UTM

UNIVERSITI TEKNOLOGI MALAYSIA

DESIGN THINKING

TECHNOLOGY AND INFORMATION SYSTEM

Section 06

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Table of Contents

1. Introduction

A motorcycle accident is not rare anymore for the road user. Every day we could hear the news about motorcycle crashes and accidents. The motorcycle is the most vulnerable transport as they have the least protection compared to cars, buses, and lorries. When a motorcycle and car collide, it is obvious that the bikers tend to get injured more than the driver.

According to (Jabatan Keselamatan Jalan Raya Malaysia, 2019), it stated that motorcycle user is the second largest community on the road which 47.6% and based on the research from MIROS, the factor of accident is 80.6% from driver's attitude, 13.2% from conditional of road and 6.2% from a collision between transport.

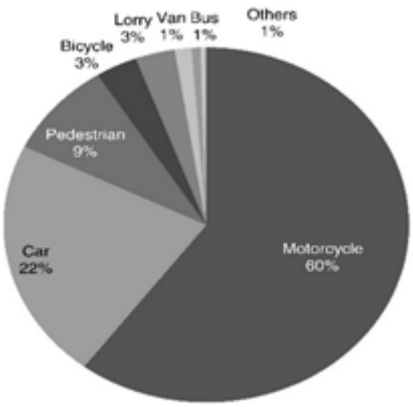


Figure 1 Fatality distribution by mode of transport

Based on figure 1, fatalities by road user by percentage, motorcycle is 60% compared to car (22%), bus (1%), lorry (3%), van (1%), bicycle (3%), pedestrians (9%) (Muhammad Marizwan & András, 2012).

Our target is the bikers. To solve the biker's problems, our team has created a multifunctional helmet (Smart helmet) that has a few facilities such as a navigation system to show direction to the destination and alert detection which will give warning to the bikers if there are obstacles on the road such as potholes. The purpose is to improve their lifestyle and to provide high safety.

2. Design Thinking

Design thinking covers the variation of creative strategies for creating projects with multiple collaborators organizational in innovation. It helps deal by listing the proper questions, as well as identify and frame possible solutions (Panke, 2019). The process anticipates steps that allow participants to analyse, synthesize and produce insights from different spots through empathy, define, ideate, prototyping and testing.

2.1. Empathy

Empathy is the first action that aims at deeply acknowledge user needs. This also includes understanding to help create innovations by meeting comprehensible and incomprehensible desires. Furthermore, critical thinking also can help compose a problem, especially for complex or ambiguous projects in a proper way (Nakata & Hwang, 2020) (Zheng, 2018). In empathy, ethnography and in-person interviews are popular choices that really beneficent in obtaining a user's problem.

2.2. Define

The next step in design thinking is define. Define is the process of unpack and synthesize the empathy result into compelling needs and scope a specific and meaningful challenge. In this step, it will go to beyond a simple definition as the complexities of the user, problem, and context described (Danah, Carmen, & Rohit, 2017). Furthermore, the list of problems will articulate based on details and user needs gained previously. The focus is framing the problem to guide design efforts moving forward.

2.3. Ideate

Ideate is the next step in design thinking which is the new concepts set into user demands being generated, utilising visual, collaborating forms of brainstorming. It may also promotes experimentation by directing a search for more powerful answers. Any possibility momentum can build during ideate process and carry over into experimentation (Carlgren, Elmquist, & Rauth, 2016) (Nakata & Hwang, 2020). Through this step, the wrapped possibilities are extended by loosening the control on assumptions and frames.

2.4. Prototype

A prototype is a visual embodiment of essential design elements and an iterative instrument to refine and inform decision-making in the design process (Carlye, Daria, & Mark, 2017). Prototypes help designers to have a great understanding about the product’s problem or limits and what the consumer will behave, think and feel when using the product.

2.5. Test

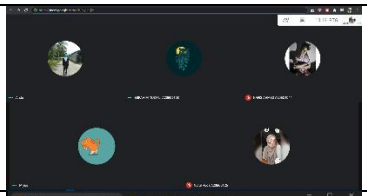
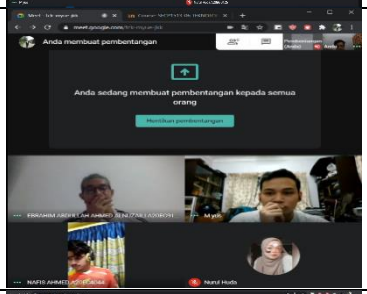
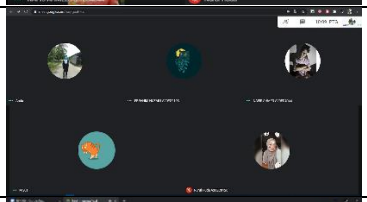
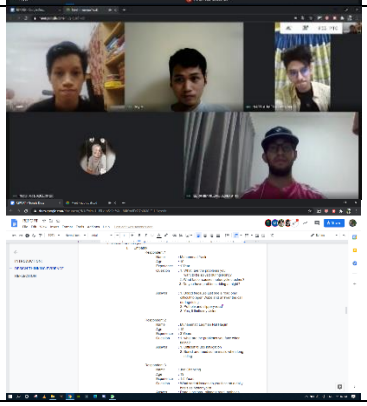
This is the last step in design thinking that contributes to cultures of openness to experimentation, failure, and design oriented strategic thinking. It should be doing experiments on some parts of a solution with actual users or internal testers (Panke, 2019). Therefore, the test is the step to explore the user’s needs again and make sure the above design scheme meets the user’s needs.

3. Problem, Solution and Team Working

3.1. Problem and Solution

Problem	Solution
• We could not meet each other in real life • We had a time difference issue between us and our 5th member (Nafis Ahmed) approximately 3 hours behind. • Difficult to do prototype together due to pandemic • Different recording equipment cause different quality in video and audio • Could not interview more people because of covid 19 • Excessive pressure of studies and assignments	• We only can do meeting online • We did our best to fix our time with him, in order for him to catch up with us. • As team member, we only manage to give design, ideas on what to put on the product • Use software editing to adjust video and audio. • Had to interview a few people and close friends. • Had to manage time efficiently

3.2. Team Working

Date	Start	End	Task	Evidence
23 October 2020	10.00 PM	11.30 PM	First meet and briefing	
24 October 2020	10.00 PM	11.00 PM	Share our ideas, choose one idea and briefing	
30 October 2020	10.00 PM	11.00 PM	Recheck our progress and solve anything problem occur	
10 November 2020	9.00 PM	12.41 AM	Recheck our video progress and start writing report.	

4. Design Thinking Evidences

4.1. Empathy

From our discussion in Google Meet, we agreed to designate the rider as the target group. To find out more about their problems, we had conducted an interview session with these respondents.

Respondent	Question	Answer
Muhammad Yasir 	1. What are the problems you want to be solved during riding? 2. What factor causes motorcycle crashes? 3. Do you have problems riding at night?	1. Bored because just see a road only, difficult to open Waze and answer the call during riding 2. Pothole and slippery road 3. Yes, it limits my vision
Muhammad Luqman Nul Haqim 	1. what are the problems you face when riding?	1. Difficult to use navigation and feel bored while riding for a long time
Joe Chenxing 	1. What sort of issues do you face while riding on a daily basis? 2. Do you find it easy to use your phone while riding motorcycle?	1. He felt bored while riding. Some junction in the corner blocked his sights. 2. No
Bader Hashim 	1. What sort of issues do you face while riding on a daily basis? 2. Do you ride for a long or just short time? 3. What do you feel you want during riding? 4. Do you find it easy to use your phone while riding motorcycle?	1. Bumps or slippery roads are a problem for him 2. For a long time 3. He wanted to hear the song but could not do it. 4. It is a problem

4.2. Define

According to the results of the respondents, there were similar problems faced by them. Therefore, we have listed possible solutions to the problem.

Figure 2 We are trying to find the solution

Problem	Pre-solution
Feeling bored while riding a motorcycle	There are speakers and microphones that can play songs as well as call
Difficult to use navigation or smartphone	Screen built-in visor
Damaged roads can cause accidents	Create a warning system to detect danger and road damage

4.3. Ideate

After had some discussions to figure out the possible solutions so that user needs will be fulfilled, we sketched the ideas on the drawing. This had illustrated on how the product will be produced as in figure 3 and figure 4.

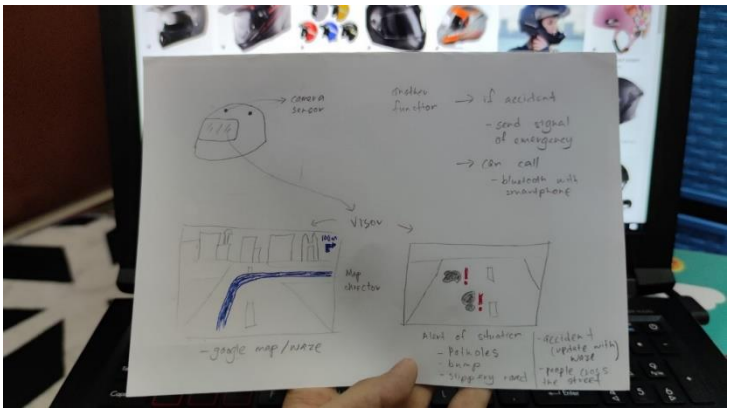


Figure 3 Draft produced by us

Figure 4 Heads-up Display

4.4. Prototype

Figure 3 Front of Smart Helmet

Figure 4 Side of Smart Helmet

From figure 4, there are 3 cameras used are main camera, infrared and lidar to get a picture of the road situation. Also, there is a built-in screen to display alerts and HUD. The screen we use is an optical head-mounted display just like in smart glasses.

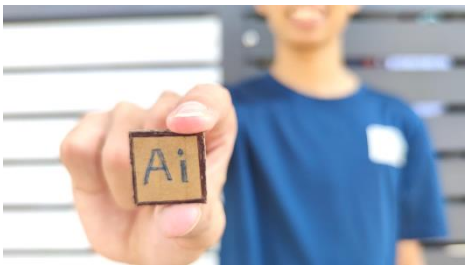


Figure 7 AI chipset

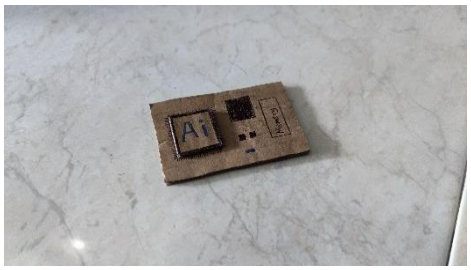


Figure 8 Motherboard

We have developed an artificial intelligence to analyze road conditions and give warn.

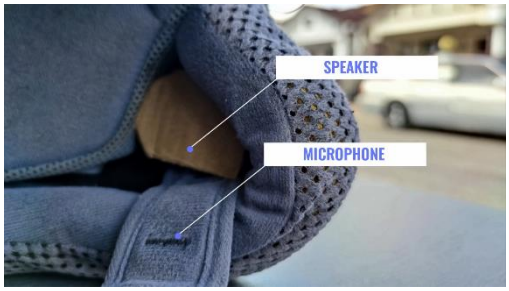


Figure 9 Inside of Smart Helmet

In addition, we added speakers and microphones to listen to songs and answer calls.

4.5. Test

Here we tested the smart helmet to make sure it runs smoothly and has no problems. We also wanted to ensure that the problems faced by this group can be solved.

Figure 10 Naim became the first to try

Figure 11 Play music

Figure 12 Warnings are issued for potholes

Figure 13 Use google map without looking at the phone

From figure 11, the song can be played with the help of a voice assistant such as Google Assistant. So, based on our test results on this smart helmet, it went smoothly and has achieved our mission.

5. Reflection

5.1. What is your goal/dream with regard to course/program?

Goals are of two types with regards to this course/program. These are short term goals and long term goals. Short term goals have the ability to provide us instant gratification. So,we feel much more confident after accomplishing the short term goals. Short term goals work very well for students of all ages because everyone loves the feeling of accomplishment. For the long term goals, these are the ones that take us to our final dream or destination and comprise a longer period of time which can be even many years. Short term goals according to experts are stairs of our long term goals. We can accomplish our short term goals which will lead us to our long term goals and we will always be on track. So our short term goal is to learn as much we can from this course from different sources and implementing the knowledge that we gather from here is our long term goal.

5.2. How does this design thinking impact on your goal/dream with regard to your program?

Well, this design thinking has noticeable impacts on our goals/dreams with regard to our program. So, the first thing that we did for the design thinking is thinking. So as we are different individualist, our ability to think is different and all of us have different types of ideas. So when all of us combined work on this project, we shared our thoughts with each other. As a result of this we came across new ideas and got to know about each other's potential. We also could enrich our participation skills and also leadership qualities, and could make friends from different countries too. And the last but not the least thing is gaining a good amount of confidence. We could understand that we also have the ability to innovate something using our knowledge and skills. And if our design thinking project becomes successful, then it can contribute greatly to Malaysia at first and then the whole world hopefully.

5.3. What is the action/improvement/plan necessary for you to improve your potential in the industry?

As a student and future's hope, we really need to gain so much knowledge and experience to widen our point of view towards Information Technology (IT). In addition, it is important for us to enhance and develop our skills such as technical and behaviour-based skills. The technical skills learned on-the-job and in college such as programming and project management can provide us with the knowledge needed to perform our tasks. These skills can be developed by joining any activity, seminar and competition, so that we are not only can give opinion but also active in offering another skills to the industry. Meanwhile, the behaviour-based skills like communication and leadership help build positive relationship between co-workers and clients. This healthy working environment is a meant much to push our country's economy further. This is because, we can give great cooperation among workmate and the clients by having this kind of skill that can be improved since in study life.

6. The Task for Each Member

Name	Matric No.	Video	Report
Muhammad Naim bin Abdul Jalil	A20EC0096	1. Edit Video 2. Record Video 3. Build prototype	Section 3.1, section 3.2, section 4.1 (respondent 2), section 4.2, section 4.3, section 4.4 and section 4.5.
Muhammad Yusri bin Yusoff	A20EC0102	1. Edit Video 2. Record Video	section 1, section 2.4, section 3.1 and section 4.1 (Respondent 1)
Ebrahim Abdullah Ahmed Alnuzaili	A20EC9103	1. Record Video 2. Presenter	Section 3.1, section 4.1 (respondent 3 and 4)
Nurul Huda binti Nor Din	A20EC0126	1. Record Video 2. Subtitles	Section 2, section 2.1, section 2.2, section 2.3, section 2.5 and section 5.3
Nafis Ahmed	A20EC4044	1. Record Video 2. Arrange Music	Section 3.1, section 5.1 and section 5.2

7. References

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Muhammad Marizwan, A., & András, V. (2012). Motorcycle fatalities in Malaysia. *IATSS Research, 36*(1), 30-39. doi:https://doi.org/10.1016/j.iatssr.2012.02.005

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