User Experience in Mobile Application Design: Utility Defined Context of Use

1Muharman Lubis, 1Edi Sutoyo, 2Muna Azuddin and 3Dini Handayani
1Telkom University, Jalan Telekomunikasi No. 1, Bandung, 40257, Indonesia
2International Islamic University Malaysia, 53100, Gombak, Malaysia
3Taylor University, 47500, Subang Jaya, Malaysia
Email: muharmanlubis@telkomuniversity.ac.id

Abstract. Mobile application has been offered tremendous benefit to the user in providing solution especially related to accessibility and availability. Product functions are important but with the better user experiences, it will have more advantages, which somehow increase its level adoption and retention within context. User experience (UX) is the outcome that this study want to achieve through implementing user centred design in the process by defining the set of methods and phases, which are loosely connected each other to solve the problem arisen. This study identified the lack of integration process within driving communities to have service in motorcycle driving practice, permission letter and rental.

1. Introduction

Today's IT development is growing rapidly due to its need in every aspect of life. The use of mobile devices as a supporting device for data management and processing is very important, especially for good data decision-making. However, technologies these days have become increasingly complex, and the functionality of applications and websites has become far broader and far more intricate. Thus, to allow the data management systems to maximise its utility with its users, the adoption of user experience (UX) design is crucial to guide the system development. In general, user experience is simply how people feel when they use a product or service. In broader perspectives, Nielson and Norman [11] defined UX as “all aspects of the end-user's interaction with the company, its services, and its products”. So, UX not only covers the design of the systems, websites or applications, but, the whole aspects that involve the products when it reaches to the users. UX design is used to improve user satisfaction when using a product or services. UX also used to increase the chances of a project's success when it finally comes to market. For example, applying UX design in development of web especially during user requirement phase [1, 2] is very significant, as it can focus on users’ preferences, issues and experiences. During the development phases, the system design should emphasize on several components such as accessibility, human factors, various types of design principles and system performance.

The adoption of UX design can help to improve users’ satisfaction in using the driving course registration system. This would bring better experience for the users to search information related to driving course registration, which it creates conveniences, accessible and increase utility of the system. Besides, it can be beneficial for both parties, which are users and the driving companies, to increase its productivity by saving cost, energy and time. Thus, this study select the user centre design (UCD) as the approach to deal with issues in the market demand and social environment with the purpose to
have prescription in designing the user interface briefly within business and social context through understanding the user requirement and system specification by utilizing persona with various scenarios. This study also denotes the creativity to facilitate the possibility to integrate mutually exclusive supported activity into single function package that can offer alternative path and intermediate solution to the some problems in motorcycle activities domain such as driving practice, examination of permission letter and ongoing rental.

2. Literature Review

The problem with software development is that technology-centric practices are more popular than user-centred practices. Based on a survey conducted by a group, they found that this problem led to a failed project because the development of the system was not focusing on users [1, 4]. In addition, previous website design were simple static pages that served up information to feed curious searchers. Currently, there are lots of online sites that are interactive and offer a much richer feel for users [12]. Thus, to increase the successful of a project system, the system should not only aesthetically beautiful but also should deliver its value, practical, pleasant, and useful. By applying user experience design in the process helps to ensure the users emotionally attached and satisfied when interacting with the systems [13]. According to Hartson and Bella [4], user experience is the amount of effect that a user feels because of interaction with, or the context of the use of a system, device or product, that includes usability, usefulness and utility impact during interaction or reflection of memory after it. On the other hand, the term "interaction with" is broad and includes the vision, touch and thought of the system or product, including its admiration and presentation before any physical interaction. This concludes that, UX does not cover only the design interface or use of a system or product, but it covers the whole aspects of the product development and delivery to its users.

Designing a user experience is a comprehensive term for all types of activities that provide a better user experience in utilising the application through the representative features. UX focuses on how to make the overall design feel for users. To achieve a positive user feeling using a website, the designer must understand the user's goals, desires, concerns, behaviours and ambitions. UX plays a role in determining how users feel when they interact with products that can produce positive or negative results. So, the process of evaluating user experience can help to improve the quality of an application or to filling gap by identifying the appropriate elements [5, 6].

According to Soegaard [12], there are seven factors in UX; useful, usable, findable, credible, desirable, accessible and valuable. Useful is related with the degree of meaningful, purposeful and worth of a system towards its users. Therefore, usable is concerned with enabling users to achieve
their end objective with a product effectively. Meanwhile, findable refers to the idea that the product must be easy to find. For example, of digital and information products, the content within them must be easy to find. On the other hand, credibility relates to the ability of a user to trust in the product. It means that the system does not only relate the job it is supposed to do, but also that it will last for a reasonable amount of time and that the information provided with it is accurate and fit-for-purpose. Furthermore, the desirability is conveyed through branding, image, identity, aesthetics, and emotional design. Afterwards, accessibility is about providing an experience which can be accessed by users with a full range of abilities. This includes those who are disabled in some respect, such as the hearing, vision, motion, or learning impaired. Lastly, the system must deliver value. It must deliver value to the business which creates it and to the user who buys or uses it. The main method used in UX is User-Centred Design (UCD), which is designing with the users’ needs and expected behaviour in mind [12]. Figure 1 presents the phases involved in UCD method. In this method, there are techniques that can be used to collect data from users, such as card sorting, expert review, eye movement tracking, field studies, usability testing and personas [12]. These techniques were proven to provide great results in many UX projects [12].

Under the UX design, there are usability aspects. Usability commonly used by academicians and practitioners to determine set of rules and principles to evaluate the quality of a system. According to Norman [11], usability is a “quality attribute that assesses how easy user interfaces are to use. The word "usability" also refers to methods for improving ease-of-use during the design process.” The main five core of usability factors are: learnability, efficiency, memorability, errors and satisfaction. Another main key is utility, which refers to the design's functionality or practical to be used [11]. Usability commonly used to evaluate user’s expressions, likes/dislikes, needs and understanding of the system. There are many methods for studying usability, but the most basic and useful is user testing [11]. Usability testing is performed to check the outcome of specific task and evaluating the usability aspects through inspection for the application that has been developed. For example, usability testing can be conducted by observing and interviewing users that interact with a system. Other investigation methods that can be used in usability studies are field monitoring, focus groups, recording of actual use, proactive field studies and questionnaires that examine user requirement and specification according to certain scenarios [8, 10].

Currently, the concept of usability is outdated. This is because the new ideas of user experience (UX) have override the usability. Yet, there are usability factors that remain in UX. For example, ease of use and useful, are very important in most software and many commercial products. The concept of user experience still illustrates all these useful elements, as a result, the ease of use can be performed extremely well [2]. On the other hand, measured usability criteria address efficiency, efficiency, security, utility, learning, and information retention, which focuses on how long it takes to remember the most common tasks of the product, either technical element and user satisfaction [14]. Meanwhile, utility is extremely important because it defines the conceptualization and functional requirement of the interface that will lead to mock-ups or prototype in the iterative cycle of revision [15].

3. Research Methodology

In this study, focus group and participatory design were used. This method is used to evaluate the success of a three-dimensional frame through attitudinal versus behavioural, quality versus quantity and the context of use [7]. In addition, the approach has relevance and align with the principle in usability that has been defined - ease of use and acceptability of application. In the data collection, the user needs to execute tasks within a certain context [8, 9]. The users, which are, students have been categorised under different groups with the purposes to define the utility, capability and capacity of motorcycle application, which utilises mobile as the platform. In short, it is expected to have functions to provide and offer service for driving practice, rental motorcycle and driver’s license, which is called utility. The group conduct focus group at particular time and day with selecting 5 (five) other students from different class to discuss their responsible utility that take around 30 minutes. Due to accessibility to the The process have been recorded with video form by using mobile phones to capture
the expression, intonation and content of communication within the activities. Afterwards, the participatory design was implemented in the class through presentation and test drive to evaluate operational, representational and interaction design of the utility-based for mobile application.

4. Discussion

Currently, to register for driving courses, it requires customers to be onsite or in the specific location or within physical building or through phone calling. Yet, it makes the customers to spend their valuable time to do every phase of registration such as administration, photocopy, walking, etc. where the length of time depend on the available quota or queuing or waiting time in specific process. Thus, it is necessary to develop an application that present driving courses offered by the company in online approach so the customers can access anywhere, at any time, by any one and with any device. This application is expected to have necessary management information system that will accumulate and handle the complaint as the customer support as well proving reliable information before download and install the mobile apps in the respected devices. The availability means in here, the personal computer also can access the same features in the website when the user want to have wide or intense feeling of user experience. By doing this, the user also can have more freedom to express certain idea or feedback to the admin in relation to the process of improving the application quality. However, the main objective of this application is to proving mobile and agile experience, so the website, in this case only provide alternative approach and supportive environment to access the system. Therefore, the user requirements is not limited only for the driving practice, but beyond that. As mostly the participant want to have better look on other further and required task process such as independent trial routine, understanding of motorcycle’s spare-parts, the awareness in the driving ethic and traffic conditions, it is necessary to have other functions of motorcycle rental and driving permit examination.

Figure 2: Mobile User Interface for the Utility of Driving Practice
Figure 3: Mobile User Interface for the Utility of Rental Motorcycle
By having the integration of relevant and mutually exclusive activities, the application can provide more accessibility and availability of features to enable better focus in finishing the task, despite the alternative platform have been done. Thus, the utility pose more important factor to define the context of use and determine the necessity in the process of mobile application. By following the current technological developments, this study create a list of online driving courses, the type of motorcycle that can be rented and the requirement for taking the exam. So that customers do not need to come to the registration place to register for car courses and choose training schedule. This system able to support the company, which it can help to promote the company to wider community. Besides, it also can increase the revenue of that companies, by saving its costs, energy and time for both companies and customers. This application has several functions which is developed into several modules, while in this phase focusing first for driving practice, rental and license, to make it easier for customers to register and choose a training schedule [Figure 2, Figure 3, and Figure 4]. Meanwhile, customers can also find driving tips and tricks based on experiences that can be shared massively and they can also take care of the licensing process for a driving license that will be assisted by related parties.

Another important activities to be analysed properly is related to database design, which in this case this study implemented entity relationship design (ERD). This process can help the developer to add or remove certain part of feature easily without implicate negatively to the performance of the system. The ERD also explain the dependability between each object in the database that composed of entity types to represent everything necessary in order to perform particular business. For this case, there are 4 (four) entity sets to be stored in the database, which are customers, transaction, document and SIM (driving license). Therefore, the relationship in the application hold specific roles in the module developed, so the future utility to be defined also influence the arrangement of modules to be analysed, then to design specific entity, which related to the relationship, roles and cardinalities. Afterwards, UX is a positive emotional reaction to the interaction between unique products and sales ideas, which aim to create product that causes pleasant and warm feeling of reaction in utilization process. Meanwhile people's needs, perceptions and emotions are very subjective, even interpretative and diverse but depends on the physical and social context [16, 17].

5. Conclusion
The mobile application become the future in the system development with its nature of availability and accessibility, that mostly people find out more supportive and pleasant compare to other kind of platform. Therefore, this study argue that the utility should be the first of priority to define the context of use instead of usability to provide more value added in the user centre design method. After all, future application programs that are made can also be used as material for further research in related
fields. With certain adjustments, the method used may also be used for modelling systems in general which are not limited to information systems access modelling systems for registering driving courses.

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**References**

[1] Lubis M and Azizah AH. 2018. Towards Achieving the Efficiency in Zakat Management System: Interaction Design for Optimization in Indonesia. *User Science and Engineering*, pp. 289–301.

[2] Orlova M. 2016. *User Experience Design (UX Design) in a Website Development: Web Redesign*. Bachelor’s Thesis. University of Applied Sciences.

[3] Von Saucken C, Reinhardt J, Michailidou I and Lindemann U. 2013. Principles for User Experience Design: Adapting the TIPS Approach for the Synthesis of Experiences. *Proc. of 5th IASDR*.

[4] Hartson R and Pyla P. 2012. *The UX Book: Process and Guidelines for Ensuring a Quality User Experience*. Waltham: Elsevier.

[5] Hellweger S and Wang X. 2015. What is User Experience Really: towards a UX Conceptual Framework. *Multi Conference of Engineers and Computer Scientists*, vol. II, March 18-20.

[6] Loboda O, Nyhan J, Mahony S and Romano DM. 2018. Towards Evaluating the Impact of Recommender Systems on Visitor Experience in Physical Museums. *Int. Conf. on HCI with Mobile Devices and Services*.

[7] Rohrer C. 2014. *When to Use which User-Experience Methods*. Nielsen Norman Group.

[8] Cruz YP, Collazos CA and Granollers T. 2015. The Thin Red Line between Usability and User Experience. *Proc. of the ACM Int. Conf. on HCI Article No. 46*.

[9] Bevan N, Kirakowski J and Maissel J. 1991. *What is Usability? Proc. of Int. Conf. on HCI*. Stuttgart.

[10] Ardevol LM. 2013. *User Experience Methodology for the Design and Evaluation of Interactive Systems*. PhD Thesis, Universitat de Lleida.

[11] Norman, D and Nielsen, J. 2014. Definition of User Experience. Accessed at: https://www.nngroup.com/articles/definition-user-experience/

[12] Soegaard, M. *The Basics of User Experience Design*. Interaction design Foundation.

[13] Preece, J., Sharp, H. and Rogers, Y. 2015. *Interaction Design: Beyond Human Computer Interaction, 4th ed.* John Wiley and sons, UK.

[14] Abras C, Maloney-Krichmar D and Preece J. 2004. User-Centered Design. *Encyclopedia of Human Interaction*. Thousan Oaks: Sage Publication.

[15] Roth RE, Ross KS and MacEachren A. *User-Centered Design for Interactive Maps: A Case Study in Crime Analysis*. *International Journal of Geo-Information* 4(1): 262-301.

[16] von Saucken, C, Lachner F and Lindemann U. 2014. Principles for User Experience: What We can Learn from Bad Examples. *International Conference on Kansei Engineering & Emotion Research*.

[17] Lachner F, von Saucken C, Mueller F and Lindemann U. 2015. Cross-Cultural User Experience Design: Helping Product Designers to Consider Cultural Differences. *Proceedings of Int. Con. of HCI*. 