not the filter attack

Task 5
Action taken
Hover over the knob and read tool tip
knew where to go and tried to figure out what it did before hovering over knob and reading
Once hovered over the knob
How quickly it gets to full volume
How fast it goes to full volume
Hovered over amplifier attack first and then on filter attack and read what it does
hovered over filter attack button and read
Hover and read tool tip on knob
Already knew!
How long it take to get full volume
If it is low, the note starts right away. If it is higher, it takes longer to reach its maximum volume
It changes how fast the filter takes to hit the decay stage

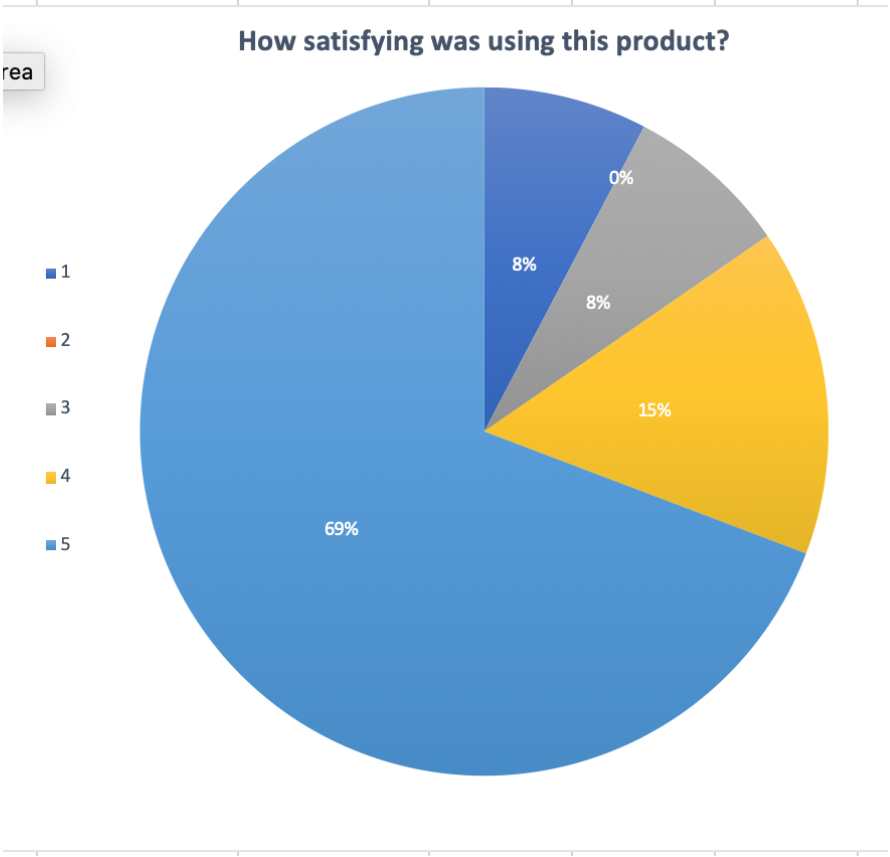
For Task 2, some of our participants failed to identify the filter cutoff knob. This is one of the most critical parts of the synthesizer. This error may be due to the cutoff knob not being visually distinct from other knobs

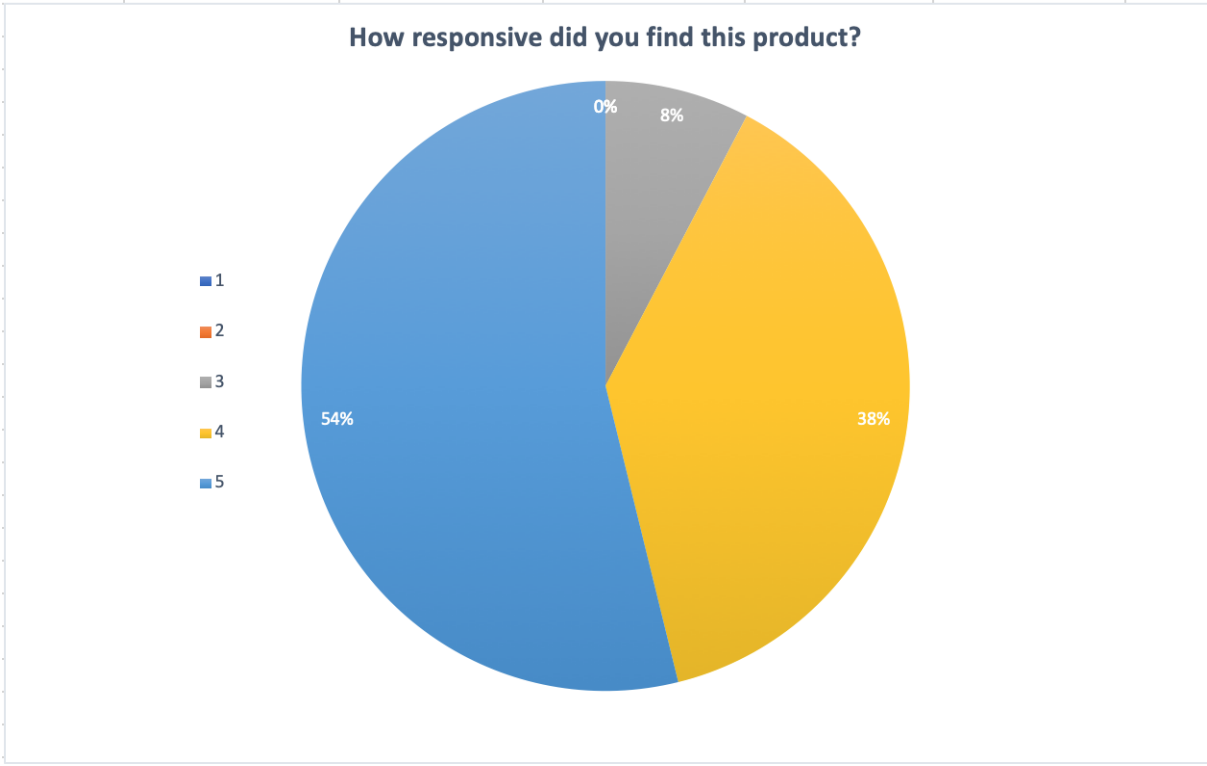
.

For Task 4, one of our participants went to a completely different area of the synthesizer. This may be due to insufficient labelling of our oscillator pitch slider.

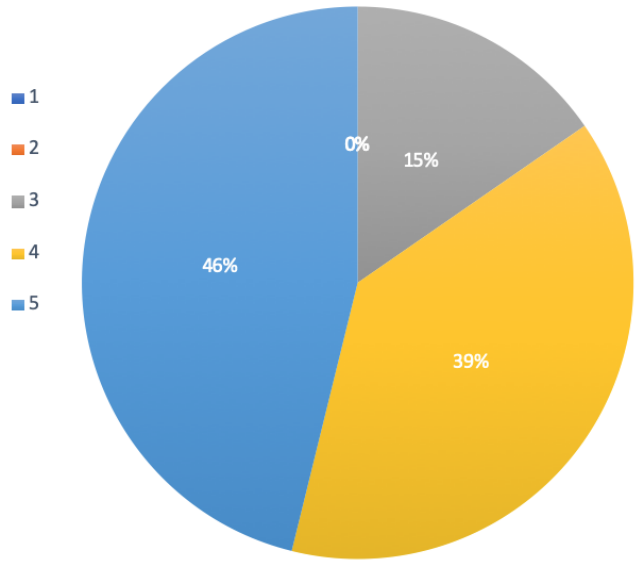
For Task 5, around 40% of our user altered the amplifier attack instead of the filter attack. We may be able to improve this result by showing a more direct connection between the filter section and the filter ADSR section.

Satisfaction questions statistical results

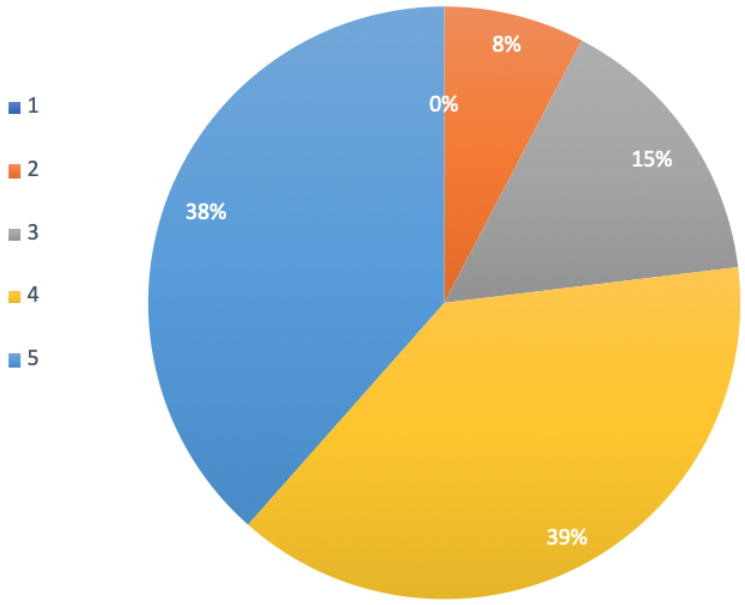


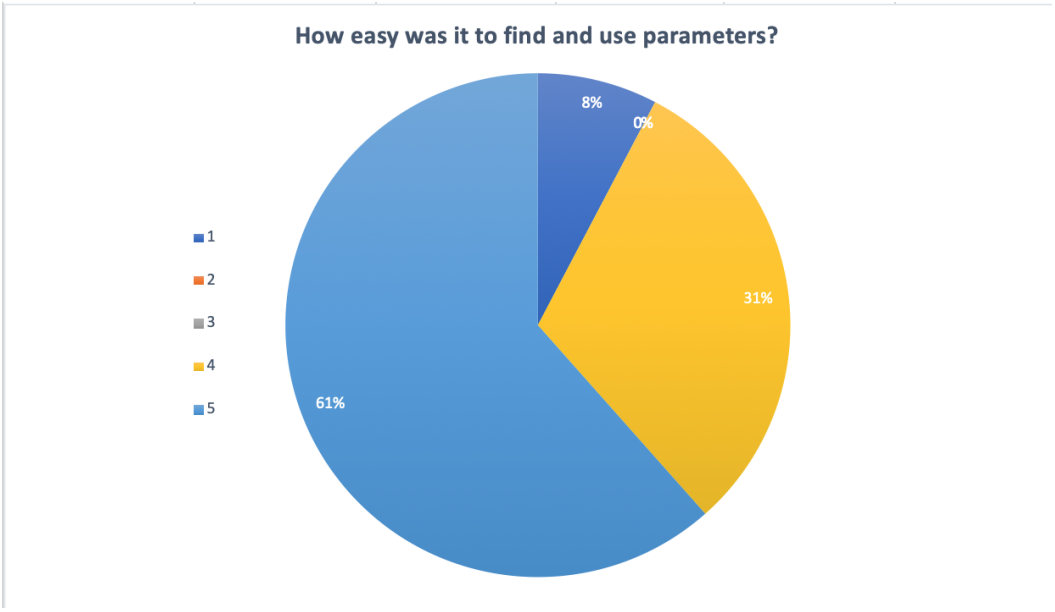


How approachable did you find the product?



How has your understanding of synthesizers changed after using this product?





Users said:

Comments and observations
really like how simple and easy to use it is and it was fun playing around with it
well structured, really like the groups, very user friendly and approachable
Liked the hover feature
I like making it loud
Fun and easy
I like that it tells you what to do and the colors and it's very straightforward
It was so much fun to use
-
really cool and super easy to use, clean design
Fun to mess around with
If i had a week to play with this i could probably make a song as good as crank dat
There's no weight between the text, or different sizes. The letters by the attack/decay/sustain/release make me think I should be pressing the A D S R buttons on my keyboard.
Using this was the most fun I've had in years. Approachability and Ease of use are inherently bad with synthesizers, so I think this product does a great job of improving these aspects given its nature.
super cool! really enjoyed it
I feel compelled to download a free synthesizer and try my hand

Improvements suggested
change the yellow color and the background color
better instructions of how to use it...
Differentiate ADSR for Amp and Filter more
Get rid of "ADSR" in title of filter to clean it up. Hover over titles to tell what each overall does
Have components more spread apart and descriptions underneath
I think the cut off should be a slider not a knob
There are to many knobs and i'm not a fan of them
I wish it was vst so that I could open it with my production program. Also a "save" button to save what i'm producing would be nice.
Bigger Section labels
A looper function
Colour would make it easier, in particular it is hard to see the red on the grey background.
Varying sizes on the knobs, alignment, attention to detail in copy, and more appealing colours all would have helped. Your eye isn't immediately drawn to anything, and without memorizing the locations of different features there's nothing about their placement or hierarchy that gives you any idea as to their importance. I think I'm at a disadvantage for having worked with synthesizers before, because standards I'm used to (like the cutoff being bigger than everything else) weren't followed. But for beginners, it doesn't make it clear, through instructions or images, that to have an experience where everything you're doing changes the sound you have to go from the top down. Unfortunately, I think this synthesizer is LESS approachable than the average, and absolutely less approachable than any popular synthesizer with as few moving parts as it has.

From the satisfaction questions we can assume that users enjoyed the program. 61% of users found it very easy to find the parameters and functionalities and no one found it very difficult. Moreover, 38% said that their understanding of synthesizers significantly changed after using the product in a positive way.

46% found the product highly approachable and 69% of users really enjoyed and found the product satisfying to use. It's important to note that 0% of users gave a scale less than 3 to any of the questions meaning that their feelings and understanding of the product and synthesizers as a whole either stayed the same or increased. There was no negative effect on any of the users caused by the product.

From the user comments, we can conclude that the product was really "simple, easy to use, fun, well structured and user friendly, approachable and straightforward".

Furthermore, from user feedback we discovered some potential improvements such as changing the color of the interface, clarifying the tooltips, improving knob differentiation, and altering knob size and appearance.

Is there a relationship between the demographic data and the collected data?

We conclude that there is no relationship between the demographic data and the collected data. Regardless of our users' demographics, the data collected gave us no insight into what kind of person was doing the testing.

Data interpretation and identified problems

The average time it took our users to achieve each task was fairly low. This suggests that the users were easily able to find each component for the given task. The last task cause our users the most trouble with the average time being more than any other task as well as the rate of error being higher. Many users specified the issue with this task when asked in what way our synthesizer could be improved on. Many said that the issue was due to the labelling, with some saying that they needed more direction on how to use it. This mirrors the data that we gained from what kind of errors the users made when they did so, with many mistakes being due to the user selecting the wrong component. This is due to some parts of our interface not standing out enough. Many users suggested interface improvements, such as colour to attract to certain features as well as bigger and more defined labels.

Overall our high-fidelity prototype was well received by our target users. Our satisfaction survey found that the majority of or users walked away finding the prototype easy to use and approachable. Looking through the comments and observations the many users found using the prototype very exciting and fun. Although we have many aspects to improve the prototype, our collected data shows that we are on the right track in achieving the overall goal of our synthesizer is to see learning to use synthesizers not as a daunting task.

Improvements to our product

There are a number of things we can add or change to improve our later prototypes and our final product:

- Labelling: Our labels need to be clearer and more consistent. One user reported being confused by the ADSR envelopes, thinking that it was asking them to use the A, D, S, and R keys on their keyboard. We also need to improve our labelling on the filter.
- Tooltip Descriptions: Some of our tooltips are hard to understand. We should rewrite our tooltips so that they are less technical and as simple as possible to understand.
- Colour Scheme: A few users reported that the colour scheme was disinteresting or unengaging. We should rework the colour scheme so it is more visually pleasing (while making sure all elements remain visually distinct).
- Knob Size: We should experiment with varying knob sizes and placement.
- Oscilloscope/Visualization: We intend to add an oscilloscope as a visual aide for users, so they can see how their changes affect the output (as well as hear it).
- ADSR Envelope Visualization: We had fewer issues with testers understanding the ADSR Envelopes than anticipated, but some had some definite difficulties. Perhaps a visual aide of some sort would help increase understanding.
- Splashscreen: For graphical eye candy, a starting splash screen should be added. This also allows us to add menu items in the future if needed.
- Tabbed or Panelled interface: Due to the simple nature of our product, a tabbed interface may increase complexity (as everything can be shown easily on a single page), but it is worth experimenting with.

APPENDIX A

COMP 3450: Phase 5 Testing
Consent form for User Data to be used in Usability Research

I _____ voluntarily agree to participate in this research study.

I understand that even if I agree to participate now, I can withdraw at any time or refuse to answer any question without any consequences of any kind.

I understand that I can withdraw permission to use data from my interview within two weeks after the interview, in which case the material will be deleted.

I have had the purpose and nature of the study explained to me in writing and I have had the opportunity to ask questions about the study.

I understand the videos taken of me in this study will be confidential and at no time will be released to the public.

I understand that in any report on the results of this research my identity will remain anonymous. This will be done by changing my name and disguising any details which many reveal my identity or the identity of people I speak about.

Signature of researcher	Date
_____	_____
Signature of participant	Date
_____	_____

Thank you for volunteering for our research!
TeamOne
Kai, Tyler, Camila, River