ASSIGNMENT

REPORT WRITING

DESIGN THINKING FOR NETWORS AND COMMUNICATION

TECHNOLOGY AND INFORMATION SYSTEMS

(SECP 1513)

SECTION -05

Group Members

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Introduction

Design thinking is a unique way of solving different existing problems of the users keeping different aspects in mind. The designing thinking approach can be divided into 5 main categories, which are –to empathize the problem, defining it, ideating, building a prototype and finally testing the prototype proposed. Design thinking acts a boon to the society as it can bring great changes to the consumer's environment.

Computer communications is the transferring of data , instructions , programs and information between two or more computers and computer networks is a network that is comprised of two or more computers linked together for sharing resources and exchanging data.

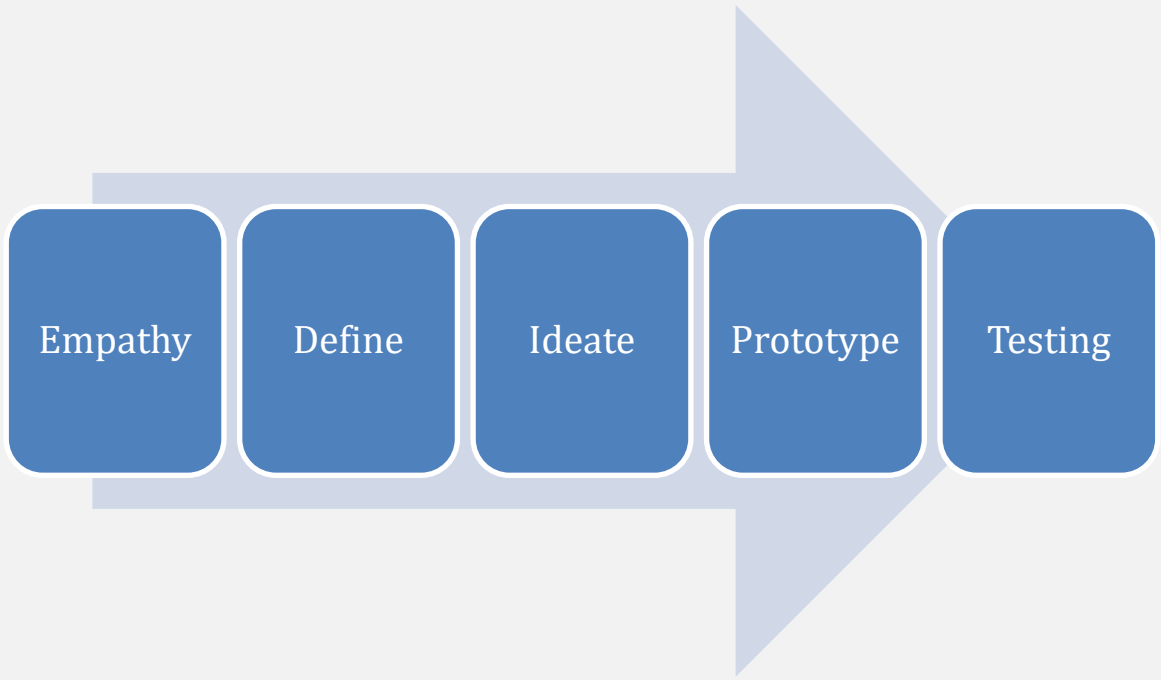
Communication and networking is important due to the fact that it makes sharing information and communicating globally remarkably feasible. They allow easy access to different information, data, programs etc which would have been impossible without its existence.

Some of the huge advantages of communication and networking are as follows:

1. *Confidential files and programs can be secured with password and can only be accessed with the authorized users during networking*.
2. *It makes communication and information sharing convenient*
3. *Networks help the sharing of hardware devices*
4. *It increases the storage capacity since data can be saved on other machines or network attached storage devices.*
5. *Accessing and sharing the internet.*

But behind every innovation there will always be a few drawbacks and communications and networking systems do have their sets of shortcomings. Our objective is to search for the drawback and rectify the problem with our proposed prototype.

We generally follow the 5 stages below to aid in our design thinking process



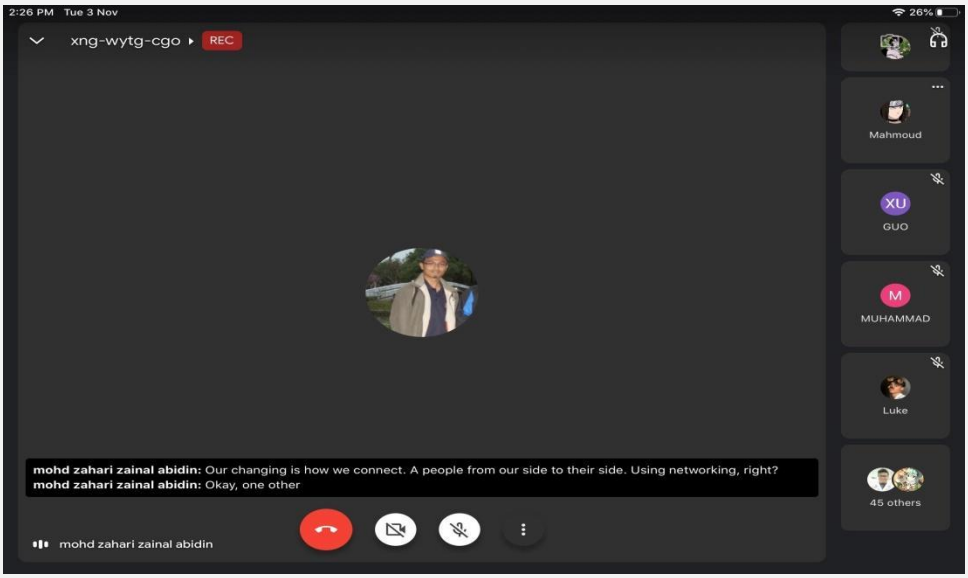
Empathy

This is the first stage of design thinking which aids us in getting into the depth of the problem which we plan to solve through extensive research regarding the topic. This very stage helps us gain a new insight on the consumer needs and work on it.

Communications and Networks eases our access to different programs, data etc. Initially, after digging deep into the subject matter we found that the Internet connections in the rural areas are somewhat slower than that of the urbanized areas. We were on our quest to find a solution to this problem which led us to approach our Network Admin of UTM.

Below is the information about the Network Admin expert we approached:

- Name : Encik MohdZahari Bin Zainal Abidin
- Network Admin
- Email: mzza@utm.my



The questions we asked the expert were:

- In rural areas, the communication and network is not so good, how can we contribute into solving this problem?
- What will change within the rural areas if they have easily accessible internet?
- How can we keep the costs for improvising the internet at a minimum?

To our first question, the expert answered that the tower is very far away from the rural areas which makes the internet connection so poor in areas like that on contrary to the towns. The strength of the network declines as it travels farther distances. He explained the different ideas which can be implemented in order to lift up the low connection ordeal from rural areas but each of them involved a huge cost for building the infrastructure.

As the answer to our second question, he said that faster internet connection in the countryside will help vastly with the economy as new companies, schools, factories can be set up which will eventually increase jobs for the citizens and increase productivity.

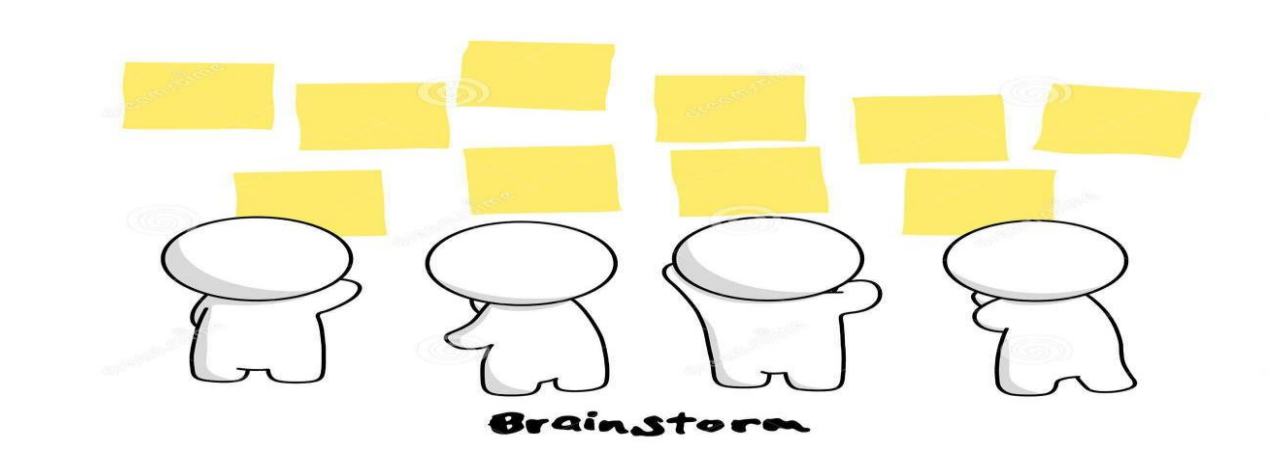
Finally to our last question, the expert talked about how the government can help with the cost, then collecting money from various private organizations or through donations, which would aid in building the very expensive infrastructure.

Define

It is the stage where we gather all the information gathered from the 1st stage (empathy). The information is analyzed and the main problems of the users are pinpointed. This stage assists us to generate new ideas to find the solution to the problem.

The points we collected through empathy gave us a clearer idea of the shortcomings of the communication and the network systems. The problems we found were mainly in building the infrastructure in the rural areas which is immensely expensive. Our challenge was to overcome the barrier of the costs and make something that is economically viable and solves the connection problems in the rural areas.

Ideate



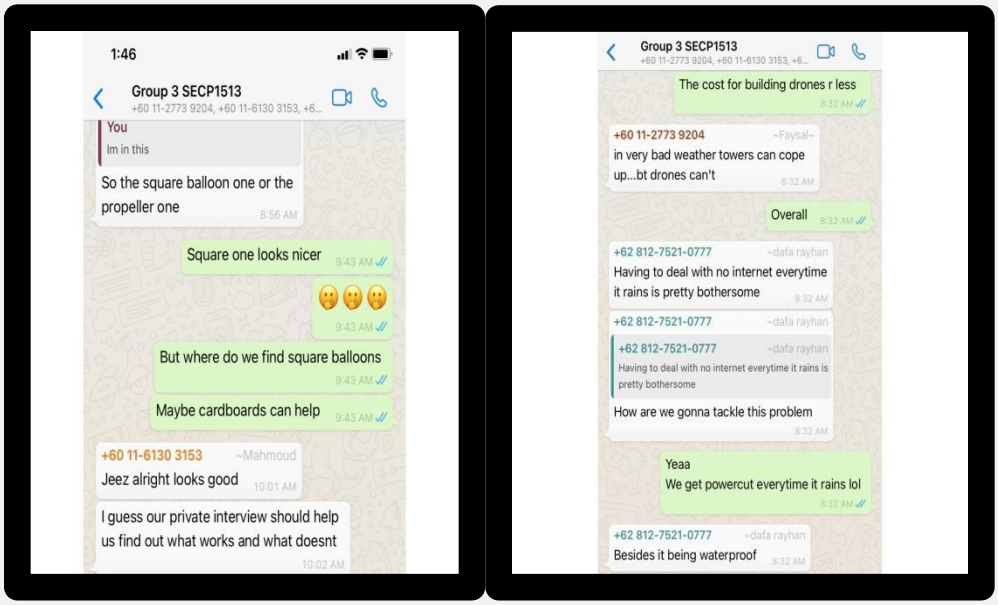
Design thinkers are able to hatch different ideas among themselves after the empathy and defining stage. They are able to identify the existing user problems through the information gathered and brainstorm by thinking of something out of the box and innovative enough to solve the problems stated.

Owing to the boundaries of the cost for the infrastructure we faced, we finally came up with something that does not even require a very expensive infrastructure. We took several days to ideate something that brings down our cost exponentially as well as provide fast internet to the rural and remote areas. Initially, we decided on building a tower on the outskirts of town but the plan was thrown away as soon as we skimmed through how budget unfriendly that was. Next, we came up with a scheme which keeps the expenses low. The plan was to build a portable router fitted into an AI operated drone but this method was also

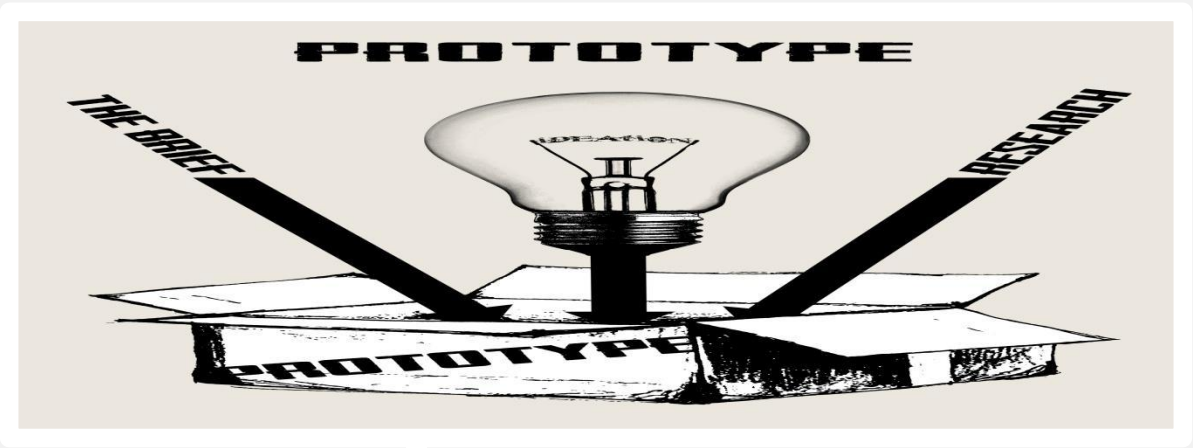
demolished since we had to keep different factors in mind such as: the battery of the drone , if it will be waterproof etc.

Eventually, we made our minds into making a router attached into helium filled Balloons which would be AI controlled and travel distances around the rural areas significantly and conveniently providing fast internet to the consumers of those regions. We decided to use foil balloons since latex balloons go out very fast. This would lift the coast barriers as well as solve our stated problems.

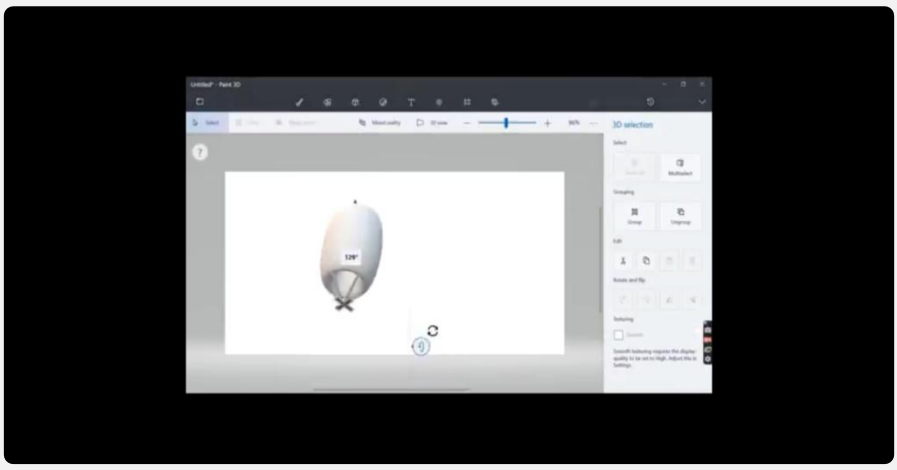
Due to Covid-19, we were unable to hold face to face meetings so we switched to communicating through online platforms. It was hard to hold audio or video meetings due to our hectic schedule so we communicated asynchronously through Whatsapp messages in majority of the time also involving a few audio meetings in Google meet.

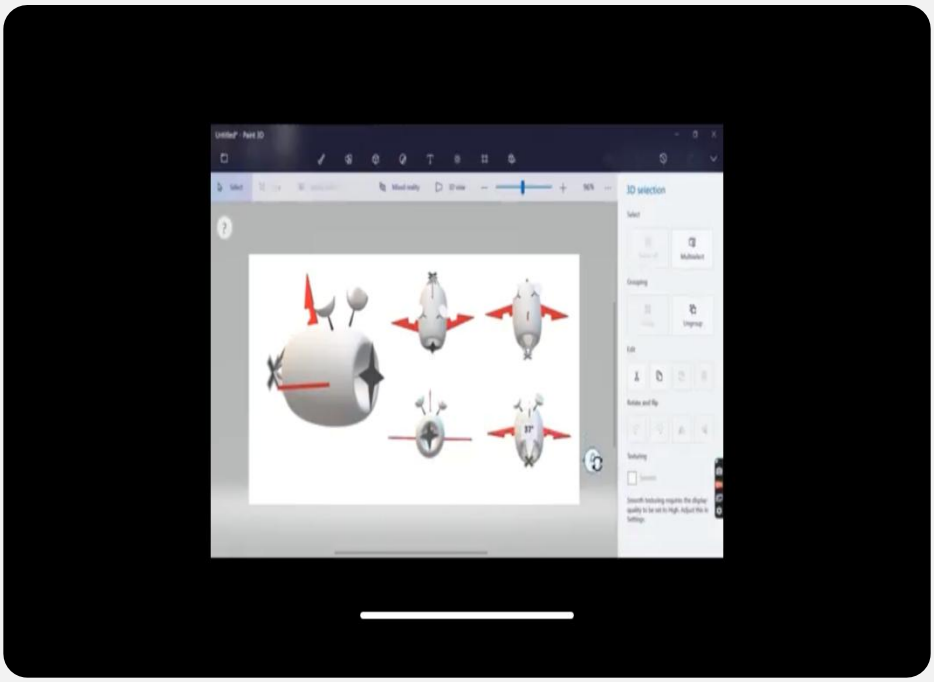


Prototype



It is the basic version of a system from which other forms of the system are created. Again, due to covid-19 we were limited to only using the web and applications to build a prototype. Since we did not have enough stationary items to build our desired prototype we resorted to paint 3D to make a similar model possible. We build a simulation of a foil balloon which carries the device which creates enhanced wireless networks that distributes the internet to the whole area. We also imitated a model for a modem that enables end users to get access to fast internet. Below are snapshots of our prototype:





Testing

This is the stage where the prototype is tested, though it can be considered the last juncture in the prototyping process. At this point the final version of the prototype is tested to smooth off the rough edges, and if necessary going back to previous stages for however many times it takes to get the desired end-product. Unfortunately, testing could not be performed as it normally would since we were limited by covid-19 related issues. The testing process was conducted as shown below:

1. *The balloon was stocked up with helium to confirm the volume of gas needed to fill up the balloon and therein how long it could travel without the need for a refill stop*

2. *The antenna is assessed to validate the WI-FI signal strength, emission rangeland the receptiveness.*
3. *The wings are examined to verify its ability to support the weight of the balloon and the aerodynamics needed to smoothly fly the balloon. They are also tested for unidirectional navigation which would prove to be beneficial.*
4. *The turbine on board the balloon is scrutinized to make sure it's functional and readily generates the electricity needed to operate the balloon without a nonrenewable source of energy such as a battery, fuel etc*

Reflections

Mahmoud Khaled Abdelfattah Mahmoud Osman (A20EC0271) - "The trouble with not having a goal is that you can spend your life running up and down the field and never score." –Bill Copeland. Personally, I believe goals are crucial not only in one's life but especially when it comes to one's career even if they are relatively vague. I hope to one day reach a level in my career where my creations can help people. I also hope to always be the type of software engineer that is able to adapt to the ever-changing world of computer science. Another thing I really hope I can achieve is to generate a work environment wherever I do work.

Design thinking has aided me in my quest for my career goals by providing the correct type of mentality when approaching a new project. Additionally, it has helped me gain teamwork and communication skills as a by-product of the group assignment which has been tough yet very educative in quite a few ways. Design thinking has also enlightened me on the ways of organizing my thought process when undergoing a brainstorming session.

To maximize my potential in the software engineering industry, I would need to undertake a few personal changes. Adaptability is key in an industry where technology is king; being able to master any new advancement to the computer science field would be immensely beneficial. Moreover, research is considered the bread and butter of the computer science field, so fully grasping it would surely be a huge step-up. Finally, one cannot speak of improvement in any work industry without the mention of communication and teamwork abilities, arguably the most important skills in a working man's toolset.

ToyaLazmin Khan (A20EC0284)I have always dreamed about building games but did not know how to proceed with it. As time passed by, my interest in building unique things developed. I started learning different kinds of codes and used apps to build shorthand games.

Eventually, I started to realize that in order to become adept in my game building passion I had to dig deep into the fields of computer science. As i graduated from my high school my mind was all set into getting into the computing field to strengthen my skills. So, I joined the faculty of computer (software engineering). My end goals are to work for a gaming company and gather enough capital to one day start my own game development company.

The design thinking process helped me load in the development of my career goals. This assignment helped me think out of the box and design something that is unique from the day to day things we use. It taught me how to work as a team and co-ordinate with the group members. In game development, end users always ask for something unique and this design thinking project teaches us to think differently from others and work as a group.

First of all in order to survive in the industry I need to have perseverance. Computer science is all about critical thinking and analyzing so I need to give my all in order to do something which others could not even think of. Studying in a technical field always engages a person into research. Innovations are very common in this field so I need to be up to date with the latest technology in order to increase my potential in the industry.

MD Mohaiminul Islam Faysal(A20EC9105)§ §I have an attraction to technology from my childhood. Among them, technology related to computers impressed me the most. So I've decided then that I'll be a software developer and an explorer. That's why I choose abroad to study. And Malaysia is the perfect place to start with. So, here I am studying software engineering in UTM and hoping to be a well- established software developer.

§ Design thinking is a critical thinking system that uses compassionate, innovative, and scientific skills to tackle issues. My dream is to be a software developer, in that case, a student studying software engineering needs a lot of creativity. Design thinking acts exactly like that way. It expands our creativity. It'll provide a vital effect to prospering my goal.

§ My action to all of these is hard working. Without hard work I'll be stuck in my path. Some people may have got some extra talents. But I think in a different way. Cause no matter how much talent he/she has if he/she doesn't study all the year he will fail. So hard working is my solution to all and God's mercy

Muhammad DafaRayhanYasser (A20EC0317) Design thinking is a problem solving method, you mainly ideate by challenging assumptions and creating innovative solutions. Being innovative is

crucial in every aspect of life, Innovation can also help develop original concepts while giving the innovator a confident attitude to take risks and get things done. With creative thinking, problems can be solved differently and strategically.

I see myself as an innovative thinker and with that choosing this program will heavily influence my mind and logic for the future. With assignments like these I'm able to further improve my problem solving skills by discussing with other members, implementing ideas, suggesting ideas, etc.

So far undergoing the classes has already opened up my mind more on how differently we're able to handle certain challenges and how we're able to mix and match different ideas to make an amazing one. To continue partaking in group assignments such as this will definitely lead me to my growth and it will definitely be a key factor for my future endeavors.

TASK FOR EACH GROUP MEMBER

Name	***Task***
ToyaLazmin Khan A20EC0284	• ***Ideating*** • ***Report Writing*** • ***Taking the interview*** • ***Chapter presentation***
Muhammad DafaRayhan Yasser A20EC0317	• ***Video editing*** • ***Ideating*** • ***Taking the Interview*** • ***Chapter presentation***
MD Mohaiminul Islam Faysal A20EC9105	• ***Building the prototype model*** • ***Ideating*** • ***Taking the interview*** • ***Chapter presentation***

Mahmoud Khaled Abdelfattah Mahmoud OsmanA20EC0271	• ***Taking the interview*** • ***Report writing*** • ***Ideating*** • ***Chapter presentation***

LINK FOR THE VIDEO

Chapter Presentation: https://youtu.be/9VXhYHk_0N4

Design Thinking Video: https://youtu.be/GQQBHnPo8AA

References

Dam, R., & Siang, T. (n.d.). Stage 5 in the Design Thinking Process: Test. Retrieved November 14, 2020, from https://www.interaction-design.org/literature/article/stage-5-in-the-design-thinking-process-test