



Faculty of Applied and Creative Arts

**UX DESIGN OF AN INDOOR NAVIGATION SYSTEM FOR A
SHOPPING MALL, ONE UTAMA, KUALA LUMPUR**

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**Bachelor of Applied Arts with Honours
(Design Technology)
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**UX DESIGN OF AN INTERACTIVE INDOOR NAVIGATION SYSTEM FOR ONE
UTAMA SHOPPING MALL, KUALA LUMPUR**

YEOH YEN KOI

This project is submitted in partial fulfillment of
the requirements for the degree of Bachelor of Applied Arts with Honors
(Design Technology)

Faculty of Applied and Creative Arts
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Final Year Project Report

Masters

PhD

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ABSTRACT

This project discusses the user experience design (UXD) for the indoor navigation system in the One Utama Shopping Mall, Kuala Lumpur. The purpose of this research is to identify the importance of user experience design and the way customers navigate within a shopping mall. The methods of investigation involved in this research include survey and visual analysis. The design of proposed interactive navigation system can help users to find the store and the place they want to go more easily. In addition, a special feature such as AR function also added into the One Utama app to let the users access the navigation in a more fun and interactive feature.

ABSTRAK

Projek ini adalah berkaitan reka bentuk pengalaman pengguna terhadap navigasi interaktif peta di dalam pusat membeli-belah terkemuka, One Utama, Kuala Lumpur. Tujuan penyelidikan dijalankan adalah untuk mengenalpasti kepentingan pengalaman pengguna terhadap pelanggan pusat membeli belah. Kaedah penyelidikan yang dijalankan termasuklah survei dan juga analisa visual. Rekaan aplikasi navigasi interaktif ini dapat membantu pengguna mencari kedai serta tempat yang ingin dituju dengan lebih mudah. Selain itu, fungsi AR juga ditambah ke dalam aplikasi mudah alih untuk membantu pengguna bagi mencari kedai dengan cara yang lebih menyeronokkan dan lebih berinteraktif.

CHAPTER 1

INTRODUCTION

1.0 Background of study

The Global Positioning System also known as GPS is a navigation system that use satellite to function. It functions 24 hours every day, every time and everywhere no matter how the weather condition and it is free of charge. At first, this system was introduced for military purpose but in 1980's, it was generally made available to civilian use (Garmin, 2017). Nowadays, every smart phones had installed a GPS system in their phones. With one click, people are able to find out the location where they want to go. It is very convenient and save time too.

However, this system can only perform well at the outdoor whereby indoor such as campus, hospitals or in office building, the GPS data are sometimes not reliable and they cannot guide the consumers to an exact location too (Barberis, Bottino, Malnati & Montuschi, 2013). Thus, many people will still get lost inside a building.

Therefore, a good usability experience (UX) is very helpful to the users. So, what is UX design? UX design is to take into consideration of every possibility that the users will take and understanding the user's needs when they experience about something that is new to them. By enhancing the UX design, communicating plays an important part on the navigating route. To ensure the effectiveness, a good UX enables users to find their way easily through the apps. As Barberis, Bottino, Malnati and Montuschi (2013) mentioned, navigation information should be make clearer, in order to reduce the burden of cognitive load.

This research generally aimed to describe the UX design of an interactive indoor navigation system for a shopping mall.

1.1 Problem Statement

Who has never faced the problem of getting lost at somewhere or could not find a specific store inside a building. Many smart phones nowadays had installed a Global Positioning System (GPS) in it however it only can be functioning well at outdoor whereby indoor is unavailable to provide an accurate data to the users. This problem not only faced by the outsider such as visitors or tourists but also the locals too. Although some building does provide a map directory

that can help the users to solve their problems but the interface design somehow will affect the usability of it. Thus, this research is generally aim to create a platform for an indoor way finding system that teach the users how to go from point A to point B in a shorter time given and shows them where their location.

1.2 Research Questions

This research is based on several questions:

1. Why is it important to create indoor navigation mobile system?
2. What are the needs and the requirements for making the apps?
3. How to design a functional and user-friendly app?
4. How to make sure the indoor navigation system works well?

1.3 Objectives of the study

There are four objectives to be achieved at the end of the study:

1. To study how the indoor navigation system affects the users.
2. To analyze the usability, design and content issues of an indoor navigation system.
3. To design an indoor interactive digital directory and navigation system
4. To validate the effectiveness of the indoor interactive digital directory and navigation system.

1.4 Scope of the study

The research is being conduct at the chosen shopping mall, which is at One Utama, Kuala Lumpur. The reason for choosing this place is that it is the top 5 biggest shopping mall in Malaysia (Ng, 2014). Besides, it is also easy to carry out the research since the flow of the crowd will be quite high.

1.5 Target Audience

The target audience for this research will be the visitors of the One Utama shopping mall in Kuala Lumpur. The age of target audience is between 16 years old until 40 years old. This is because the purpose of this project is to ease the navigation for the users through digital interactive navigation system and mobile application.

1.6 Significance of the study

By carry out this research, it can solve the navigation problem in the shopping mall. Besides, it also helps the users to find a specific store in a shorter time given while shop in a huge shopping mall. Besides, this study also can help them to relocate themselves so that they would know their exact location in the mall and thus enjoy their shopping.

1.7 Summary

In conclusion, the navigation system at One Utama shopping mall still have some problems that causes the shoppers get confused at the shopping mall. Thus, the researcher decided to improve the user experience of the navigation system in One Utama shopping mall to help the shoppers to find the specific shops more convenient and faster.

CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

In this chapter, it will discuss about the importance of way finding and indoor mapping, the technologies of indoor navigation system, the difference and the importance of the UI and UX design and the usability of the apps, investigate the personas and the opportunity for mobile application development.

2.1 Way Finding

Traveling at an unknown country is no more a difficult task to human because there is a map and a GPS system that can helps to guide the tourist. Mautz (2009) said that indoor way finding system were aimed to navigate the user within closed environments. But sometimes the location of the map directory cannot be found is also a problem. Therefore, a good way finding system is very important and if it was installed on personal device will be better. Besides, it also helps to relocate some objects by using wireless concepts, optical tracking and ultrasound techniques (Koyuncu and Yang, 2010). As Ozdenizci, Coskun and Ok (2015) mentioned. navigation means leading the users from one point to another point through monitoring and showing the movement of an object from the original location to the destination along the path.

2.2 Indoor Mapping

After entering the indoor spaces, sometimes the GPS system does not support the data for providing the route map inside the building. Thus, many people will still be confusing and lost in a building although there is a map directory. Therefore, a good way finding can help a lot in planning a route and navigate its own way without wasting the unwanted times. According to Samataro (2013), indoor mapping has solved various problem as it expands more. For example, college students can easily find their way to the classroom and navigate the campus on their own. Visitors can get to reach a place without disturbing the staff on duty.

2.3 Indoor Navigation Technologies

Navigation technology is a system that helps the users to show them their pathway they want to go. These technologies may based on optical, sound, magnetic wave, satellite and so on (Farid, Nordin, and Ismail, 2013). According to Samataro (2013), GPS is not dependent on the satellites to provide an update on the locations. There are several ways of technologies to solve the indoor navigation system such as:

1) Wifi and Bluetooth

Bluetooth-based indoor navigation technologies seems to have a smaller potential in terms of the area but more accuracy and trustable data. Besides, according to Li, Zhuang, Lan, Zhang and Sheimy, (as cited in Fallah, Apostolopoulos, Bekris and Folmer, 2013) to apply a long term based location, wireless positioning technologies are more trustable on it.

2) Near Field Communication (NFC) internal

NFC is a short range wireless communication technology with bidirectional. It communicates when two devices near to each other within few centimeters (Ozdenizci, Coskun, Ok and Aydin, 2011). Although it is an innovative, friendly and low cost navigation technology but need to have a NFC mobile device and an installed indoor navigation apps (Ozdenizci, Coskun, Ok and Aydin 2015).

2.4 User Interface (UI) Design of a Mobile App

To create a mobile application, the design interface is very important. Before designing an app, several fundamentals need to be taken into serious consideration. Designers may sit down and observe how the users use and explore the functions of the apps. Some basic interface design can take into account such as below:

- Stay consistent with the design
- Design a familiar UI patterns
- Importance of visual hierarchy
- Simplicity

According to Treehouse (2013), consistency interface design and familiar UI enables the users easy to understand and thus increase the efficiency. Besides, the visual hierarchy of the interface also very important in terms of size, color, and placement of each element. Other than that, simplicity is also one of the key reasons to a better interface design. For example, WhatsApp messenger, Google search engine, Facebook and Apple iPhone are widely well known by the users because of their simplicity design. To achieve simplicity design, not only just leave some white space over the design or choosing minimal colors, designers need to put oneself in else's shoes to know and understand what the users really need in order to achieve their goals in the system (Wong, 2017). In addition, a good UI design not only can improve the usability of the app but also bring convenience to the users to complete their task on hand instead of wasting time to discover how the apps functioning (Paunovic, 2011). Therefore bringing benefits to the users while enjoying using the apps.

2.5 User Experience (UX)

According to Garrett (as cited in Plonka, Sharp, Gregory and Taylor, 2014), UX design is about how the product works and how to improve its functionality in real world. Everything that appear in our daily life has their own user experience. Thus, it involves with the Wireframes, sketches, user interface, research about user's behavior and characteristic, performing usability testing (Plonka, Sharp, Gregory and Taylor, 2014). To produce a successful mobile application, some important aspects need to be take into consideration. The understanding of the users' characterizations and users' behavior is very important to achieve the successfulness of the product yet can accomplish the users' needs (Armour, 2016). A good UX design of an app must help the user to accomplish their goal thus to encourage them to download the apps.

UX design consists of information architecture (IA), interaction design, visual design, usability engineering and designers tend to confuse them (Macefield, 2012). Information architecture (IA) is structure from a user's perspective and it focuses on the organization of data so to fulfill the requirements of the users. Furthermore, interaction design is the mechanism and interaction between the systems and the users so that users can meet their goals in a better experience whereby visual design is the interface of the system to make the system looks better. Usability engineering is about the testing process of the app. It is important to make sure the effectiveness of the design. Designers can go through interviews or questionnaires from the users to get the feedback for the usability testing.

2.5.1 UX Design vs Usability

User Experience (UX) design is about the understanding of what the users need and help them to get the information through the online interaction (Koopmans, 2013). Although experience cannot be created, but designers can design a solution for the users by enhancing the usage and interaction between the users and the applications. According to Marsh (2014) everything has a user experience not only mobile application but also the tools, vehicles, and other daily necessities too. However, designers are not to create the user experience but to make it better experience. On the other hand, usability also plays an important role in developing an app. According to Spool (as cited in Mifsud , 2011), UX design is all about the emotional connection with the way the users interact with the application whereby usability is the ability to achieve what the users want while surfing the software. Therefore, usability is not equal to UX design but is both essential to bring success for a mobile application. Hence, there are some simple steps on how to conduct the usability testing:

Step 1:

Designers need to ask themselves what is the main problem they want to solve and the goals they want to achieve. This could help them to find a better solution (Kurtuldu, 2017).

Step2:

Interviewing the user's opinion. This is a great way to help in the development of the app. Some questions such as the process on how they complete a task, how their