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As we began this course, we were quickly introduced on how the process would be done and what was expected from each of us. Evidently, this course is on a much higher level and every student was quickly challenged to perform decently. In the same week, we were separated into three groups from 4-5 students and got to know one another better in order to properly engage in the brainstorm process. Due to everyone being international students, we were able to incorporate ideas from different points of views which led to a great expansion of creativity and to our final prototype. However, Ian was very clear that we were to find an idea that would help a social issue, as well thinking more into the business side of it.

Now, in order to start the actual process of the project, we were introduced to Bastian Rapp who is the CEO, cofounder, and current CTO of Glassomer which is the material we were ordered to focus on. He briefly explained the whole creation process of the Glass and how unique it is compared to the normal glass we currently use everyday. Glassomer glass takes a sufficiently less amount of energy to be produced and can easily be shaped at room temperature or by 3D printing. As well as being able to create very detailed material in the product. After this process is done, the glass is placed in an oven that also takes less heat and energy than a normal glass-making process. With this information being exposed to us, we were able to properly begin our brainstorming process for our final idea.

At first, we started with a broad variety of ideas that could help a couple of social issues that are currently taking place in our world, but as time passed by and we continued to learn more about this material, we had to cross out plenty of those in order to reach our final idea that would be most likely to succeed. Basically, this whole process was a handful of trial and error. As we brainstormed, we decided to focus on four areas that we thought had great potential for this project which were: beauty and hygiene, medical, watch industry, and beverage packaging areas.

Some ideas led to the production of glass razors in order to promote proper and inexpensive hygiene materials for everyone; however, it lacked many key points to properly work. One of our prominent factors for this idea was the fact that razors could be sterilized with this material and would not need to be replaced quite as often, as well as creating the razor blades to be as thin and detailed as a normal razor. However, this idea came to an end when someone proposed, “what if it falls inside the shower and breaks?” If the glass shattered, it would be impossible to go forth with this due to the dangers it would hold. The same happened when we were focusing on inputting this type of glass on specific details on watches; however, we realized that many pieces in a watch must have specific properties that cannot be found in Glasomer, and there is not a huge market for and its complexity. production of special or for people who would cocktail glasses for restaurants like to personalize them;



however, this idea lacked the primary point of finding social issues, was not sustainable and probably not better than the current process of custom drinking glasses; therefore, it was taken out. Lastly, our team thought about changing the lenses from glasses to this Glassomer, and this idea seemed to prevail among all the obstacles that were being hard to overcome by the whole purpose of the project. Going through all of this process was essentially possible due to the vision board we were required to create (an image is provided above this text). At times, specifically in projects like these, it is crucial to visualize our ideas because of the overabundant thoughts we might have which can be truly overwhelming. By sticking sticky notes to the white board, it helped solidify the picture of what we were all thinking about. Due to everyone having a different background, and experiencing different events in their own lives, many desired to help the poor communities in their countries as well as elevating their country's good health and well being of every citizen. Other teammates understand the struggle of not being able to see correctly and how unbearable it is to live with such a disability. Therefore, with the sticky notes, we were able to properly transmit those ideas towards everyone and grow into a united understanding to go forth with the same mindset.

In addition to the 'vision board' we also had the opportunity to present to the class and obtain feedback from everyone. We started off by presenting our medical and hygiene areas, which was the glass razor. Even though we had already stumbled among some problems, we decided to keep it because we had gained plenty of confidence that it would be possible disregarding the issue we had thought about earlier. However, when we shared our ideas, many students also pointed out another problem which would be about the risk of packaging and transportation methods. Due to the razors being completely made out of glass, it would add up to the transportation cost because it would require more cautious care, and many people would prefer to avoid those types of problems. This was an excellent example of how Ian had warned us not to be overconfident in our idea and simply believe it will work out. This is a constant issue with plenty of innovators that truly believe their idea would change the world, but once it goes into the market, they realized it wasn't as good as they thought it would be.

Moving on, we also used the strategy of emailing professionals to provide us with feedback over the custom glasses mainly for cocktails, in order to see if this idea was still an option for the final product. Many people were saying that restaurants would not be interested or moved by this offer due to the existence of cheap glasses. We also received word from a mixologist who mentioned that professionals dedicate more time to the drink itself than the glass it is put on. With these comments being said, we decided to remove the custom glasses idea out of the picture in order for it not to be a burden the same way the razor idea was.

Lastly, when continuing the research on watches, we realized that many of the pieces had to have specific properties that Glassomer may not compare to and sadly, we could not find any additional information on the differences. This was mainly because our team did not have the sufficient knowledge to continue looking into the properties the watches hold. We also went back in to try and look for another way out in order to see if the idea was worth looking for other

solutions, but the niche areas and products that could be made out of glass, but once again, this was out of our hands to reach out for. Therefore, we could not get more out of the idea.

At this point, we were strongly losing our motivation in the project, our team, and ourselves. We truly had difficulty advancing in our project due to all the ideas being dropped and not being able to figure out our final research idea. Therefore, we paused, took a breath, and we went back to the beginning to look for other possible solutions. We had to learn to figure out a problem, not just an answer. With this problem we had to then use a list of pro's and con's to glass to create a list of constrictions. After creating a list of constrictions, we realized it is very hard for people to learn how to change their actions. People do not like to change and businesses tend not to realize that changing action is hard. The best way to convince people to change their ways is by making it easier or starting with a group of people who are already dissatisfied.

The second week, when we got to CERN, we felt run down and out of ideas. Everybody began to feel a drop in energy. We did not know where to go from there. When researching here we learned a bunch of new information that may not directly relate to our idea but changed the way we thought about the design process. There are three big red flags that happen most often: we get compliments instead of real feedback, people can not predict their future, and it takes a long time. It is easiest to gain true information by observing and engaging in a casual and friendly way. After learning about how to engage we learned how to find a spot where you're comfortable taking a risk using data but you will never find 100% of the data. We came to this realization and learned that there are many many places that glass could be used but many are too easy and too hard. An example of this is that we decided to take the route of creating an online service that would print prototypes for people. This would specifically apply to art students and those who may need prototypes but do not have access to a 3D printer. When getting feedback on this idea we were told again and again how simple it is. When we came together as a group we realized that we had taken the easy way out. We are surrounded by extraordinarily smart people and many many tools that could help us create something brand new, and put it all to waste. We also learned that it is quite okay to throw out and bring back ideas. Many of our ideas that we quickly brainstormed at the beginning that we thought we would never use turned out to be very useful in other ways. When going through our ideas we would take some parts of one idea and when focusing on it, we were led to other ideas. We also learned that during the process of understanding the product, we were going to be wrong. When looking back on it, it was obviously hard but taught us much more patience. Once we got over this low energy we went back to the drawing board. We looked back at our ideas and realized that we still had not followed through on the eyeglasses idea. We began to research if it could be printed and if there were any benefits of using glassomer's technology to print them. It was faster, more energy efficient, and could be useful in low income areas. Our idea was to put up small clinics in low and middle income areas where people could come and get glasses and their eye health checked. We realized that a huge constraint for this would be that people do not have the time or money to go to an area to get checked. This made us realize that maybe we can do it at schools and focus on the children who, if not for access to eyecare, may have a lower life

trajectory. This then made us realize that we could take an all terrain vehicle and fill it with equipment so it could travel throughout the countries. When researching who could support it or pay for it we realized there are many nonprofit organizations focused on improving access to eyehealth as well as governments that are pushing for better eye care that could improve education which leads to better jobs and a better economy. We learned that the prototype of our idea would be very different to others and is much more complicated than just printing the product. When we did some deeper thinking of the channels and people who are going to use our idea we turned it into different sources and led us to more questions. An example of this is that we were not specific in which governments would use this technology and what the outcomes would be. We had not thought of older people's education because their eyes deteriorate or help young children become better educated because if the children can't see and the parents don't have the money for it then the child struggles. If there was an in school test then the children would learn more and help the economy in the future. This helped lead us to figure out exactly who we are serving and we locked in on school children. Aside from researching the lenses and a who to serve, we had to research eyecare and vehicles. When looking into the tools needed to give a proper eye exam, we used our current knowledge of what happens during an eye exam to those who already wear glasses. We used this basic idea to lay out the steps and research the specific tools. We then went through and researched online prices and ways we could lower the cost. After figuring out machinery, we research buses and ambulances. We knew that we had to have a vehicle that could access hard to reach communities that may not have the smoothest roads. We believed a large bus would be a good fit but it did not have the durability as something similar to an ambulance does. We then got the specifics of the bus sizing and sent it off to an outside source to give us a render of the bus.

With all that said we do have many unanswered questions that would need exploring through small experiments and launches. The first is the actual total price. We have a rough estimate of what the price of the bus and equipment may be but in the end we do not have specifics into gas prices, wages, usage, repairs, and more. The only true way to get a good gauge of this would be to do small experiments. This then leads us to our next question which is will the price turn away interest from NGOs, education and health ministries, private companies and other non profits? If so, would there be a way to lower prices without losing service levels? This then brings around the idea of expansion. People would prefer to invest in a growing and expanding business but without the opportunity or a clear plan of growth, will investors invest? The one area that currently has the potential for growth is the number of countries that may use these mobile eye clinics. We would begin in small areas and use that to see if it works. Once we gain feedback and an understanding of the system we would make our tweaks and see if we can expand into other countries or markets. Could we make similar trucks for other healthcare issues? Could we make other mobile medical trucks using 3D glass printing? There are many markets that we could research that may lead to expansion but as of now the only direct link is expansion throughout countries.

Another question that arose during our research is the question of security. In many areas of low income there becomes an issue of security of companies and businesses. There may not be a strong public safety force in those regions leading to issues with the bus. If we were to be sending people and expensive medical equipment into these areas, how would we protect those working as well as the products? If we were to experience backlash from a community who may not want our help, how would we maintain a safe environment for all involved?

Many of the current questions left may only be answered by running some smaller experience or interviewing more investors. As a group we only had a short period of time to get information and collect interviews which may have led us to turn a blind eye to some issues and maybe even have some issues we are not aware of. With more practice, tests, and information we would clean up the process and answer questions. This leads to a more solid business and can help to calm the nerves of other companies who may also want to join our process.

There are many benefits to our idea because our project, "Pa Que Veas," offers better overall healthcare for citizens in low income areas. Why would someone pursue this? Well, there are many families that can not afford glasses and consistent eye checkups, but many people do not realize the transportation and time taken out of work to see an eye specialist or take children to the eye doctors. When a parent must take time off of work for either them or someone they care for, they lose that day's worth of income. On top of that they also lose money by buying transportation, which in low income countries may take longer to reach an acceptable eye specialist which costs more money. They then must pay for the testing and after that the lenses and the frames. With Pa Que Veas, we can bring these specialists to their doorstep and on their own time. This could be after work, during lunch breaks, or even during school for children whose parents can not afford any spare time. The benefits also include less energy consumption in the creation of glasses. The way Glassomer prints uses only 25% of the current amount of energy necessary to create the lenses. This may interest people even if they are not completely in need of glasses. People who are environmentally friendly may be interested because of this impact.

Business

From the outside, it is understandably hard to see the business connections in our idea. This is because when creating it we held sustainable development goals at the forefront. This does not mean there is no revenue to be made here. When thinking about the uses for these buses outside of the low income area, companies would hire these buses to help improve their worker's eyesight leading to more productivity and higher income. There is also the fact that all of the investors interested in supporting a truck, must buy the printers and glass from Glassomer creating a long lasting relationship. Even though glasses may not be a highly replenished item, they do need to be replaced every 1-2 years because of wear and tear and changing prescriptions. This gives the bus no reason to ever have no customers or a reason to be running. At the same time some incentives for companies to invest would be tax breaks. It is not the most ethical source of gaining investment but many multimillion dollar companies are always looking for

ways to avoid taxes. In this way they can avoid taxes, help people in lower incomes, and help their own workers through free or low cost eye care.