**REPORT:**

DESIGN THINKING

**SUBJECT:**

TECHNOLOGY AND INFORMATION SYSTEMS (SECP1513-02)

**GROUP/TOPIC:**

GROUP 8: COMMUNICATIONS AND NETWORKS

**LECTURER'S NAME:**

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# INTRODUCTION

What is design thinking skills? Basically, design thinking skills is a skill that are used to solve a problem but in a much more detailed and precise workflow. Many designers applied this skill when they want to solve one particular problem. It is much more effective this way because we can see every aspect while finding the best solution for a problem. These skills are practise widely among youngsters to produce more creative future generation. For example, we do have d-school which the students are trained by the skills in Beijing, Paris and Kuala Lumpur itself. (Hasso Plattner, 2012) said that "design thinking creates a vibrant interactive environment that promotes learning towards conceptual prototyping." (Design Thinking : Understand—Improve—Apply, pg 5). Here, we can see that design thinking have 5 phase which are empathy, define, ideate, prototype and testing. Each of these phases must be completed to come out with a best solution.

Next, what is network and communication? Obviously, they are both different things but are closely related to each other. In this era, our network and communication have major improvements compared to those olden days where we use telegraph, letters and land line telephone. Now we have wider range of ways to communicate because technology keeps on improving, even some have implemented artificial intelligence (AI) in devices. For now, we have Wi-fi, 4G cellular line and even better: 5G but it is not available in Malaysia yet. New technology makes us easier to communicate, we only need the power of our fingertip and everything can be done in a blink of an eye. Even in this covid-19 pandemic, luckily technology exist so we can just work or study from home without the needs of going out.

With all these magnificent technologies we use for network and communication, there are of course problems. Same like when we are doing programming, we will always expect bug to happen right? In this assignment, we are required to investigate problems related to network and communication and we chose to work on problems faced in UTM. For your information, UTM provides multiple services for everyone in the campus to ensure that the network and communication run smoothly. That leads to many problems because the number of people in the campus are huge. So, let us discover the problems we identified while practicing design thinking skills.

# DETAILED STEPS

First, as stated above there are 5 phases which are empathise, define, ideate, prototype and testing. Empathise can be define as a phase where we observe the needs, their current problem or any improvement that users wishes to have. For this phase, we decided to interview En Mohd Zahari, network admin from UTMDigital. During the interview, we asked him questions regarding the topic to kill our curiosity. He also shared with us UTM's network infrastructure, how the communication in UTM runs, services provided by UTMDigital and the problems he had faced in this field. The interview went well and all our questions were answered. Furthermore, we did our research to have a clearer vision on our topic.

Next, we collected all the information needed and move to the next phase which is define. Define phase is where you process and discuss all the knowledge you obtain from the first phase, empathise. Since we are not in campus during this Covid-19 pandemic, we did our discussion and express our thoughts in WhatsApp group chat and online meeting via Google Meet. During the discussion, we exchanged opinions so that we understood the situation our users faced. Once finished, we move to the next phase, ideate.

Ideate is when you brainstorm the solution to solve problems faced by user. We then focus on the bandwidth and anti-virus problem stated by user. Next, we came out with ideas to solve it. We also added improvements to the current situation. Besides, we list out all possibilities that can help to solve the problems. Then, we jump into prototype phase.

Prototype phase is a phase where you invent something with intention to solve user's problem. We are required to make a prototype in digital form since we cannot meet each other and we chose Figma as our digital platform. We came up with a few prototypes and lots of editing have been made to fulfil and satisfy what our user wants. It was challenging but we finally made it. After all the editing, we are satisfied with the prototype.

Finally, to the last phase that is testing. We showed users our prototype and give them a brief explain on the functions. After that, we ask them to give us feedbacks like any weakness that we can improvise later. All in all, we received positive feedbacks from the users.

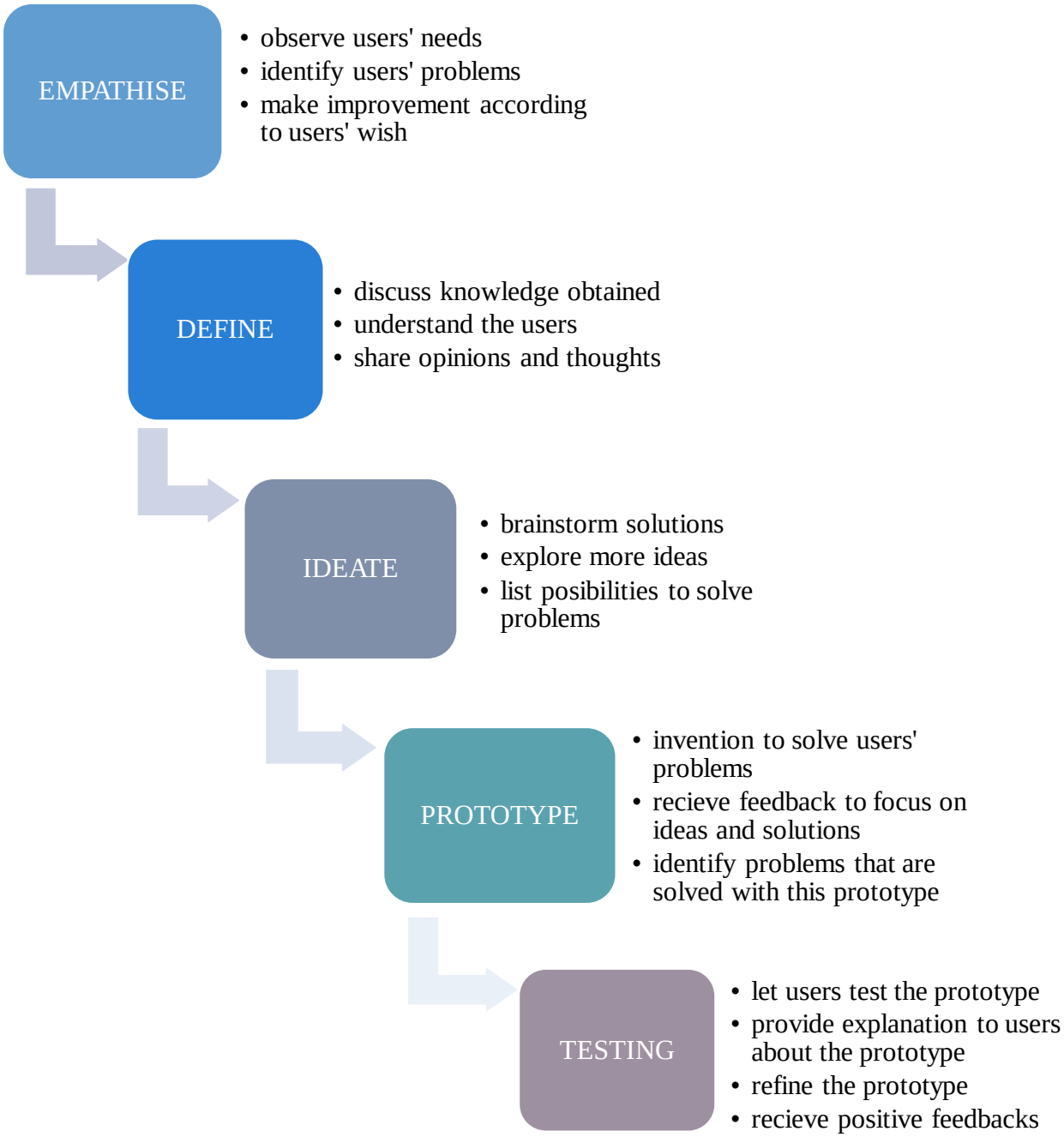


**Figure 1: Design Thinking Skills**

This figure 1 above shows the details of design thinking steps, which is empathise, define, ideate, prototype and testing.

# DETAILED DESCRIPTION

## 1.0 Problem

We had studied about communications and network and carried out an interview. Through the interviewed and some discussions, we had identified problems regarding communications and network. We listed down all the problems and will explore further to find out the solutions.

1. **Slow network speed**

   Although UTM has the fastest network among the universities in Malaysia but there are still students who make complaints regarding the speed of network in UTM. For example, the network is slow and always has problems to load page at the access point. Some students even encounter the problem where they suddenly exit from a page or websites while using the network in UTM. This had affected the work performance for users of UTM Wi-Fi.

2. **Student does not download antivirus software**

   Previously, UTM provided 40000 free software for students to download. However, not more than 3000 students downloaded and make good use of this benefit that UTM offered. Therefore, UTM had stopped providing this advantage to students. This cause the student to not have the awareness to download antivirus software. Furthermore, some students will download pirated software or documents that contains virus which will cause congestion to the network in UTM.

3. **Streaming is not allowed in UTM**

   Nowadays streaming plays an important part in student life especially when conducting online classes. Despite that, UTM does not allow student to conduct any live streaming. This is because streaming consumes high usage of data and UTM routers are unable to provide the required bandwidth for student to conduct live streaming. When student carry out plenty of live streaming, it will affect the bandwidth of the network. This reflects in slow speed of network and low quality of internet as the bandwidth is limited and the transmission of network is slow.

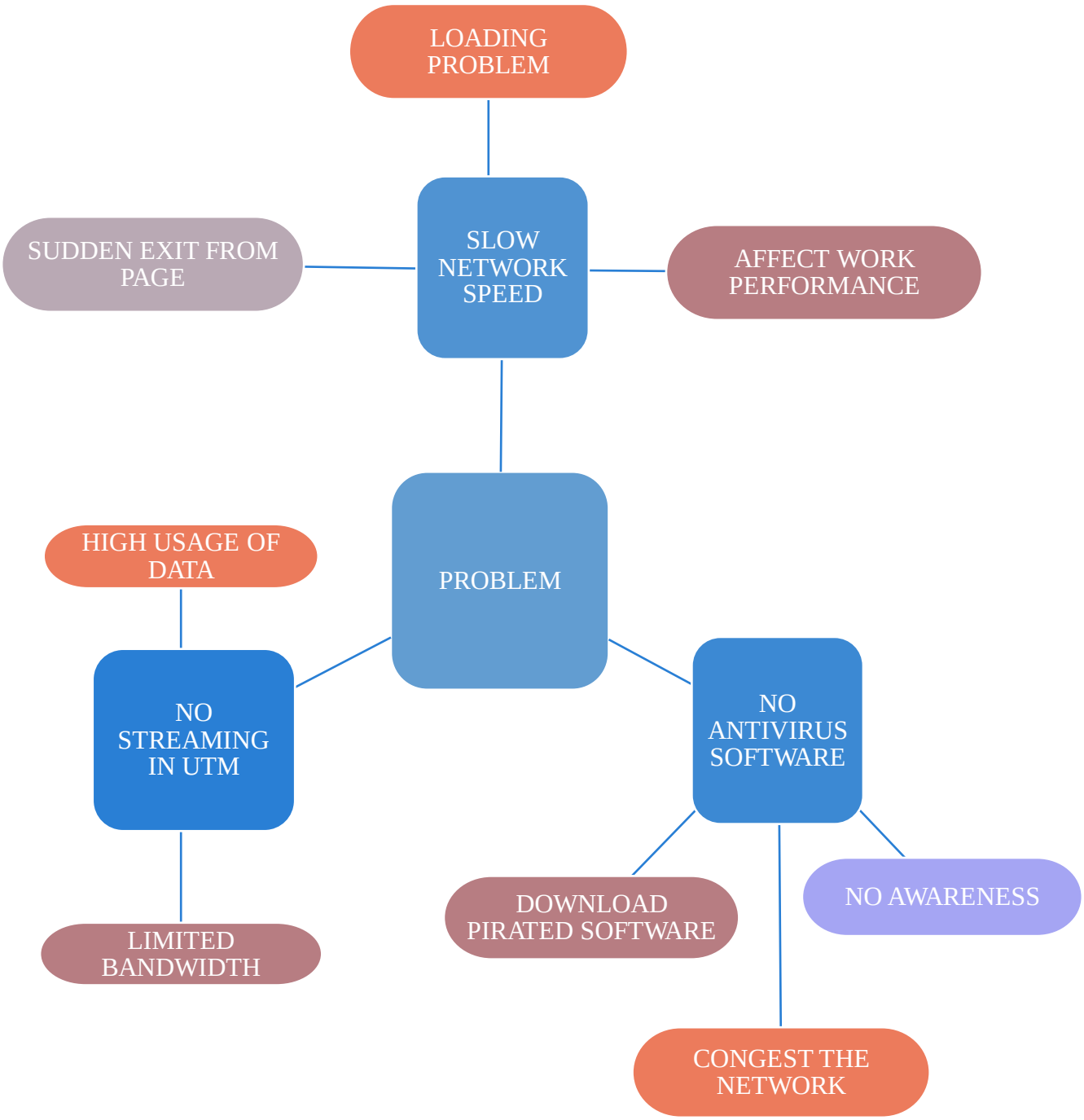


**Figure 2: Identify Problems**

Figure 2 above shows problems regarding communication and networks in UTM, which are slow network speed, no streaming allowed in UTM and student not downloading antivirus software.

## 2.0 Solution

We had studied and did some analyzation on the problems. All of us generated several ideas which was then filtered based on user's necessity and conveniences. Then, we held an online meeting and explained our ideas. Eventually, we came up with solutions for every problem stated.

To overcome the issues, we decided to create our prototype in a form of web extension rather than an app as we could not ensure that student will definitely download the app. However, with web extension, it could be inserted in another webpage such as in UTM portal.

Regarding the problem of congested network, we decided to educate users behaviours in using UTM network by urging them to download antivirus software in their laptop. As viruses such as malware and Trojan are recognized for slowing down the networks and restraining work performances. For instance, (CLEARPATH, n.d.) stated that malware impacts your computer in the following ways: disrupts operations, steals sensitive information, allows unauthorized access to system resources, slows computer or web browser speeds, creates problems connecting to networks and results in frequent freezing or crashing.

Therefore, we decided to list down some suggested antivirus software for students to download in their laptop which are AVG Antivirus, Avast Antivirus, Avira, Kaspersky and Sophos. This could provide them the awareness of downloading antivirus software in their laptop and make it more convenient for users to download as they would not need to spend time comparing different types of antivirus software. Additionally, the network will also be secured with the presence of antivirus software. This is due to the fact that, (Comodo Cybersecurity, n.d.) mentioned that the Trojan horse virus gathers passwords and personal Trojan horse virus gathers passwords and personal information for as long as 200 days if left undetected. When the hackers gain the data, they use all of the stolen information in several ways. They sell it to the black market, steal bank account access, or ask for ransom.

Furthermore, to solve the problem regarding live streaming, we resolved it by displaying the condition of bandwidth and included an application form for video streaming request. This form is used for student who wants to conduct live streaming using UTM network. The approval of this request depends on the condition of bandwidth. Thus, problems where many students carry out live streaming at the same time could be avoided. This could also ensure that the UTM routers are able to provide maximum bandwidth and faster network speed.

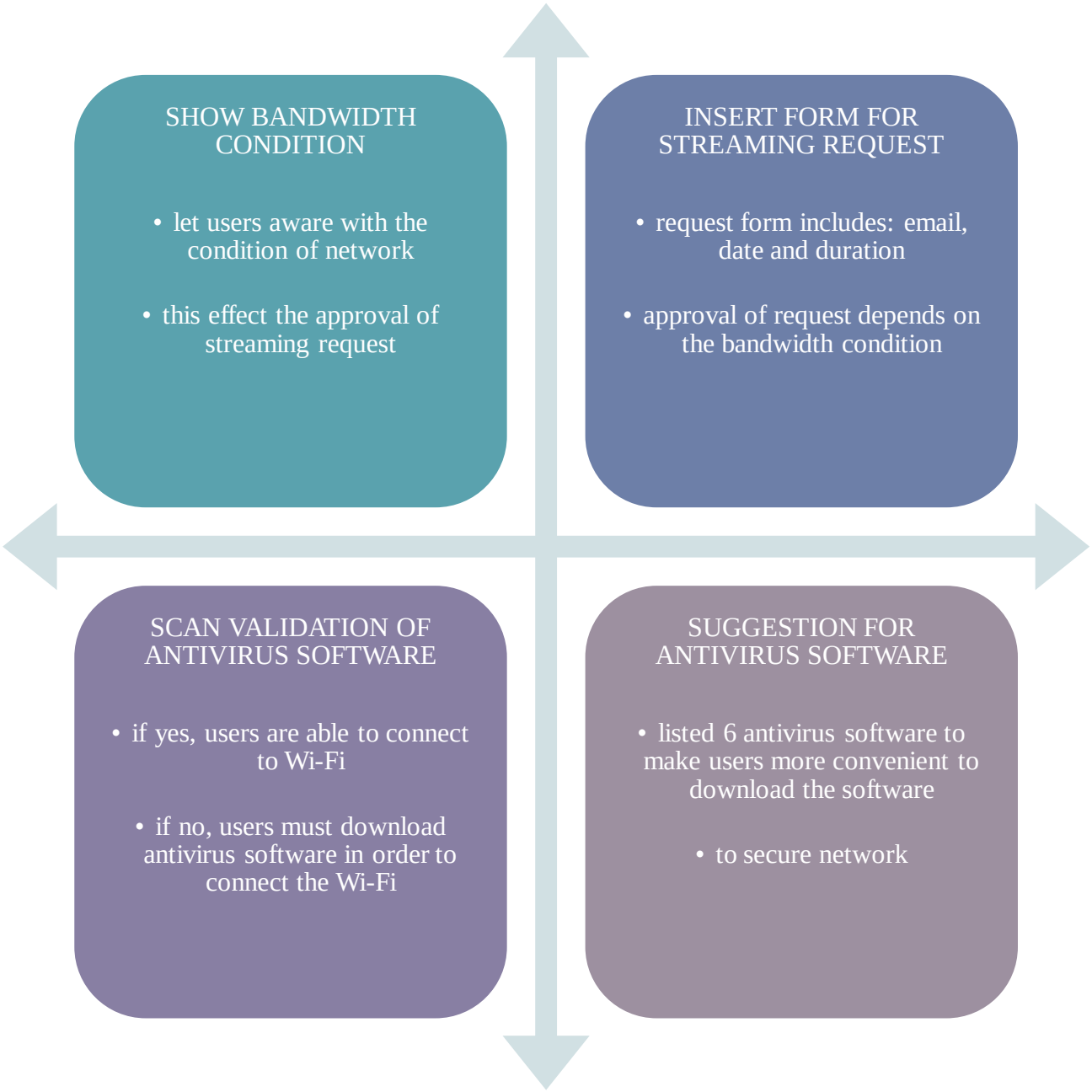


**Figure 3: Solution for our problems**

Figure 3 shows solutions for each problem stated in figure 2, which are show bandwidth condition, insert form for streaming request, scan validation of antivirus software and suggestions for antivirus software

# 3.0 Team Working

This whole project could not be completed without teamwork and contribution from each member. We decided to pick a group leader right after we received this assignment to make sure that everything will go smoothly as planned. Chloe had been a great group leader by assigning duties to all of us fairly and made sure that everyone did their work. As Design Thinking has five phases, we decided that each member will contribute to each phase so that everybody will participate in the process of completing this project.

Starting with Empathy phase, Chloe was in charge of contacting the user, which was from UTMDigital, Rasmin came up with the inquiries, Dafina recorded the whole interview session while Amirah was interviewing the user. Even though this was the first experience for everyone, but everything went great. The second phase is Define where we held a group discussion through Google Meet and listed down all the problems while watching the recorded interview session together.

Then, we decided to move on to Ideate phase where we brainstorm ideas for solutions to our problems through Google Meet. Chloe, Dafina, Amirah and Rasmin brought up various great ideas. Later, Chloe sketched the prototype while the others commented and gave recommendations to improve them. The meeting was recorded by Dafina for video purposes.

Next, we started writing our report. Amirah wrote the introduction and detailed steps, Chloe and Dafina wrote the detailed description, Rasmin and Dafina wrote the design thinking evidence. Lastly, Dafina compiled all of them together. For the Prototype phase, since it is difficult for us to do this together, Rasmin did the prototype based on the sketch from the previous discussion that we had. Then, we held another meeting for Rasmin to show us the prototype and then we continued designing the prototype. This meeting was recorded by Dafina for video purposes.

Finally, the Testing phase. Chloe, as a representative for our group, had shown her brother our prototype to be evaluated and we received favourable response. Everything was a success from the beginning as each member played their own role in completion of this Design Thinking assignment.

# DESIGN THINKING EVIDENCE

## 1.0 Sample Work

**Figure 4: Sample Work Done**

Figure 4 above shows the sketch of sample work for our prototype which includes the scanning for antivirus software, bandwidth condition and request form to do live streaming.

# 2.0 The Process

## 2.1 Empathize

In this first phase, we listed down the questions that we want to ask the user. Then, we hosted an interview session through Google Meet. These are the list of questions that we prepared:

1. Can you briefly introduce yourself to us?
2. What are the problems you have to deal with regarding communication and network based on your working experience?
3. What kind of specification should the future of communication and network have?
4. What kind of topologies do we use in UTM?
5. When you are using this (communications and network), is there any problem that you faced and make you really hope it can get improved?
6. What problems that the students of UTM face?
7. In your opinion, what is the cause of the problem faced by the students?
8. What do you think can be done to overcome this?

Encik Mohd Zahari Bin Zainal Abidin

1. I am Zahari, IT officer here from digital department. Before this, I am in the data centre department so I know all the infrastructures. The customer service and any IT services in UTM is now under my department.
2. Many students do livestreams even though they're not allowed to which makes the network congested and due to that the network will be slow.
3. A fast and secured network.
4. Now we use star topology. It is used to connect colleges with each other.
5. Due to the pandemic, most lecturers now have to use video streaming application to teach and this needs a lot of bandwidth. To overcome this, UTM needs to increase their budget on the networking and increase the bandwidth.
6. Most students often complain that the internet speed is too slow.
7. This can be due to the students opening multiple tabs and not having any antivirus installed which uses more bandwidth than normal use.
8. UTM has already provided students with free anti-virus software but the lack of awareness is the problem. I would suggest educating the new students and creating awareness about this.

## 2.2 Define

In Define phase, we listed down the problems that we gained from the interview. This phase had helped us in identifying the problems clearly. We could see that UTM have problems regarding congested network which caused the network to be slow. Besides that, UTM users are lack of awareness.

**Figure 5: Identifying Problems**

Figure 5 shows the meeting session among group members to discuss about the problems regarding communications and network in UTM that we gained during the interview.

## 2.3 Ideate

The third phase is Ideate, we conducted an online meeting for brainstorming process. In this phase, each and every one of us came up with various and creative ideas on how to solve our problem. Next, we finalised our solution for our problem and then we tried to sketch and design together on how our prototype will look like. These are the result from our brainstorming process:

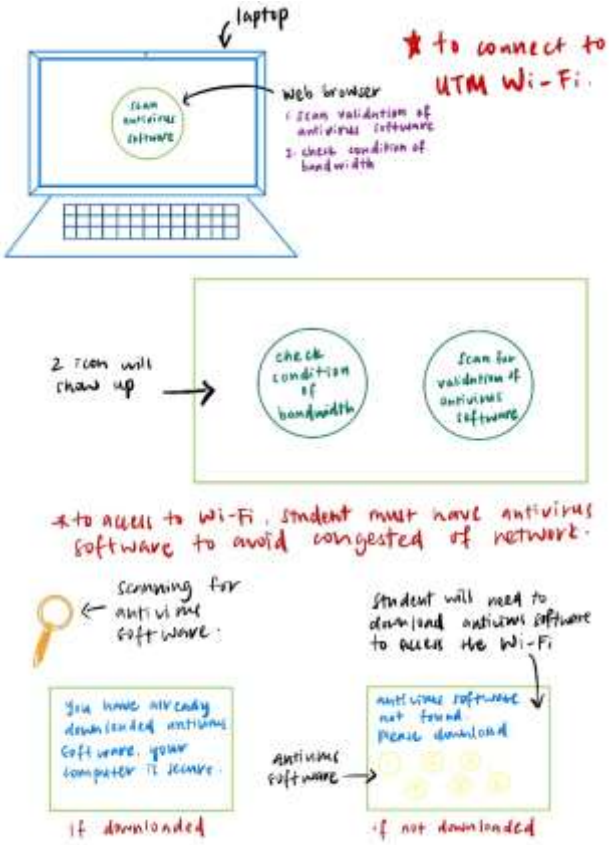


**Figure 6: Sketch of Prototype**

Figure 6 shows the sketch of prototype after conducting a brainstorming process with group members through online meeting.

## 2.4 Prototype

Moving on to the next step which is Prototype. In this phase, we used an interface design tool called Figma. This prototype took almost four days for us to complete since we need to make sure that this prototype is user friendly and accessible for everyone.

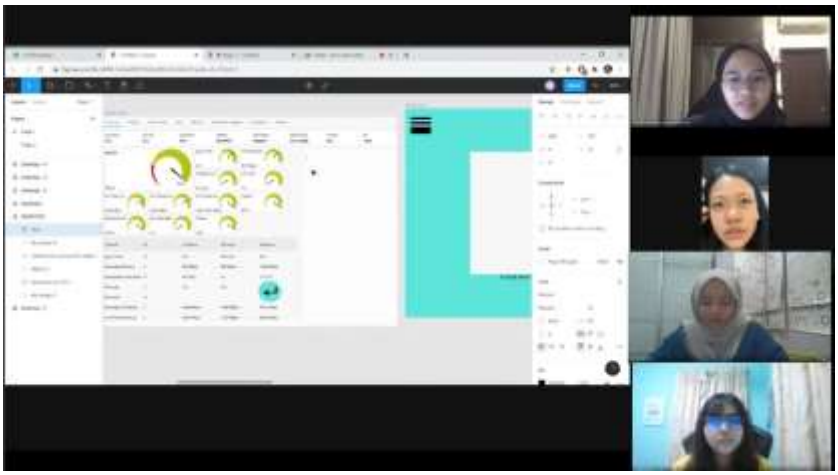

**Figure 7: Process of Making the Prototype**

This figure 7 shows the process of us discussing about the making of prototype using Figma.

**Figure 8: Prototype**

Figure 8 shows the main page, bandwidth condition, request form for live streaming and scanning process for validation of antivirus software.

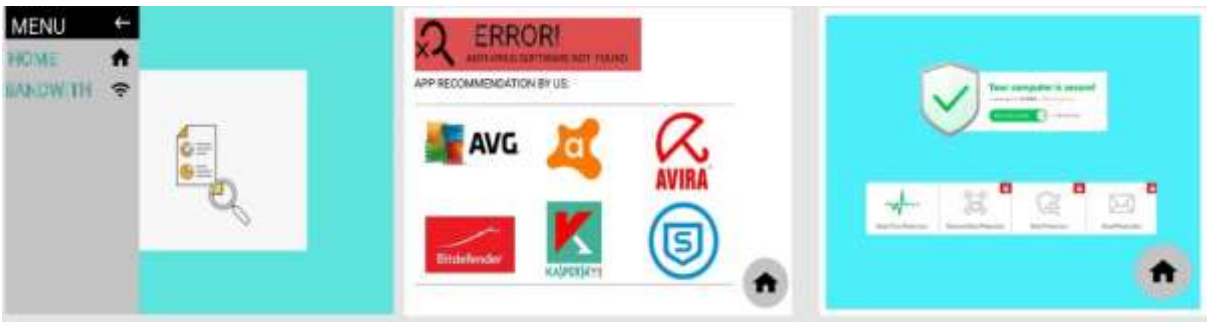


**Figure 9: Prototype**

Figure 9 shows the outcome after scanning for validation of antivirus software.

## 2.5 Test

Lastly, we presented our prototype to the user for testing. This is to make sure that our prototype completes the user needs. This phase is important to know whether our prototype needs to be improved if the user is not satisfied with the prototype.

**Figure 10: Testing Prototype to User**

Figure 11 shows that Chloe is explaining the functions of our prototype to user and receive feedbacks from users.

This is the link to our YouTube video for our design thinking project:

https://www.youtube.com/watch?v=9f7QbAmvd90

This is the link to our YouTube video for our chapter presentation:

https://www.youtube.com/watch?v=lZz2pqt-06g

# REFLECTIONS

## 1. Amirah Raihanah binti Abdul Rahim

Talking about dream, I do have tons of dream that I want to achieve and the biggest one is pursuing my career in data engineering. I first know about this field was when I joined a program in MMU which they gave some exposure about data science. Ever since that, I started to do my research and I found out that Data Engineers are in high demand. I started to really gain interest and my curiosity rises up. I questioned a lot and I am excited to discover more about it. That is my dream regarding this course, I wanted to know more and more because I know there are no limits in learning. There's always an open door for you to keep on learning and know about new things. From this project, applying design thinking skills it does really give me an impact to think out of the box. In order to succeed in Information technology (IT) field, you really need a creative mind. The ability to solve problem under any circumstances is a very important skill to master. Design thinking skills really exposed me on the right way to solve a problem. With me being able to learn about this, it can help me prepare to face any problems later. Last but not least, I am going to do my best to achieve what I dream of and makes it come true. I am willing to commit in whatever task given to me because I know it is for my future. I will gain more knowledge and get myself ready for more exciting challenges in the future.

## 2. Chloe Racquelmae Kennedy

My goal in Data Engineering course is to receive more knowledge and are able to be engaged with company that is associated with big data in the future. This design thinking has taught me the importance of creative thinking, focusing more on the users' needs and emphasize on the results as it is crucial to develop something that would be beneficial to people in their daily lives. It has also allowed me to speak out my ideas and improved my communication skills. Last but not least, I understand the fact that accomplishing my dream is not simple and experience is essential in this industry, so I would like to gain more experience in operations or systems regarding software and also furnish myself with significant skills and abilities by doing more research and practice in order to be an expert in this industry who has all the vital aptitudes.

## 3. Radin Dafina binti Radin Zulkar Nain

I always have that dream which is related to my course, Data Engineering where I dream of to become a Data Scientist one day. Data Science require Complex Problem-Solving skill where they need to know how to approach a problem productively. Throughout the entire completion of this Design Thinking, I learned a lot of new things from the bottom of not knowing Design Thinking to solving problems. This project requires a lot of teamwork and communication especially with my group member although it is a bit difficult since we were very far from each other. So, we need to creatively think on how to complete this Design Thinking in an efficient way. Design Thinking also had taught me on how to solve a problem in a proper and detailed way which is probably related to my dream. I realize that I need to solve problems based on the five phases in Design Thinking more often to prepare myself for the future. Other than that, I also realize that I need to polish and work on my generic, critical thinking and other important skills so that I will be able to adapt especially in the industry.

## 4. Rasmin Kaur Sandhu

My goal for my course is to graduate with flying colours and have a career in the tech industry. From this project, I can see why design thinking is such an important skill to have. It helps us to solve problems more efficiently. This project also made me realize that I need to work on my problem-solving skills, how to solve problems more creatively using design thinking.

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# TASK OF EACH MEMBER

| | | |
|---|---|---|
| 1. | Amirah Raihanah binti Abdul Rahim | Resource Investigator |
| 2. | Chloe Racquelmae Kennedy | Leader<br>Complete Finisher |
| 3. | Radin Dafina binti Radin Zulkar Nain | Video Editor<br>Presentation Designer |
| 4. | Rasmin Kaur Sandhu | Prototype Designer |