SFU BEEDIE SCHOOL OF BUSINESS

Assignment 2.2: Final Document

BUS: 238

D100 Introduction to Entrepreneurship and Innovation

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1. Introduction:

The team's chosen topic for this assignment is video games and esports. Video games are one of the most well-known forms of entertainment. During this digital age, game developers are competing against each other and are continuously developing new games in order to attract a lot of people. The reason why the team has chosen video games and esports as the topic of investigation is through the team's shared interests and experience in playing video games. This has also made it more convenient for the team to brainstorm and identify a problem that is related to our topic of investigation. As we brainstormed some major issues for computer users, and especially professional video gamers, we discovered an issue that we think we could bring a unique perspective to. With wrist issues becoming more prevalent in the realm of video games, a solution that we came across is a computer mouse attachment that supports the wrist and fixes it in place to move with the mouse and arm, instead of the primary source of movement coming from the wrist.

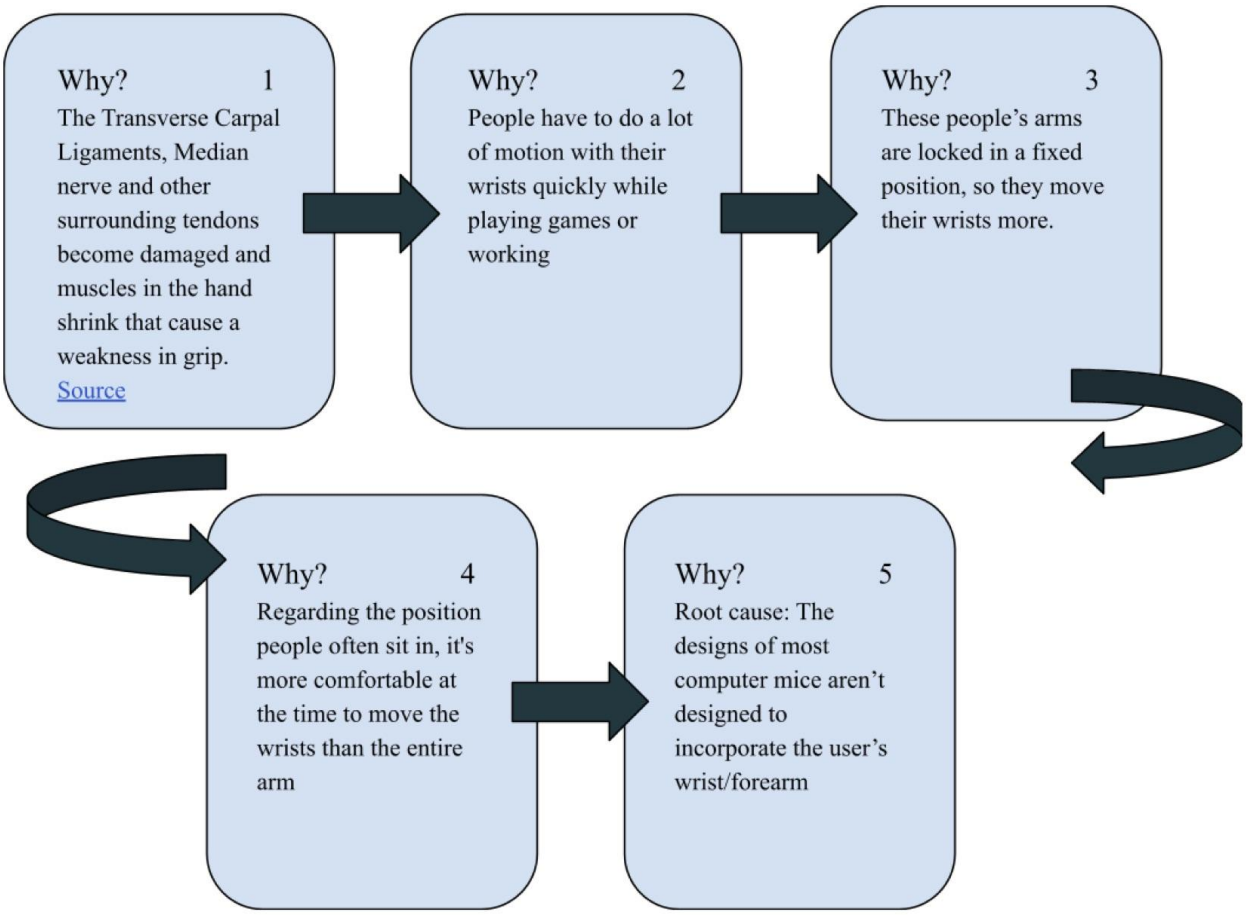
2. Problem identification:

One of the biggest problems with playing video games is that there is a risk of damaging one's wrist. This can lead to the development of carpal tunnel syndrome which is a common issue that most people who play video games encounter. Carpal tunnel is an opening in the wrist that is formed by the carpal bones on the bottom of the wrist and the transverse carpal ligament across the top of the wrist. The risk of developing carpal tunnel increases when people move their wrists a lot more for long periods of time. The team has also realized that the majority of video games are fast-paced and require quick reaction timing from the user which allows people to flick their wrist a lot. This has allowed the team to brainstorm potential solutions that can prevent further harm to one's wrist which will reduce the risk of developing wrist issues such as carpal tunnel.

5 Whys:

The team has found that the reason why wrist issues such as joint damage, carpal tunnel and arthritis can develop when playing video games is mainly due to the tearing of the transverse carpal ligaments, the median nerve, and damaging other surrounding tendons. The team has also found that applying pressure around the wrist damages the median nerve. This causes muscles in the hand to shrink and as a result leads to a weaker grip in the hand. Upon further research as to why people who play video games develop such issues has to do with movement of one's wrist. The majority of video games are fast paced and require quick reaction speed. A lot of people tend to move their wrists quickly in order to increase their speed. However, the continuous movement of one's wrist for long periods of time contributes to developing wrist issues. The reason why people tend to move their wrist is due to the fact that their arms are locked in a fixed

position. When looking at a situation of a person sitting by a desk and playing video games, moving the entire arm is a greater inconvenience compared to one's wrist as it not only makes it more uncomfortable, but it also takes more effort and time to move the entire arm.



Root Cause:

From the analysis of the 5 whys, the team had concluded that the design of computer mice would need to be modified to ensure that less pressure is applied to the wrist, the muscle and tendon groups are protected for long amounts of time, and that the user feels comfortable around the wrist. In order to accomplish this, the team thought about integrating a wrist support which is composed of a soft cushion at the end of computer mice to promote good posture and reduce the risk of damaging one's wrist. Another possibility the team has considered would be for people who play video games to adjust their mouse sensitivity. This determines how much the cursor on screen will move based on the user's movement. Adjusting the mouse sensitivity will ensure minimal effort of the wrist when playing video games, thus reducing the risk of developing wrist

issues. However, the team felt that this root cause could be handled by the user themselves as there are many video games that give the user the option to adjust their own sensitivity. Upon further research into the topic, the team has found that the height of one's table is another factor that keeps the arm in a fixed position. When the table is lower than one's arm, the wrist will bend downwards which applies pressure to the muscles in the wrist which is not ideal. Therefore, adjusting the height of the table to a point where the wrist bends downwards is better. Research has shown that bending the wrist down rather than up is better at reducing the risks in the long run. However, like the previous root cause, this can be handled by the user themselves. In addition, there are already tables where its height could be adjusted to a higher position, an example being standing desks. Therefore, the team has concluded that it would be more challenging in innovating a product from this root cause since there are other products that solve this root cause. The final root cause the team has thought of is improving one's back posture, the position of the arm is linked to how the back is positioned. While the team has considered possible ideas for a product that could resolve this issue, there are braces or vests that attach around one's waist that locks the back in a good posture. Also, it was the team's decision to focus on ways to promote good posture of the wrist as it is more tied to playing video games.

Research:

While conducting research into the cause and effects of wrist damage, it was discovered that, according to multiple medical sites, the leading cause for wrist tendons and joints damage is believed to be "repetitive movements" including typing on keyboards or using a computer mouse and playing video games for extended periods of time. Another source also specified one cause to be a person's hands being placed too low while typing on an elevated keyboard. Movements such as these and awkward hand placement can lead to prolonged joint damage, carpal tunnel, arthritis and tendinitis. Carpal tunnel syndrome forms from an increase in pressure and stress to the median nerve in the wrist. The "structure" called the Carpal Tunnel is a narrow passageway surrounded by bones and ligaments on the inside of the hand. Putting pressure and stress on the median nerve creates numbness, tingling, joint pressure, and stiffness in the wrist. Arthritis and Tendinitis are medical names for the inflammation and swelling of one or more joints and tendons in a given area that can result in stiffness of the joint, pain and reduced mobility. While typical solutions to deal with these issues include resting and stretching the affected area, more serious forms may require surgery. Two methods highly suggested by professionals is thermotherapy, which uses heat and cooling components to reduce tension and stiffness or reducing swelling and inflammation, or implementing a splint or support. A splint is when an unsupported or injured area is strapped to a straight and stable material that offers support. Casts and tight wraps are forms of a splint that help in the process of healing a broken bone or a sprained joint. Sites that specialize in Ergonomics and Medical practices also suggest that, in order to reduce unnecessary stress on your wrist and arms, your wrists should not be resting on the table. This is because it induces a positively inclined angle on your wrist, which can cause strain and damage. Instead, they suggest that the wrist should be either aligned with your arm or

should have a declining angle to better reduce pressure on your wrist. They also suggest minimizing the amount of twisting that your wrist does and to start the motion from the arm and shoulder so as to keep the wrist from performing unnecessary twists and jerks.

From this information, we have determined that a good solution to help the problem would be to create a mouse addition that would elevate the user's wrist to reduce tension on the joints and tendons. Additionally, we want to build some supports and indentations for the wrist to rest in that stabilize and splint the wrist so that you cannot move the wrist when moving the mouse. This would enforce more usage of the arm and shoulder when moving the mouse as opposed to relying solely on the twisting and jerking motions that people normally do.

3. Customer segmentation:

Interviews:

Our initial set of interviews found a relationship between hours spent gaming and wrist pain or stiffness, where pain started to arise after around 2 hours of gaming. The most common remedy to this was stretching as denoted by the interviewees. Varsity esports player Matthew Parisotto mentioned the tendency for esports players to be particular with their gaming equipment for the sake of improved performance, therefore it would be unlikely they would switch their equipment out for something different. Our first set of interviews concluded with the customer segmentation of those who use their mouse for roughly around 2 hours a day that have experienced pain in their wrist.

Our interviews on our three solutions had overwhelmingly conclusive results in favor of adjustable components, with interviewees emphasizing on comfort and personalization. This aligns with the preference of gamers who want to stick with their same equipment while also offering them a remedy that doesn't interfere with how they play. Our list of possible customer segmentation from this set of interviews consists of mice users with concentrations in PC gamers, workers who use PCs frequently, anyone who experiences physical pain from using a PC mouse for a long period of time, university varsity teams for gaming, and professional Esports teams. We chose to specify our customer segmentation in PC gamers as we believe this will be the market that will benefit the most from our solution.

Empathy Maps:

Eye strain, body aches, joint, back and wrist pain are what our interviewees reported were what they noticed after long periods of gaming. The most common remedy reported was to take breaks. There was not an emphasis on wrist pain from our interviewees, but comments on how

there are products to help the wrist but at the cost of game performance. Therefore this further specified our customer segmentation into people who experience wrist discomfort but do not want to sacrifice their gaming performance.

Customer Persona:

The customer persona is a representation of the target customers that will benefit from the team's product. It was based on people who have played video games for over 7 - 10 years for an average of 1 - 4 hours each day. Because these people have been playing video games for long periods of time, they are more likely to experience discomfort in their body, especially around the wrists. A lot of wrist movement is required from the first-person shooter games that the majority of our interviewers play during long sessions. The customer person is an example of customers who wish to continue playing video games for long periods without having to experience discomfort around the wrist and are looking to reduce their risks for developing serious injuries.

Name: Joe Kujoh

Age: 17

Occupation: University student

Location: Vancouver, Canada, North America

Relationship Status: Single

Archetype: Logician

Traits:

- Organized
- Hardworking
- Perceptive
- Ambitious

About	Personality
Joe was born on July 31, 2004, in Vancouver. Joe grew up playing video games. He loved to watch professional players compete in the games he played and wondered if he too had the skills to become a professional player. Joe would play games for 1 - 4 hours everyday. He really liked to play fps shooter games such as Valorant and League of Legends. During his spare time, Joe would learn to make his own channel on Twitch and would stream games. This gave him the opportunity to learn how to entertain and meet people. Today, he is currently studying at a university with a major in Computer Science, learning the different components that are necessary in a computer, hoping this would give him the knowledge to build his own computer.	When it comes to playing games, Joe is very competitive. He always strives to aim for the top, aiming to become a professional player. Through his years of playing games, Joe has learned to effectively communicate with his team members. He finds that communication is necessary so that the team is able to work and coordinate their attacks more efficiently. Joe takes games seriously, but is also respectful of his team members and their skills. He would try to find ways to support their performance and adapt to each situation.

Goals:	Frustrations	Motivations
• Get a high rank in Valorant and in League of Legends. • He wants to keep his body in good condition to maintain his performance. • He also plans to get a lot of subscribers on Twitch. • Become a professional player	• Experiences wrist pains and eye strains after extended periods of screen time • Dislikes dealing with toxic players • Mental health. Losing many games makes them feel inadequate	• Being seen as good at the games he plays • Being noticed and appreciated for his MLG skills • Must make a high enough rank to qualify for teams.

4. Solution development:

During our brainstorm process, we came up with a variety of different forms for our Wrist Support product that are each unique. Each of these ideations are designed with the intent to help with the main idea of reducing risk of damage to the wrist, but they each approach it from a different angle. Our final five ideas were; to create a cooling agent inside the Wrist Support, to integrate a heating circuit or heating pads into the product, making the support adjustable and customizable to alter its form to better fit the user's wrist, to implement a form of "Acupressure" that applies pressure to certain parts of the wrist and hand, and to make the Wrist Support product "in-house" where it is part of the mouse as opposed to being a separate component.

1. Cooling Agent

Cooling agents are a version of therapy that are used in multiple forms such as a cooling gel, ice baths, liquid nitrogen, or ice packs. Cooling components such as these are all used in Thermotherapy through various methods to help lower blood pressure and decrease the stress in muscles and tendons to lower inflammation. Inflammation occurs when a body is exposed to a harmful outside force (bacteria, virus, etc.) or when a body becomes injured. The body sends out a type of cell called the "Inflammatory Cell" that focuses on destroying the dangerous force and growing back tissue. This destruction and growth of cells is what creates the inflamed swelling and burning sensation. The application of a cooling agent is used in therapy to help relieve the burning sensation and to create a smoother blood flow through the area to reduce the swelling. This reduces the current damage and reduces the risk of further damage to the inflamed area. Cooling agents are most commonly used in medical practice as a way to help athletes who put large amounts of stress on their muscles and joints and to help relieve symptoms for Arthritis and Carpal Tunnel.

Since our interviews determined that many people suffer from wrist inflammation and other wrist issues, or have suggested the use of a cooling gel or cushion, we determined that using some form of a cooling agent in our product would greatly benefit from this addition. Through the many versions of this idea, such as using cooling gel and refrigerated pads, it was determined that the better idea would be to use a combination of a type of machine washable Viscose Bamboo fabric that always rests under room temperature and actively cools the body and wicks away sweat, and a small form of air conditioning that would be controlled by a series of buttons on the side of the product. While cooling gel and refrigerated pads would provide more immediate cooling, interviewed individuals stated that it would be too much of a hassle to constantly cycle through refrigerated pads or having to buy new ones, and medical practice has determined that cooling gels are not as effective for extended periods of time. The air conditioning system in the product would provide a faint and controllable airflow that would help cool the cushioning and fabric while the fabric itself would pull away sweat and have it evaporate, replicating the body's own cooling function of sweating. These two together would create a constant cooling system that can be controlled by the user and would last for extended periods of use.

2. Heating Agent

Heat therapy comes in two different types: dry heat and moist heat. Dry heat therapy is often offered through electric pads or gel packs. On the other hand, moist heat includes steamed towels or damp clay packs. There is a preference for moist heat to be applied to injuries as it penetrates deeper to reach muscles, ligaments and joints. However, it is more common to see the use of dry heat therapy when it comes to smaller areas of interest such

as the wrist, with heated wrist braces being popular. Electric heatings pads use infrared technology which converts electrical energy to radiant heat. Gel packs either are chemically heated or can be heated in a microwave. Heat helps dilate blood vessels and increase blood flow. This ensures that oxygen and nutrients are being delivered to the area being heated, promoting healing. Heat also decreases muscle tension which in turn increases flexibility and range of motion. It also plays a role in pain management and reduction of muscle spasms, muscle tension and joint stiffness. It is important to note that heat therapy should not be used when swelling is present.

3. Adjustable components

Computer mice are not “one size fits all” and in many cases they are not easy to use or ergonomically comfortable or feasible for every person. Hand size, arm length, and wrist functionality all differ from person to person. From people with injuries causing decreased maneuverability of one's hand and wrist, to joint pain for people with arthritis, to people who just generally have a larger or smaller hand than generally thought ideal for a computer mouse, one thing is common, using a computer mouse is not the most comfortable practice in the world. To help ease the pains caused by overuse or uncomfortableness of using a computer mouse, we have enabled our product to have adjustable components for easier modification depending on each person's needs and comfort. A detachable piece by piece setup allows for each person to mold the shape of the mouse to fit their hand size or accommodate for any disabilities. For someone with a larger than average hand size, stretching the mouse to a longer shape is capable of allowing for more easier and comfortable use. On the other end of the spectrum, shortening the length and size of the mouse is capable for those with smaller than average hands. Other components can also be added on or attached to help with hand and wrist strain, such as a padded wrist holder, attached to the mouse itself that adds increased comfort and luxury to the users gaming or working experience by minimizing the strain on the wrist muscles and tendons that normally would be put under immense pressure during long periods of mouse use.

4. Acupressure Wrist Support

Instead of using soft fabric as the base material for the cushions of the team’s design for computer mice, the team decided to change the material of the cushions to a rubber wrist support with small rubber needles that will apply acupressure to the wrist. Acupressure is an ancient healing art that’s based on the traditional Chinese medicine practice of acupuncture. During ancient times, skilled acupressure practitioners would perform this method on people to help relieve the stresses in their muscles. However, experts in the clothing industry have innovated and developed new shoes that have integrated the concepts of both acupuncture and acupressure by using tiny rubber needles that apply

pressure to the muscles in the foot. This can commonly be seen in certain slippers where the inside contains a rubber acupuncture sole. With acupressure, pressure is applied on specific places on the body. These places are called acupoints. The design of the rubber wrist support would be similar to the rubber soles that are placed inside certain slippers. Through the use of the team's mouse design, the user will rest their wrist on the rubber wrist support where pressure will be applied to the P-6 acupoint, also known as the Neiguan. The Neiguan is located on the inner arm near the wrist. Performing acupuncture on this point can help relieve nausea, release muscle tension and promote blood circulation. It can also relieve many common side effects of chemotherapy. Using a new material for the wrist support and combining it with the original idea to attach a support that branches upwards at the end of the mouse would encourage users to move their entire arm rather than their wrists. The design will also include wings that branch outwards from the wrist support in order to prevent the wrist from falling off. Through the use of this design, users will be able to play video games for long periods of time while their wrist is resting upon a rubber wrist support that applies acupressure to the Neiguan which releases the stresses on the muscle groups around the wrist. Therefore, the rubber acupressure wrist support would reduce the damage playing video games for long periods of time can have on one's wrist.

5. Mouse in-house

Our final idea is to create our own mouses in-house so that we can guarantee structural integrity. Over time, applying pressure to a detachable support piece can cause the piece to slide down and no longer support the wrist in its optimal positioning. To combat this our product could produce a mouse along with the support so that the bar is no longer attachable, but built into the structure of the mouse itself. Through interviews with SFU Esports Varsity team players, there was a common concern regarding the quality of the mouse. As there are many companies who have already established and perfected their mouse designs as well as developed a devoted following for their products, we will have difficulty convincing our sponsors and target audience to use our mouse long-term. If we are to create a mouse it must be able to hold its own in a currently established market. The mouse must be as lightweight as the other mouses available. A current market giant is the Logitech Pro X Superlight Wireless is "less than 63 grams"(Citation), and has established themselves as an industry giant. When we produce our mouse we must use our materials efficiently to ensure we are not adding unnecessary weight to our mouse since we are already disadvantaged with the added weight of our support handle. Though we are almost certainly unable to compete with the Superlight on its own, we may still be able to cut the weight of the support attachment by a few grams since we will not need to include the adaptability structures. When an attachment would need infrastructure to attach to any mouse, there are additional materials needed and therefore more weight added to the mouse as a whole. If we are able to produce our own mouses with a wrist

support structure built in we can cut down the overall weight of the mouse ensemble. In the end this would be ideal for Esports players who need both the wrist support to prolong their career and the lightest possible mouse ensemble to maintain their performance.

b. Test a minimum of three of these concepts with users. Share your ideas and show prototypes with users, and conduct interviews to get feedback. Include details of the feedback you receive and the choices you make as a result of this feedback.

After various interviews through questionnaires were performed on a variety of people, a majority of whom suffered from wrist and joint issues after extended periods of use, they gave some feedback on each ideation. They also gave insight into which version they would think about purchasing for themself or a friend, and how they believe each version could be improved upon.

1. Cooling Agent
   The cooling agent was ranked second from the three choices as the interviewees' main point of feedback on it was that it most likely wouldn't offer the same amount of assistance that a refrigerated cooling gel pack or ice pack would provide. They mentioned that the fabric would be useful but wouldn't create a cooling effect strong enough to offer enough of an effect. Additionally they mentioned that the electrical air cooling would also not make enough of a temperature difference. Their ideas for improvement were to alter the fabric to include a cooling wrap or gel-like interior that would provide more cooling than the air cooler.

2. Adjustable components
   The adjustable components attachment was by far the most popular amongst the interviewees. They loved the idea of an attachment that could change its shape to fit the user's wrist more accurately and create a stable support that "locked the wrist in". Most of the feedback that we received for this was to simplify the design down a bit so there are less moving components involved and more focus on the "ease of use" aspect. We could do this by creating less widgets and arms that would need to be adjusted and base it more off of orthopedic soles that are used in footwear and, as one piece of feedback from Josh also suggested, a type of gel mold that is used to make hockey player's mouth guards form fitting. This would require the attachment to be heated in order to be molded to the user's wrist, but would be able to provide a more "form fitting" addition to better stabilize and support the wrist.

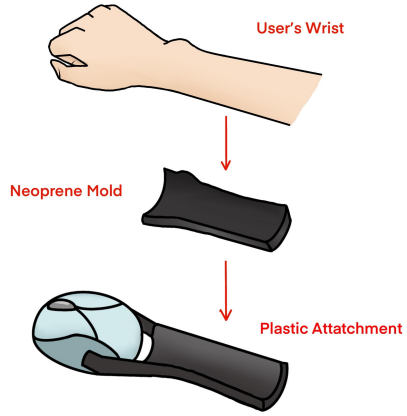
3. Acupressure Wrist Support

   The acupressure was the least-picked option for "Would you buy this for yourself or for a friend" as most people's feedback was in regards to comfortability. People pointed out that acupressure would mainly take effect if the user was moving their wrist on the support to better push on those specific areas, which goes against the idea of what we are trying to accomplish as it would provoke more wrist movement. Although Jodie did mention that having varying levels of hardness for the balls would be useful and that having a solid metal base would keep the wrist from worsening. Unfortunately this would also add weight to the attachment, which we also want to try to avoid.

c. Use this feedback and evidence to select one creative solution that: (1) solves at least one (but probably not many more than one) of the user's most important/most painful problems; and (2) is actionable and implementable by you as a start-up venture. Explain your selection and provide a detailed description of this solution.

➢ Adjustable Component

For our final ideation, we focussed on the Adjustable Components attachment. The original idea was to use a series of movable winches and clasps that could be altered to fit the user's wrist, however after obtaining feedback we decided to edit the material and implement a microwavable mold that could later be latched onto the mouse. Microwaving it would soften the mold and allow the user to shape it around their wrist to better stabilize it. The molding component would be made out of a Neoprene and a foam cushioning material to better comfort and fit the wrist, as well as be malleable enough when heated to mold to the user's wrist. That material can then be placed onto the light built plastic attachment and is ready for use.



5. Business model creation: - Cynthia

a. As there are many moving parts to a start-up business such as ourselves, we have organized the 9 key components of our business model in order to clearly lay a foundation for ourselves. Our value proposition is a solution for those who develop carpal tunnel from sitting at a computer for hours at a time. Though your average person is not required to sit at a desk for over 2 hours at a time, there are individuals who have built their career involving mouse usage. In some cases, such as professional Esports, using a mouse for 8 hours a day cannot be compromised, therefore we have a solution where you do not need to sacrifice your wrist for your livelihood. Our target customers are not people who use mice, as there are other solutions they can pick such as changing the mouse entirely or using a standing desk. We are targeting esports players who are required to use a specific mouse and computer set-up for hours at a time. For these clients, their issue is more debilitating to their careers since carpal tunnel can cause enough pain to keep them off the team for several months. In the case of Varsity Esports teams, a few months is deadly to their progress since it can be the entirety of a semester that they are unable to play or represent their team. To truly specify, our target audience are university students currently playing on varsity esports teams of which are predominantly male due to the nature of the gaming industry. To sell our product to our clients we will be selling both online and physically in stores. We will utilize distributor companies such as Best Buy and Canada Computers to sell our products in stores and online as these companies have such services. To get the attention of our customers we will be using online personalities and entertainment platforms to promote our product. The goal is to sponsor pro players with an online presence since these influencers are already carefully watched by our target market. We can encourage purchases by including affiliate codes where a view can receive a certain discount when using a code from the influencer. The influencer will get a cut of the profit as well as payment for creating

advertisements in their videos or on their live streams. Our revenue model will be sales based with one-time payments by the customer to our distributors as these are the standard practices among computer parts in the industry. The key resources of this operation involve engineers to create the most lightweight and comfortable support possible. If we compromise these features, our target market will not give our product a second glance. Naturally we will also need to manufacture our own product and materials such as the lightweight plastics we will be using. As a start-up our first partners will be local varsity esports teams. These teams are constantly asking for sponsorships for technology so we can easily make relations with them. As we grow larger we will go to large American Universities such as Maryville University which has one of the top performing League of Legends teams in North America which would give us great influence on the varsity landscape. Among our key activities, we must become experts in both relationships and production. These being the most critical as mouse supports are not common and we must influence our target market to utilize our product. Without the use of celebrities or current pro players, our product will be virtually useless in the eyes of consumers. Among the most important costs, sponsorships and advertising will be the greatest especially to pay top tier players who are being bombarded with other companies as it is.

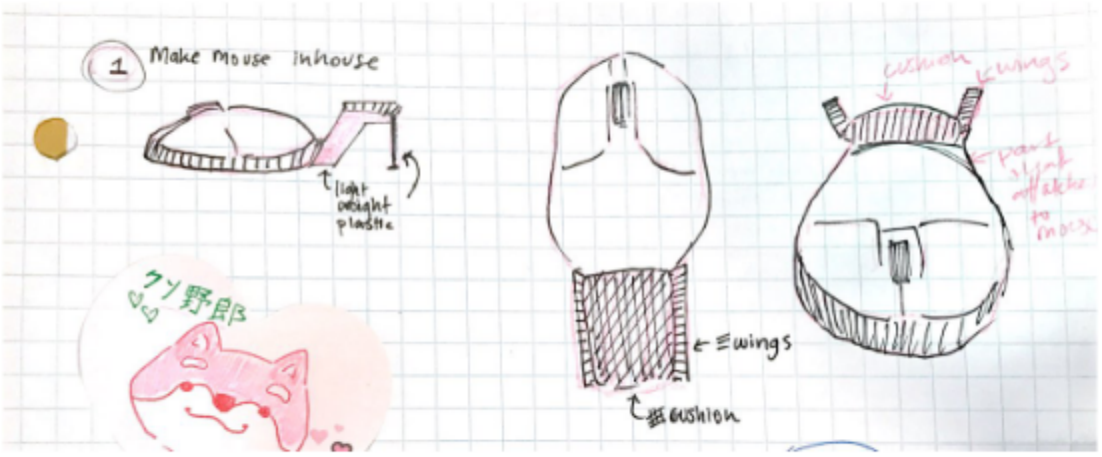
b. As we have been developing our business model, we have spoken with several of SFU's varsity esports teams regarding our new product. As it were, our greatest challenge would be to convince our target market to use our product. Since there are no standardized mouse supports, and the typical mouse supports are not suitable for esports players, therefore making our sales pitch an uphill battle. However, when we spoke more about the harms of carpal tunnel there was more interest developed from our varsity team. It is a common stereotype among young men in their 20s to believe they are immortal. They sleep poorly, eat poorly, and do acts that are detrimental to their physical health. To try and sell a health and wellness product to men in their 20s also seems like a true challenge since this is not a priority to them. In the end, however, with enough support and exposure from professional esports players, we can develop a sense of encouragement to our audience since these influencers speak their language better than we can. When speaking to the esports teams about purchasing the product, there was a price range of $10-$15, since they were not willing to pay much more for a product they may not like. They also spend generous amounts of money to get the best technology for their respective games, therefore the budget for their set-up is currently at its limits. Whether our product satisfies their needs is dependent on the current wrist health of the player. As we spoke to the League of Legends team, the ones concerned for their wrist health were the ones who already started feeling pain. Those who did not feel pain on a day to day were not interested in preventing it.

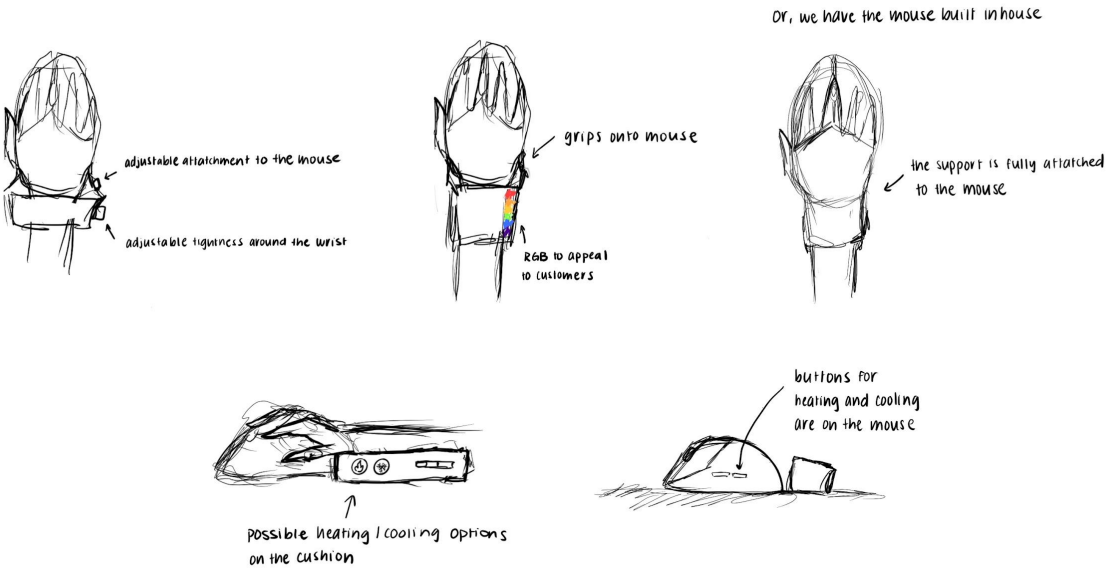
6. Teamwork:

Each person in our team has our own strengths and weaknesses as well as personality traits and skills that help us do well in what we do best. Bringing these qualities together in a group setting helps us create and innovate something new that draws on all of our strengths to produce something good for the world. Marcus is an avid gamer and has had lots of experience with working with video game companies and in tournaments and competitions. He also has Assisted in a professional research study for animating an AI interface. He has been playing PC games for over 16 years and has used a wide variety of mouse models and types and has experienced wrist discomfort himself personally due to mouse use. Marcus also interviewed people who play video games and work on computers as well as coordinating group meetings and discussion, Marcus also identified the 5 whys and analyzed case and effect of wrist injuries. Cynthia interviewed SFU's league of legends varsity ADC and analyzed their results in terms of effects of long mouse use. Cynthia also helped draw the prototypes and used her connections with the SFU Varsity team to see the connection between wrist pain and mouse use. Ahmed Interviewed a UBC computer engineering student to see his personal takes on what discomforts he might feel from using a computer mouse considering he uses them for school, work, and personal recreational gaming. Ahmed also observed regular people at the city center library to see how long people tend to use a mouse and what effects could be seen and how they react to mouse usage over long periods of time. He also invested in a new ergonomic logitech mouse to compare with the feeling of using that versus an older mouse that was known to give wrist and hand cramps over long periods of use. He also is an avid Playstation gamer and has himself experienced hand and wrist cramps due to long periods of time gaming with a controller and was curious and passionate about how that might differ from someone who would be using a PC mouse. He also researched and developed how the adjustable components solution development idea would work. Bea utilized her outstanding art skills and her passion of drawing to ideate the prototypes visually and create the team logo. She interviewed mouse users that have been PC gaming for over 10 years. She also worked on the opportunity and justification paragraph. David has been passionate about PC gaming for over 10 years. He observed students in the computer lab at SFU's Surrey Campus to see on average how long students spend using computer mice. He also interviewed some friends of his that have experience in playing fast-paced games as well as he also developed the customer persona.

—APPENDICES—

Sketches


1
Make mouse inhouse
light weight plastic
wings
cushion


adjustable attatchment to the mouse
adjustable tightness around the wrist
grips onto mouse
RGB to appeal to customers
Or, we have the mouse built inhouse
the support is fully attatched to the mouse
possible heating / cooling options on the cushion
buttons for heating and cooling are on the mouse

David's POEMS Observations:

People: Who is there?	5 - 7 university students, aged 18 - 25
Objects: what is there? e.g. Equipment, material, product, infrastructure	Computers, mouse, keyboards, chairs, work binders and one or two textbooks
Environments: what is distinctive about the environment there? e.g. noise, temperature, crowdedness, public/private, (in)secure, atmosphere	Relatively quiet (some noise from the common area at the Surrey Campus), Temperature: warm, public space (computer lab on the 1st floor), sounds of clicking and typing of the mouse and keyboard can be heard
Messages: what messages are people receiving? e.g. from other people, (in)direct communications, their environment, advertising, promotions	A couple of students were checking their phones as a means of communication. There were no forms of online advertisements that were present when the students were using the computers in the lab.
Services: what services are being offered and what interactions occur?	No particular services were offered in the computer lab. This is also because the students were either working on their assignments, or were helping others with online projects from their courses.

Summary:

Cynthia's POEMS Observations:

People: Who is there?	Those affected by carpal tunnel use a mouse for many hours a day. When watching how controller users move, their wrists are far more mobile since the controller is constantly moving between a resting position such as on their lap or in an elevated position where the hands carry the controller. The main reason carpal tunnel affects mouse users and not controller users comes down to the desk that your wrist sits on.
Objects: what is there? e.g. Equipment,	The desk is what allows for the weight to be

material, product, infrastructure	placed on the medial nerve. Among the forms of gaming controllers there are not options that allow for a flat pressure to the medial nerve like a flat desk does. For VR controllers, console controllers, and the like they do not require a desk therefore the positioning that damages the median nerve is only an issue for combination desk and mouse users.
Environments: what is distinctive about the environment there? e.g. noise, temperature, crowdedness, public/private, (in)secure, atmosphere	For those who play many hours of video games their environments tend to be quite private except in certain esports scenes where there are physical arenas or training rooms. The design of their computer set-ups are calculated. They will purchase a specific mouse, specific mouse pad, and require certain graphics for their monitor, and so on. When designing this product we must keep in mind that if the overall feeling of the product is not to their liking they will not use it regardless of the health benefits. This demographic of people are very particular about their equipment and their purchases are dependent on the improvements on their gaming performance.
Messages: what messages are people receiving? e.g. from other people, (in)direct communications, their environment, advertising, promotions	Within the SFU esports varsity teams there is constant talk about chiropractors and wrist pain. All of SFU's esports varsity teams use mice as their primary controller and require around 30 hours dedicated to tournaments, scrimmages, and practice a week. There is also lots of talk about a lack of support from SFU compared to other universities. Other universities provide facilities and health support to their esports teams while SFU only recognises our teams as club teams.
Services: what services are being offered and what interactions occur?	For SFU varsity students there is no service set in place to recover from injury. There are only stretches and breaks when their wrist or back feels sore. For other universities, health care is provided to such

	teams such as a chiropractor or an ergonomic computer set-up on campus for the students to practice. These services are long term solutions and can help lengthen their careers.

Summary:

Bea's POEMS Observations:

People: Who is there?	A group of people who are playing games together aged 17 - 26.
Objects: what is there? e.g. Equipment, material, product, infrastructure	A small table with a single lamp in the middle. There are multiple laptops and mice for each person respectively.
Environments: what is distinctive about the environment there? e.g. noise, temperature, crowdedness, public/private, (in)secure, atmosphere	All the people are crowded together in a private space on one table, meaning they have a limited amount of space to move. The atmosphere is noisy with people talking over each other. The lighting is dim and the temperature is hot with fans going on in the background, creating even more noise.
Messages: what messages are people receiving? e.g. from other people, (in)direct communications, their environment, advertising, promotions	They are receiving gaming callouts and remarks from each other.
Services: what services are being offered and what interactions occur?	No particular services are being offered. The interactions that occur are between the people both in-person and in-game, creating a blend of interactions in both the real world and the digital world.

Summary:

Marcus' POEMS Observations:

People: Who is there?	People roughly aged 18-24, students, "gamers". People interested in playing video games.

Objects: what is there? e.g. Equipment, material, product, infrastructure	There's computer PCs fitted with monitors, mice, mouse pads, keyboards, gaming chairs, and above average quality monitors.
Environments: what is distinctive about the environment there? e.g. noise, temperature, crowdedness, public/private, (in)secure, atmosphere	ETZONE Space There's bright lights in the area because of the fluorescent colors and people are constantly conversing with each other, there's sometimes loud shouting or whoops and the sound of computer fans. The temperature is hot in the room as there are many bodies in there at a time and a large number of high end computers running at the same time. The area is in a secure place as it is inside a building and inside a room. The area is somewhat crowded as not all the computers are being used but there is still a decent number of people in a small space. People are using the space to either work or play video games.
Messages: what messages are people receiving? e.g. from other people, (in)direct communications, their environment, advertising, promotions	People are conversing with each other and talking about their game or trying to give "call outs" to each other. The energy that people seem to be conveying to each other is varied between either very relaxed and casually playing and resting in their chair, or are straight up in their chair and are active. There are signs in the building saying to make sure to take breaks.
Services: what services are being offered and what interactions occur?	The services being offered are the aforementioned equipment, the time and space to play/work with an above average computer setup. They are interacting with the other people in the room as well as people that may be online with the people playing in the room.

Summary:

People seem to be very comfortable in these kinds of spaces where the equipment is all available to them and are open to conversing with each other. They also seem to vary in attitude as they play or work, ranging from relaxed and slouched in their chair to upright and active as they focus. There are signs that state that people should take breaks every now and then as they play

but most people seem to ignore this. Additionally the area itself would seem quite uncomfortable as the temperature is a little on the higher side and the room is a little small, but people seem okay with these inconveniences as long as they can play their game.

Ahmed's POEMS Observations:

People: Who is there?	Anyone of any age can be here as it is a public space for use by all members of the community.
Objects: what is there? e.g. Equipment, material, product, infrastructure	Books, resources, and standard public computers. Not particularly high end but meant for just general use.
Environments: what is distinctive about the environment there? e.g. noise, temperature, crowdedness, public/private, (in)secure, atmosphere	As I was at the city center library, the ambience was very quiet and mellow not a lot of loud noises except near the computer are where you can hear chatter of those working together on a project, the clicking of mice and keyboards, and the noise of a few kids playing a computer game together in the area. It was fairly uncrowded as it was such a big library. The library is a public space so it was available to use by all members of the community.
Messages: what messages are people receiving? e.g. from other people, (in)direct communications, their environment, advertising, promotions	Usually at this library there are signs that say to keep quiet and advertise different community programs and events as well as rules and signs directing users and customers to different sections of the library depending on what they're working on. The main message at the library is always to keep quiet and that suggestion is given by posters, other community members and staff.
Services: what services are being offered and what interactions occur?	Services offered include public computers available for use by the general public, books and other resources to loan, and other opportunities provided by the institution. Free computer access is also available to everyone which is where I was paying my attention observing. I saw people interacting with the staff on using the computers and with

	each other if working together. I noticed that when individuals were using the computers for a long period of time they would often get up and take breaks and stretch their arms and hands and crack their necks. I inferred that this could be due to the strain being put on their wrists and hands from using a computer for so long.

Summary:

People come to this place for a variety of reasons but it seems they are comfortable with the ambience for studying and casual reading as well as gaming and researching on the public computers. I noticed that it was generally younger people using the computers for games and work and they tend to spend longer amounts of time there. I also noticed that these people using the computers would generally get up often and take breaks and stretch more than those walking around and browsing books or sitting and reading. This is interesting to show that those sitting in one spot playing a game on a keyboard and mouse need to stretch and move otherwise they would get wrist pains or hand cramps is what I inferred.

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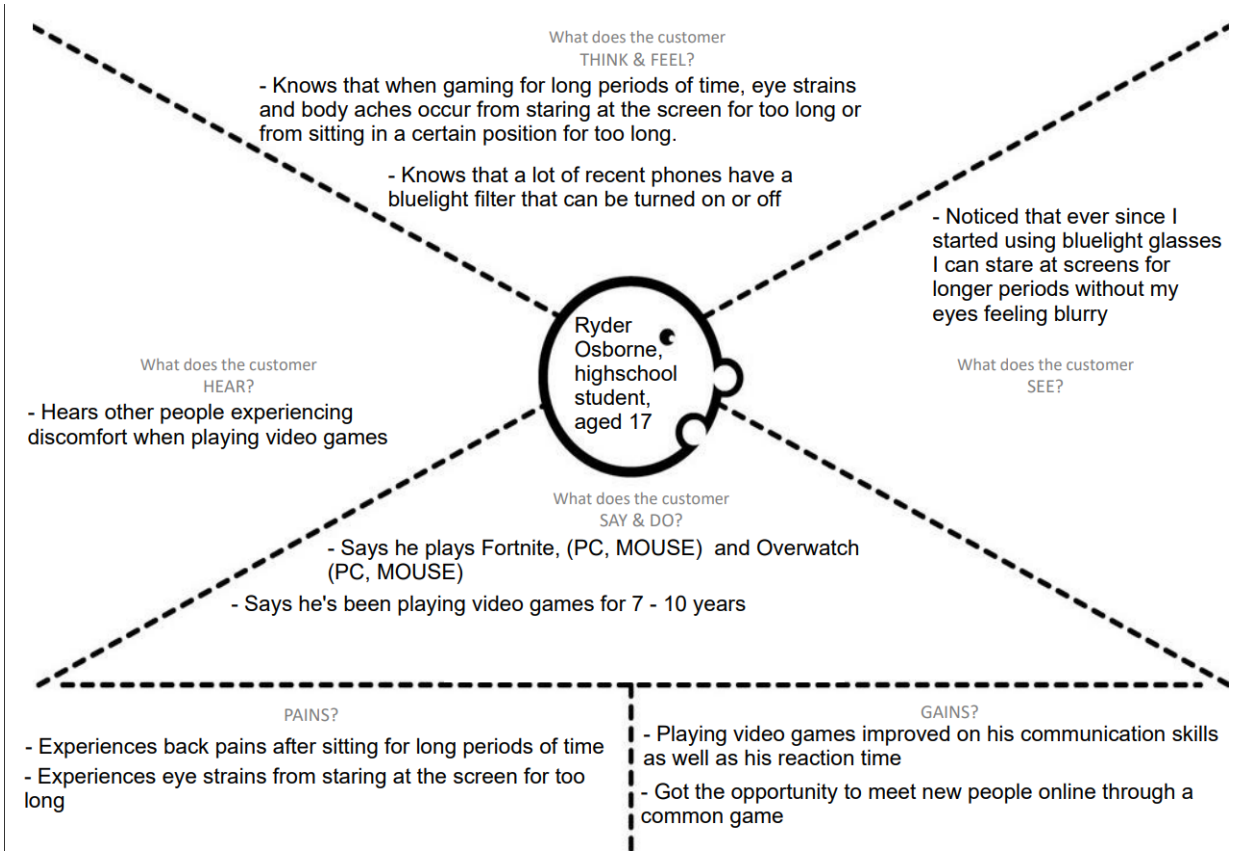
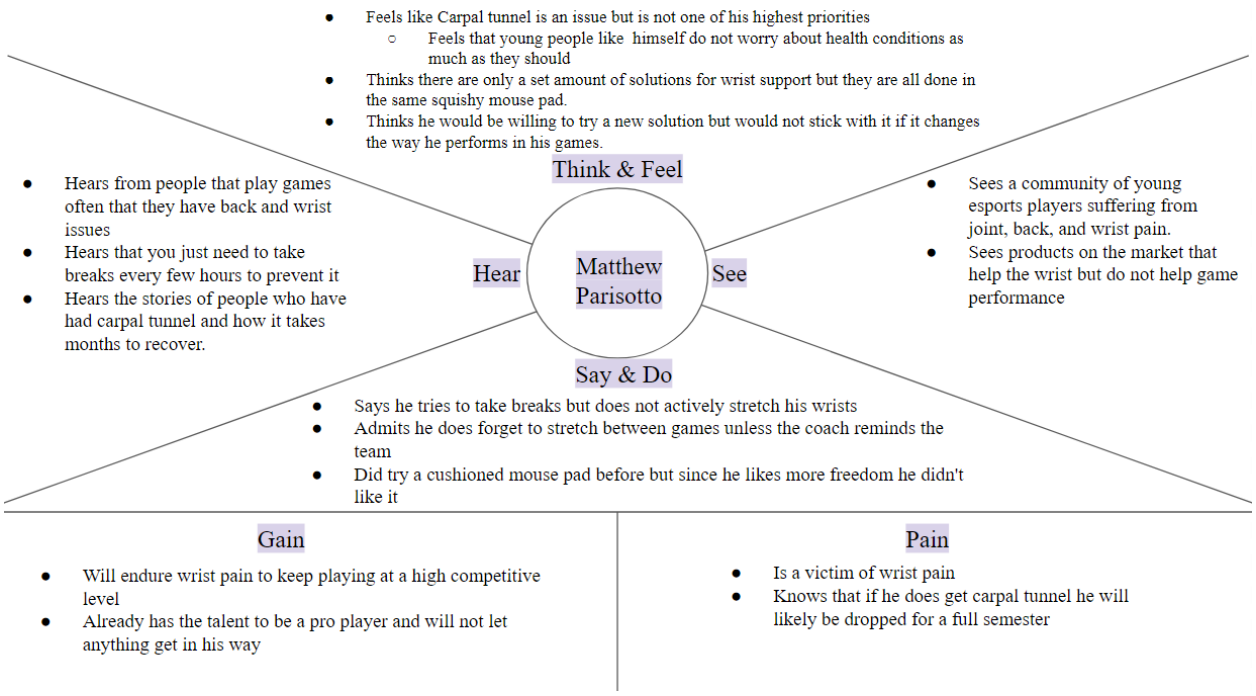
Empathy Maps:

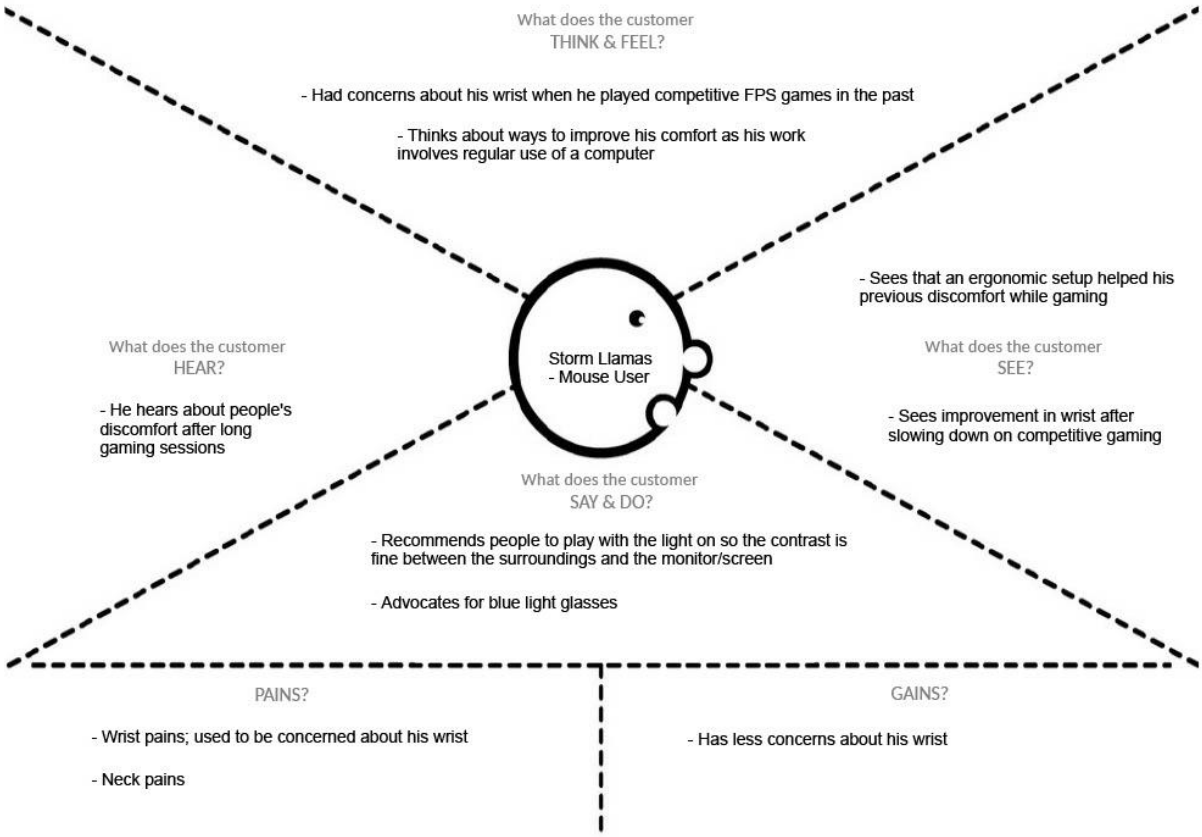
David:



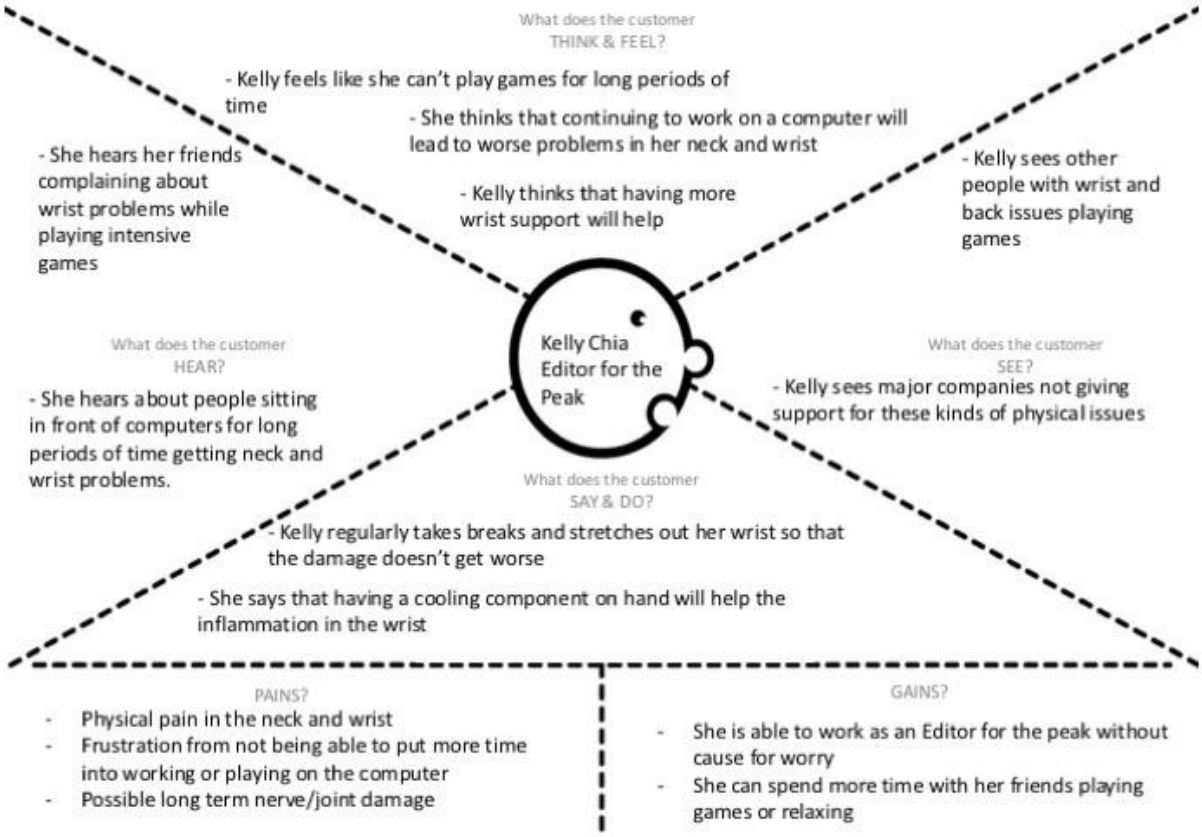
Cynthia:


Think & Feel
Feels like Carpal tunnel is an issue but is not one of his highest priorities
Feels that young people like himself do not worry about health conditions as much as they should
Thinks there are only a set amount of solutions for wrist support but they are all done in the same squishy mouse pad.
Thinks he would be willing to try a new solution but would not stick with it if it changes the way he performs in his games.
Hear
Hears from people that play games often that they have back and wrist issues
Hears that you just need to take breaks every few hours to prevent it
Hears the stories of people who have had carpal tunnel and how it takes months to recover.
Matthew Parisotto
See
Sees a community of young esports players suffering from joint, back, and wrist pain.
Sees products on the market that help the wrist but do not help game performance
Say & Do
Says he tries to take breaks but does not actively stretch his wrists
Admits he does forget to stretch between games unless the coach reminds the team
Did try a cushioned mouse pad before but since he likes more freedom he didn't like it
Gain
Will endure wrist pain to keep playing at a high competitive level
Already has the talent to be a pro player and will not let anything get in his way
Pain
Is a victim of wrist pain
Knows that if he does get carpal tunnel he will likely be dropped for a full semester

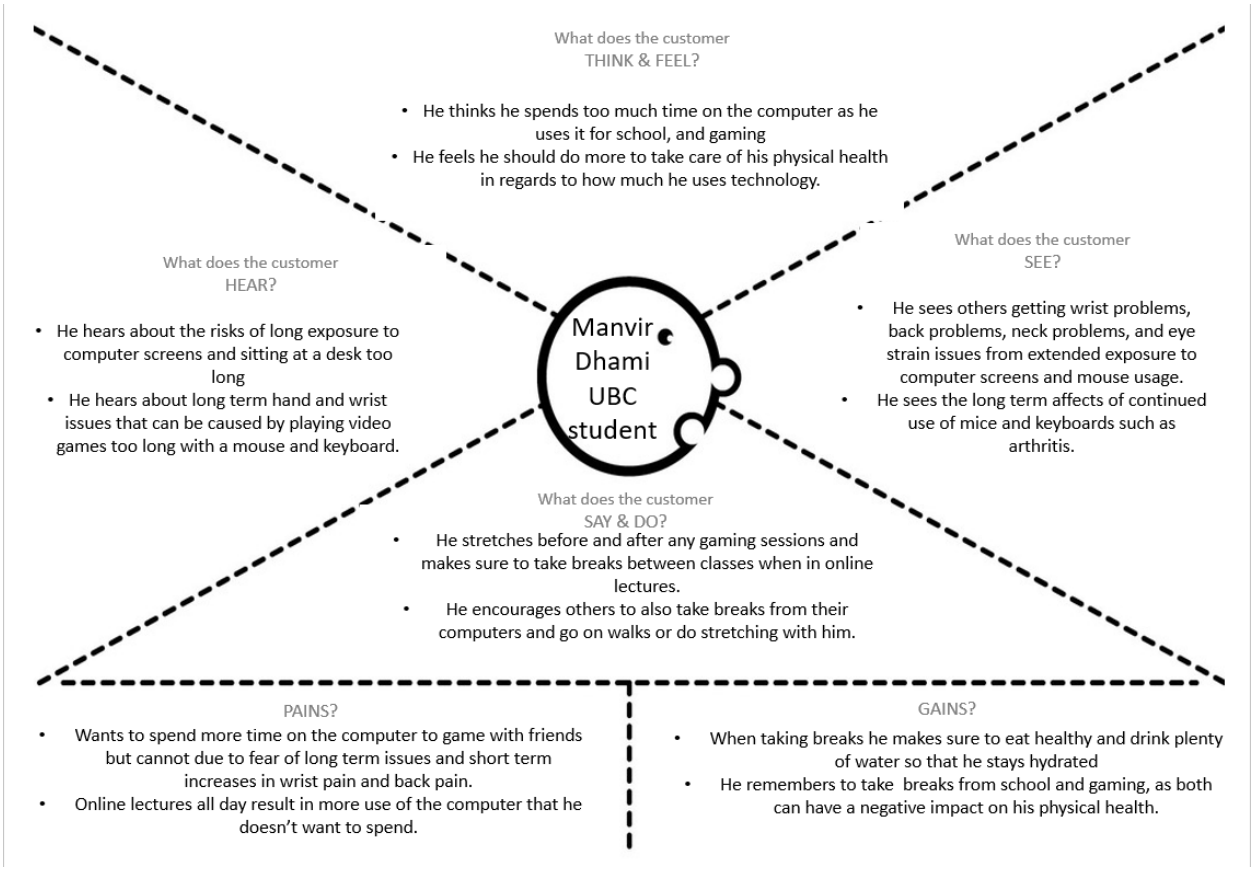
Bea:


What does the customer
THINK & FEEL?
- Had concerns about his wrist when he played competitive FPS games in the past
- Thinks about ways to improve his comfort as his work involves regular use of a computer
- Sees that an ergonomic setup helped his previous discomfort while gaming
What does the customer
HEAR?
- He hears about people's discomfort after long gaming sessions
Storm Llamas
- Mouse User
What does the customer
SEE?
- Sees improvement in wrist after slowing down on competitive gaming
What does the customer
SAY & DO?
- Recommends people to play with the light on so the contrast is fine between the surroundings and the monitor/screen
- Advocates for blue light glasses
PAINS?
- Wrist pains; used to be concerned about his wrist
- Neck pains
GAINS?
- Has less concerns about his wrist

Marcus:


What does the customer THINK & FEEL?
- Kelly feels like she can't play games for long periods of time
- She thinks that continuing to work on a computer will lead to worse problems in her neck and wrist
- She hears her friends complaining about wrist problems while playing intensive games
- Kelly thinks that having more wrist support will help
- Kelly sees other people with wrist and back issues playing games
Kelly Chia
Editor for the Peak
What does the customer HEAR?
- She hears about people sitting in front of computers for long periods of time getting neck and wrist problems.
What does the customer SEE?
- Kelly sees major companies not giving support for these kinds of physical issues
What does the customer SAY & DO?
- Kelly regularly takes breaks and stretches out her wrist so that the damage doesn't get worse
- She says that having a cooling component on hand will help the inflammation in the wrist
PAINS?
- Physical pain in the neck and wrist
- Frustration from not being able to put more time into working or playing on the computer
- Possible long term nerve/joint damage
GAINS?
- She is able to work as an Editor for the peak without cause for worry
- She can spend more time with her friends playing games or relaxing

Ahmed:



Survey results:

https://docs.google.com/forms/d/19cmvDfCXgtzsdH1e664-MVy-7-R8WoFH_YLrxhiAyso/edit#responses

https://docs.google.com/forms/d/1a5aCLF_3pmOYgIwppyjIhWi9GuY8FaMGZfY58_IIkyk/edit#responses