

Research Method 1: Interview (conducted by Leon)

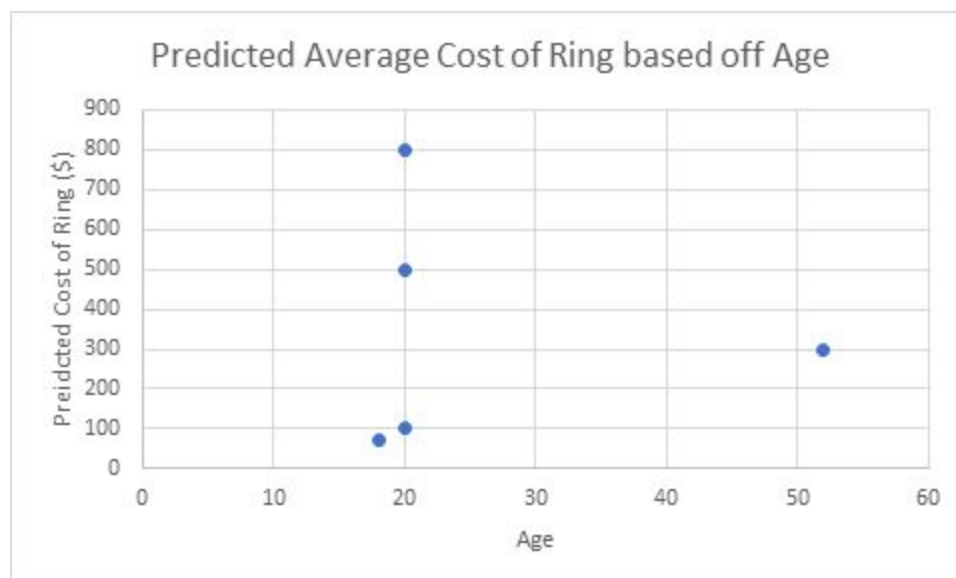
The methodology that was used by me to collect data was in the form of an interview. I interviewed a total of 5 people, 4 of which were college students and one was a faculty of University of Colorado Boulder. Within the four different college students, they were all in different majors. The variety of majors include: Integrative Physiology, Economics, Undeclared, and Business. This wide range of majors provides different perspectives on the use of technology, and we can perhaps make correlations between their majors and their habits related to technology. The age demographic was relatively close with the only outlier being the adult who was not around the average age of 20. It is also important to note that all 4 college students are working (20-30 hour work weeks) while being full-time students. The interviews were conducted in a private study room in the Center for Academic Success.

Within the interview, some important pieces of information that I found was that everyone owned a phone and laptop. This is not very surprising because they are mostly college students but what did surprise me about this information was how everyone used the phone for the same purpose which is to text and snapchat which can be categorized into socializing while laptops were used for more academic purposes. Almost all interviewees had access to some form of paid subscription based streaming service with the most common one being Netflix. They all stream Netflix on their laptops and not on their phones. Most of them don't even have the Netflix app installed onto their phones. I was very surprised at the wide range of prices I got for how much the interviewee would pay for The Ring. I explained to them the product and all its potential uses and asked them how much they would pay for such a product. The range for the prices ranged from \$70 - \$800 given that a lot of the interviewed participants were not very

knowledgeable about the market value of technology. The toughest question that was on the interview with not many answers was “What does your smart device not do that you wish it could?”. Only 1 out of the 5 participants answered this question to some extent. Since the majority of interviewees use technology passively and accept what these devices already have, they buy smart devices based on the list of current available features. Once I told the participant about The Ring and its features and asked if this is something that they would need, all 5 participants agreed that this would be useful to have.

Upon asking whether or not the interviewee preferred a device that is wearable or carryable, the only participant that would prefer to have it carried said “I don’t enjoy wearing my fitbit because most of the features that it claims to do does not really work. For example if I move my hand the watch should turn on but that feature does not work”. I asked that if the product did work as intended, would they change their mind, and they said they would. So, I learned that the underlying factor is that a lot of wearable devices claim to do things that don’t function well and this participant gave up on trying to use them and did not stick with them.

Overall, after conducting these interviews, I learned that it would be very helpful to have some function that could control devices remotely, stemming from the question “can you demonstrate for me how you would respond to a text message if your phone was upstairs and you were here?” that was presented to the interviewees. Another design improvement would be being able to make emergency calls when the user’s phone is far away.



Research Method 2: Online Surveys (conducted by Wesley)

I conducted an online questionnaire. The questionnaire was distributed to other people at CU Boulder as well as family or friends living in other parts of the United States.

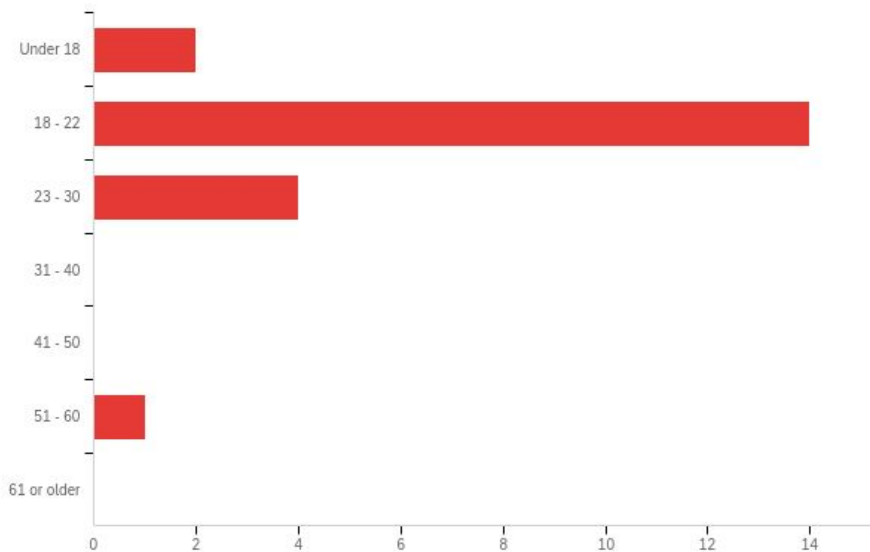


Figure 1

As shown in Figure 1, of the 21 responses, 2 people were under 18 years old, 14 people were inclusively between 18 and 22, 4 people were inclusively between 23 and 30, and 1 person was inclusively between 51 and 60 years of age. Yet, everyone who participated in this survey owned a smartphone, and most people use their smartphone to call, text, browse social media, listen to music, check their email, watch YouTube, and surf the web. On top of that, they also wished that their smartphone would have a longer battery life, automatically adjust volume based on the app being used, and being the key to their car.

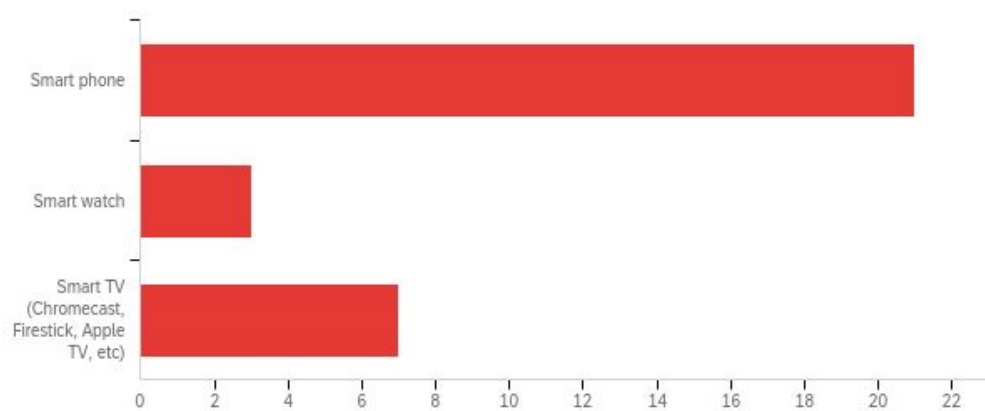
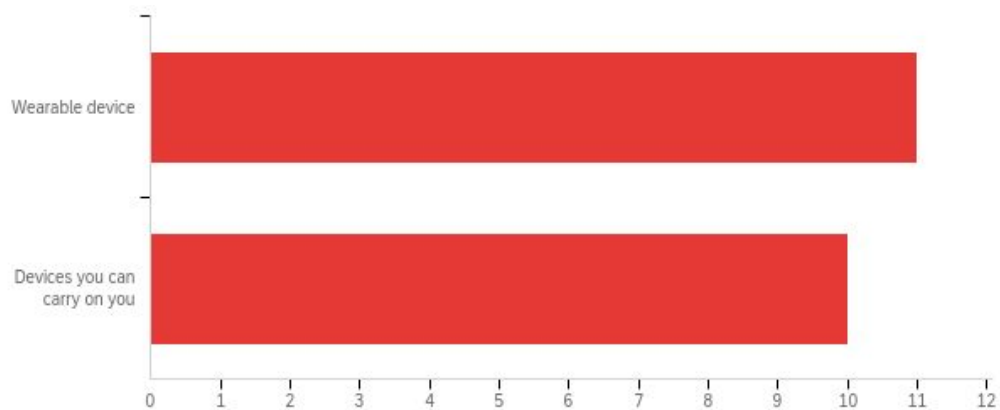
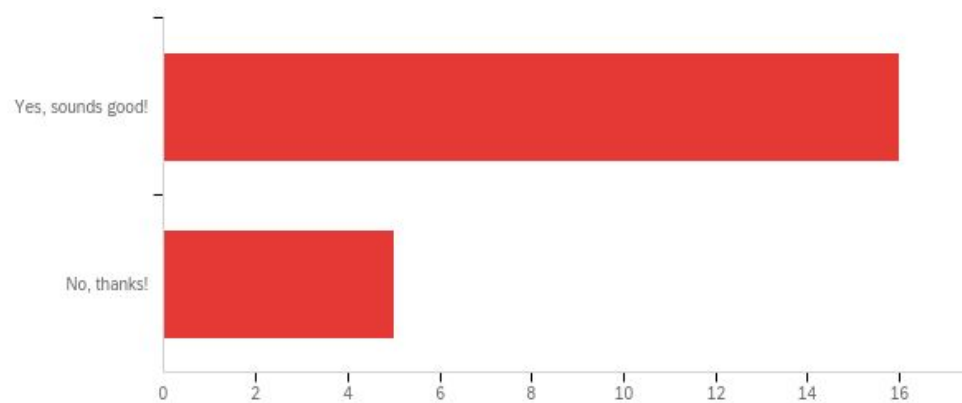
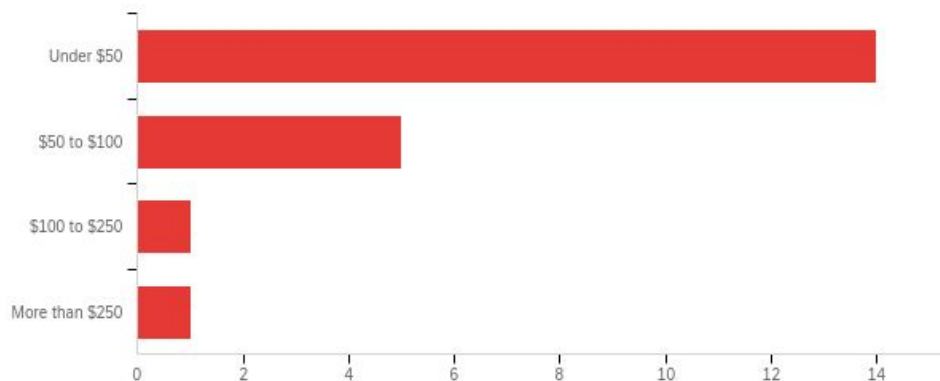
**Figure 2****Figure 3**

Figure 4

Interestingly, according to Figure 2 and 3 above, even though everyone owned a smartphone and only a few have a smartwatch, only slightly more than half of the people who completed the survey preferred wearable devices over devices one can carry on oneself. Furthermore, there was an overwhelming percentage of people who were interested in a wearable ring that can connect to other smart devices than those who weren't (as shown in Figure 4). The people who were not interested in such devices all thought the ring would not be useful to them at the moment, so spending more money on The Ring would not appeal to them. Of the people who were interested in the ring, there were many features that were described as “must-haves” by numerous people: call and text, GPS, music/volume control, notifications, heart rate measure, track steps, and unlock other smart devices.

**Figure 5**

Lastly, as shown in Figure 5, the majority of people who completed the survey would only pay under \$50 for a device like The Ring that would allow them to control their smart devices.

After conducting the online survey, we learned that, first of all, in regards to smart devices, people across all age groups think alike and use them for pretty much the same purposes. At the same time, people who were not interested in a device like The Ring were not from one single age group. However, there is still room for a device like The Ring because there were still more than half of the people who preferred a wearable device (like a ring) over a device they can carry on them (like their smartphone). In addition to the original functionalities of The Ring where people can double tap to reply to texts via writing with their hand and triple tap to adjust the TV channel or volume by swiping left and right or up and down, respectively, and have the notification band of The Ring light up when there is a new notification, people have hopes of what their smartphone can do. To meet some of these demands, we can add features to The Ring such that it can act as a key to one's car or other smart devices by unlocking those devices when The Ring is within the vicinity of those devices while making sure The Ring has a much longer battery life than other portable smart devices today, i.e. a few days to a week. Additionally, in order to make The Ring appeal to more people, we should also implement a microphone on The Ring such that people can speak into it to leave voice messages, perform voice commands, record audio, or make emergency SOS calls, GPS tracking, gestures to adjust the output volume of a source/connected device, and a turnable "knob" on The Ring that allows the user to switch between connected devices when turned as to control those devices. As for the cost of such a device, we would potentially have to lower the price, so people would be more susceptible to buy and try a new device like The Ring.

Research Method 3: Observation (conducted by Yvonne)

For one of our research methods, we did an observation. We chose to use observation as one of our methods because we wanted to see if there were other underlying problems that users face when they're using their many technological devices and how we could potentially fix them with our project.

This observation was conducted in the lobby of the Atlas (TAM) building. I chose this building because the sample group here is normally not too big, where it can get crowded and difficult to observe, and not too small, so we can get enough data. There are also usually people of other age groups besides college students in this area. Furthermore, people who are in this lobby are usually working on their devices such as laptops and iPads, especially if they have a major or minor in TAM. The layout of this lobby also enables one to see what everyone else is doing because it's very open.

Going into the observation, we wanted to see how many devices do people normally have, what these devices are, how they interact with them, and if they have any difficulties while interacting with them. Moreover, we wanted to figure out if there are tasks that are repeated throughout multiple devices.

The data that I collected includes that almost everyone has more than one mobile/ smart device, and the most common ones are smart phones (like iPhones and Samsung Galaxy), tablets (iPads are the most popular), bluetooth earphones (such as AirPods), smart watches, and laptops. More than half of the people there had more than half of these devices and were using them simultaneously. For example, they would be on their laptops but checking their phone while listening to music with their wireless earphones and wearing a smartwatch. Other people would be looking at lecture notes on their laptop while taking down some notes on their tablet and also listening to music. In addition, we recorded a quote that was overheard during the observation, where a student was talking to another student saying that he lost his AirPods but "Find My Airpods isn't working and it's just completely gone".

One of my major findings in this observation is that we saw that people could see the messages on their smartwatch but they would only be able to reply using a different device. This will later be addressed in the questions down below. Another finding is that people often use one

device to charge another device, such as using a laptop to charge a tablet or earphones. This led to us thinking about a feature where the Ring could keep track of the battery levels of all of the smart devices connected to it, so the user could know if one of their devices is running out of battery even when they're far away from the device. To address lost devices, we thought of a feature for the Ring to have, which is for it to keep track of all of the locations of the devices, which can work in conjunction with the battery feature because usually if a battery on a device runs out, then the GPS tracking of it fails. We also learned that it might be helpful to have a function where all notifications can come from just the Ring, because we observed that notifications can be redundant at times, when users are getting notified by all of their devices one message comes in, with a buzz from the phone and two 'ding' sounds, one from the laptop and another from the tablet. This could be distracting while the user is studying or trying to focus. After this observation, a question that came up is that will our design be too similar to similar watches, and if so, how could we make it even easier to use and integrate more features? Another question was that even though we have a way to reply to messages and write things in general with our Ring, how does the user even see what message came in, since it's just a ring that notifies the user? This question helped with our design in that we have decided to have a projection technology where the Ring can project out things onto a surface for the user to see. Overall, the observation helped us to alter and add to the current design of The Ring.

Summary:

The Ring is a wearable device that provides easy access to all of the user's smart devices, and many things that could only be done by operating on multiple devices at once can now be done by just The Ring. In the past few weeks, The Ring team has studied their customer segment in the hopes to find out how the Ring will better serve their clients. The team has chosen to study their potential consumer by conducting observations, online surveys, and interviews. A meeting was held on Friday, February 28th at the Bear Creek Apartments to discuss the results and all of the members were present.

- Observation: this research method was conducted with 20 to 30 people in the Atlas building
- Online Survey: 20 people have completed the online survey allowing the group to better understand the behavior of our customer segment. The group now has a better knowledge of which smart devices do our customers own on average, what functionalities are wished to exist on these devices, whether or not our customers like to wear a smart device or carry them, and a better idea of how much on average would our target consumers pay for the Ring.
- Interviews: The interviews were conducted with 5 different people. This research method was essential for us to explain our product to our customers and to better recognize the habits of our potential clients with regards to the current smart devices they own. Interviews were made on Thursday (02/27) from 9am to noon.

Once satisfied with the research findings, the group got together to discuss the real needs of our customers' segment and what functionalities should we keep, add, or discard from The Ring. The observations, online survey, and interviews allowed us to conclude the following topics:

- An average of 30% of the people researched would be willing to carry another smart device in their pockets. More than average are okay by using a wearable device.
- On the interviews, people were able to better understand The Ring and so they considered a reasonable price for this product to be in between \$200 to \$400. However, we noticed that people who did the online survey had a lack of understanding of what The Ring was and so they stated that a fair price for this product would be between \$50 to \$75.
- The behavior between people and tech was consistent in all of the research methods. In other words, people have the same way to interact on their phones when texting/listening to music, browsing on their laptops, or watching a movie on TV.
- A lot of people wish there could be an easier way to change the volume of their TV/music player.
- People very often stated that with multiple devices it can be annoying to enter a password all the time unlock their smart devices.

We also considered the questions below while collecting data:

- What do users have to do when their devices are far away from them but they want to access their device?
- What difficulties do users have in general while managing so many devices?
- What are the most attractive features that people would want to have on a device like The Ring?

With all this information, our group has decided to make a few changes to The Ring. According to people's preferences, we will implement a way for people to unlock their phones, tablets, and computers by just having The Ring on. Also, we will implement the gesture feature which will allow our users to change the volume of their TV/music player by making a circular movement with their fingers. We also want to add a mic for being able to make emergency calls and to answer their phone, and most importantly, as an added safety feature, to be able to make sound recordings in the case of danger or as the user needs. Furthermore, since so far we have only designed The Ring to enable users to send messages by writing with their finger on a surface, but they cannot see the message, we want to integrate a projection ability on the Ring. Other than these features, our research showed that people care a lot about the aesthetics of what they are wearing. With that in mind, we will make some changes to The Ring design to make it look more appealing and pleasant to our users.