UNIVERSITI TEKNOLOGI MALAYSIA

SCHOOL OF COMPUTING

Faculty of Engineering

SECP1513 – TECHNOLOGY & INFORMATION SYSTEM

DESIGN THINKING REPORT:

SYSTEMS ANALYSIS AND DESIGN

SECTION : 08 – 1SECR

COURSE NAME : BACHELOR OF COMPUTER SCIENCE – COMPUTER NETWORKS & SECURITY

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Introduction

What is Design Thinking?

Design Thinking is a thinking methodology by design that uses a step-by-step approach into solving problems in a user-centric way. It is especially efficient in order to get to the root of complex problems that are unclear and unidentified. There's no definite explanation for design thinking. It is an idea, an approach, a process, and a way of seeing the world. It has grown beyond the confines of any individual person, organization or government. Design Thinking can be utilized by understanding and empathizing clients' needs and wants, by looking at a problem in a different perspective that revolves around humans, by executing brainstorming sessions to create many ideas, by implementing the ideas into a physical prototype, and testing the prototype on the client to improve on flaws and defects.

This report will revolve around the five phases of Design Thinking model which was proposed Hasso-Plattner Institute of Design at Stanford (d. school). According to d.school, the five phases of Design Thinking are as follows: Empathise, Define, Ideate, Prototype, and Test.

Problem Statement

In our design thinking process, we were given one topic to discuss on, which is System Analysis and Design (SAD). First, we define what is SAD itself. A system is a collection of activities and elements organized to accomplish a goal. Systems analysis and design is a six-phase problem-solving procedure that makes up the systems life cycle. The cycles are preliminary investigation, system analysis, system design, system development, system implementation and system maintenance. These steps are being embedded in real life system building. However, for our design thinking, we use the current phases order for us to come out with a solution system.

Based on our initial survey, we found a few problems that may be faced by the person we interviewed which are coins changing and calculation process. This will be elaborated more in *Define* phase later on. So, we come out with a question, what system can be created to overcome those problems?

We see the problem on wide lens of view. Therefore, we decided to create a system which can perform calculation for the items bought fast and accurately. Since that all of our team members know how to use a C/C++ Programming Language to develop a program, we initiate our ideas without no more delays.

Work Plans and Progress

During this level, we conducted a lot of meetings and discussions in order to achieve our goals in design thinking process. Each of the deliberations are recorded within a timeline to ensure we are on accurate development path.

Meeting Minutes

Meeting Information

Date: 2 October 2019

Time: 9 pm – 10 pm

Venue: WhatsApp

Attendance:

Az Mukhlis Iskandar bin Azli

Muhammad Iskandar Zulqarnain bin Mohd Ishak

Nur Nabilah binti Yusman

Meeting Agenda:

Item	Meeting Agenda	Action
1	Brief description of the assignment	• Our leader, Mukhlis was briefing about our design thinking assignment
2	e-book : (System Analysis & Design)	• Iskandar was shared an e-book for our topic in group WhatsApp

Meeting Information

Date: 5 October 2019

Time: 10 pm

Venue: WhatsApp

Attendance:

Az Mukhlis Iskandar bin Azli

Muhammad Iskandar Zulqarnain bin Mohd Ishak

Nur Nabilah binti Yusman

Meeting Agenda:

Item	Meeting Agenda	Action
1	System Analysis & Design	• Iskandar was shared slide PowerPoint about our topic in group WhatsApp

Meeting Information

Date: 6 October 2019

Time: 2.30 pm – 4 pm

Venue: Dewan Seri Resak, Kolej Tun Dr Ismail

Attendance:

Az Mukhlis Iskandar bin Azli

Muhammad Iskandar Zulqarnain bin Mohd Ishak

Nur Nabilah binti Yusman

Meeting Agenda:

Item	Meeting Agenda	Action
1	Brainstorm session on how to present our topic system analysis & design - Look for user who faced problem in system - Find one method to solve our user problem	• Searching about system analysis & design • Discuss and exchange idea about how to solve the problem
2	Distribution of tasks in report and video	• Mukhlis - explain system analysis & design • Iskandar - design thinking assessment points • Nabilah - step and descriptions in design thinking and evidence for each phase
3	Determine who we want to interview to ask about system-related issues	• We decide to interview the aunty who runs the business in N28

Meeting Information

Date: 7 October 2019

Time: 12 pm – 2 pm

Venue: School of Computing, N28

Attendance:

Az Mukhlis Iskandar bin Azli

Muhammad Iskandar Zulqarnain bin Mohd Ishak

Nur Nabilah binti Yusman

Meeting Agenda:

Item	Meeting Agenda	Action
1	Interview the aunty: - Ask the problem that she faced - Suggest our method to her	• The aunty agreed on the proposal
2	Prototype for system analysis & design	• We used programming to create our prototype
3	Shoot video for design thinking	• Mukhlis – video editor

Meeting Information

Date: 9 October 2019

Time: 9 pm

Venue: WhatsApp

Attendance:

Az Mukhlis Iskandar bin Azli

Muhammad Iskandar Zulqarnain bin Mohd Ishak

Nur Nabilah binti Yusman

Meeting Agenda:

Item	Meeting Agenda	Action
1	Team status updates	• We were finalizing that our report and prototype. For our video still in progress.

Design Thinking Phase

Empathize

Empathy is the involvement of considerate another person's thoughts, moods, and condition from his or her point of view, rather than from one's own. Empathy simplifies helping behaviours that come from within, rather than being forced, so that people behave in a more concerned manner.

Although there may be individual variances in empathy based on genetic differences, research suggests it is possible to boost the capacity for empathic understanding. In recent years neuroscientists found the terms of ‘mirror neurons’ which are believed to enhance the capacity to display, read, and impersonator emotional signals through facial expressions and other forms of body language. Mirror neurons may help individuals share emotional experiences and become more empathic toward others.

In design thinking, empathize more narrowed to ask people around about the problems they experienced and understand the problem. We try our best to get into the mind of client as well as picturing what is wanted. We conducted an interview to person and they elaborated on the difficulties. Then we started to define the problem

Previously, we have done interviewing our chosen individual, which is one of the people in School of Computing’s building. The details are as below:

- Name : Puan Rohana
- Age : 54 years old
- Background : A business woman who own a shop and managing all the finance and affairs of the works

Figure 1 shows we interview our client

Define

During the define phase, we analyse in detail, interpret the outline info from empathize step and then define clients need. In this stage, we force all the information we have gathered in the first stage and organizes, interprets and makes sense of it. This lets to express the problem that is at the essential of the design challenge. Meaning, we have to define an actionable and meaningful problem statement that needs to be solved. This design challenge will guide the designer and kick-start the ideation process rather than just defining learning objectives. This stage is about clarity and focus. Therefore, each of questions that we asked to our clients will be taken into maximum consideration. For example, we asked about the difficulties in managing the shop to the client we interviewed. So based on her elaborations, we may come out with various initial solutions.

Ideate

Imagine research ponder, create a vision, creative, brainstorm. Ideate refer to group discussions to come up with ideas and ways to solve problems. For those who do not know, idea also a creative and concentrated process for those involved to give an environment that facilitates free, open, and the non-judgemental sharing of ideas. Besides, ideas are very helpful in solving user problems. This is because, we can produce a quality and user-friendly product based on brainstorming sessions. Thus, we gathered at most of time to ensure that our thoughts are successfully delivered to every team member.

Figure 2 shows that team members are discussing on the topic for solutions

Figure 3 shows our team members are brainstorming

Prototype

Prototypes are built so that designers can think about their solutions in a different way, as well as to fail quickly and cheaply exploring multiple iterations of designs, so that less time and money is invested in an idea that turns out to be a bad one. Here also we apply creativity to create physical design with an initial illustration to a real one. Prototypes can be submitted for testing and feedback, leading to better experiences for the business and for users. That is why prototyping is a fundamental skill for any system analyst and designer to come out with the best results which is appealing to the end user or clients.

Specifically touching on our hands-on project title which is System Analysis and Design, we create and design a system which satisfies the need of our client. By referring to our client's background, we build a system that can display menus and discounts of food, calculate final bills and print receipt.

Figure 4 shows that our team members are doing prototype

```
==================++++++==========================
          RESTAURANT ORDER SYSTEM
==================++++++==========================

          ~~Welcome to AIN.Co Restaurant~~

          ************************
           1. Current User Mode
           2. Guest Mode
           3. Gross Profit(Admin Only)

          ************************
             Enter your option:
```

Figure 5 shows the system that we create for our client

```
---WELCOME TO OUR RESTAURANT!---


_____________________________________


What do you want to order?
1 Food
2 Drink
3 Dessert
4 Set
Your choice:
```

Figure 6 shows interface of the system

```
        Food            Food            Item
        Number          Name            Price(RM)

          1       Chicken Chop          12.30
          2       Burger                10.50
          3       Cheesy Wedges         5.75
          4       Fried Chicken         4.20
          5       French Fries          3.95

Your choice (press 0 to cancel):
```

Figure 7 shows interface of the system

```
Generating your receipt...


********************************************************************************
                              Bill
********************************************************************************
               AIN.CO VAR. CUISINE RESTAURANT
                 PARAMOUNTDIGM MALL, NEW JAUHAR
                 1SECR (M) Sdn. Bhd. (15011-U)
               Level 85, No 176, Jaya Sprint Street,
                   90432, JAUHAR, SOUTH DIAMOND
                       Tel: 07-8752916
                        www.ain.com

                   Sat Oct 12 08:36:47 2019


________________________________________________________________________________
Product                 Qty     Price(RM)
Chicken Chop            1       RM12.30
Fried Chicken           2       RM8.40
Fries                   10      RM39.50
Iced Coffee             12      RM62.40
Chocolate Cake          3       RM9.60
Durian Ice Cream        5       RM13.75
_____________
Total Price                     RM145.95
Paid:                           RM150
Changes                         RM4.05

YOUR ORDER HAS BEEN PLACED.
YOUR TURN NUMBER CODE IS 0001
PLEASE PICK UP YOUR FOOD AT COUNTER WHEN IT'S YOUR TURN.
THANK YOU!

Press any keys to finish...
```

Figure 8 shows interface of the system

Test

Testing is quite simply. The process of testing your prototype on real users. During the phase of testing, you will see how your target users interact with your prototype and gather valuable feedback. You will learn where your prototype succeeds and where it needs to be improved. The insights gathered during the testing phase will enable you to iterate on your prototype. Plus, review design for flaws and utilize feedback to make revisions are also important to serve better fallouts.

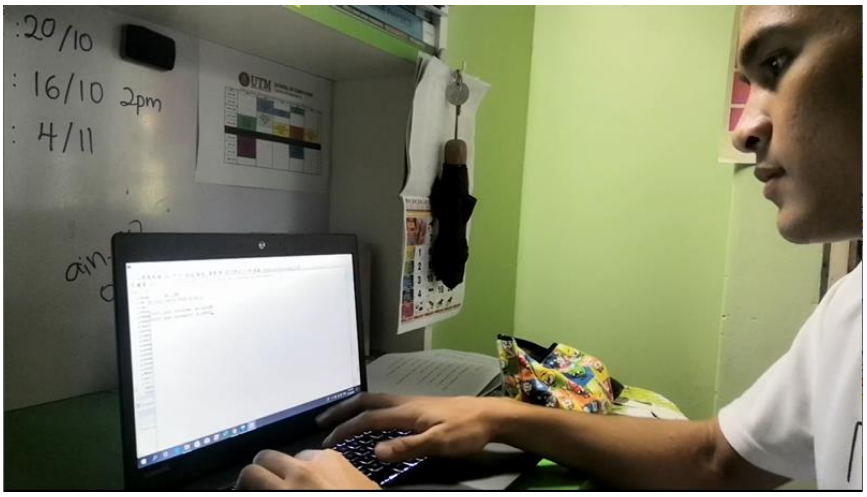

Figure 9 shows a user is testing our system

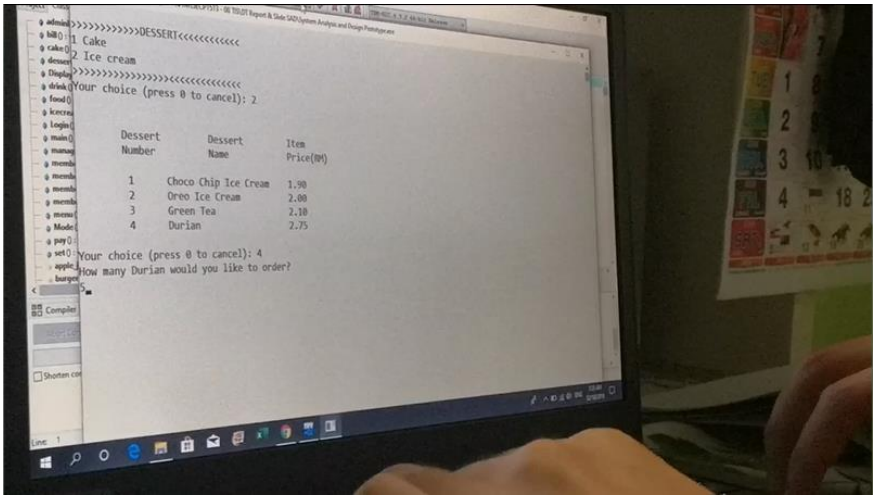

Figure 10 shows the system part tested by user

Assessments

Assessments divides itself into several phases to be considered. It is first initiated by plan, then followed by learn, analyse, share and finally, act. During our design thinking phase, we considered these elements to be included in our assessments between design thinking phases.

Phase	Assessments
Empathise	We managed to plan an interview with our client and analyse what is her problem.
Define	
Define	Once the problem was inspected, we come out with solutions and ideas to solve it.
Ideate	
Ideate	Creative thoughts lead to a better starter on creating prototype and we learn how the prototype works.
Prototype	
Prototype	Finalizing the project and do the act of finding end user to test the prototype.
Test	

Overall, at the end of project we perceived that design thinking process gave us the biggest influence on the way we document a project form beginning until the end. This is due to a systematic way on defining the problems until the problems were solved.

Reflections

Group Leader – Az Mukhlis Iskandar

Generally speaking, for my goal/dreams with regard to this course, it is to my intention to grasp basic knowledge and understanding of Computer Network and Security in order to fully develop and enhance my skills as a computer science student. However, precisely speaking, what I hope to gather from this course is the ways to prevent or stop cybercrimes or attacks from occurring so that the well-being of people's lives can be preserved.

Design thinking helps me develop a process to solve complex problems in an unconventional way. Throughout my life, I have been taught to do a problem-based solving method to solve ill-defined or unknown problems but design thinking adds a whole new perspective to look at whenever I encounter a problem regarding online issues.

To improve my potential in the industry, it is necessary for me to indulge myself into the intricate world of computer science. Gaining a lot of experience and staying consistent with my process of learning can help me to hone and sharpen my skill set while refining my capability as a functioning member of the industry.

Member(s) – Nur Nabilah

I hope one day, I'm able to inspired other people to use technology as a catalyst in industry. For your information, design thinking is one of the most creative ways to solve problems. This is because, 5 phases in design thinking can encourage more innovative industrial workers. The actions I need to take to improve my potential in the industry are being open to new ideas and experiences, and constantly looking to improve my skills and knowledge.

Member(s) – Muhammad Iskandar Zulqarnain

To this present day, an era of technology globalisation is taking part all around the globe. This include all aspect of life such as education, medication, transportation, communication and many more. Therefore, it is important for us to put ourselves in a place whereas we are growing together with the time. Since that I have been involving myself in Computer Networks and Security course, I am looking forward to gain more knowledge so that I can apply it to future undertakings which leads to positive impact.

In order to achieve my goal, I found that design thinking process contribute major percentage. With 5 phases that we encountered; I may come out with the most effective solutions to my problem in my current course. For example, if I want to establish new networking area, I must know the organisation's needs. Then only I develop the system without any loss.

Besides, I need to boost my soft skills to grow brilliantly and perform in the industry later on. This can be done throughout the years in my first Bachelor's Degree where the university itself already assist the platform via career centre to develop your aids in industry.