LOCALIZING USER EXPERIENCE FOR MOBILE APPLICATION: A CASE STUDY AMONG USM UNDERGRADUATES

Jap Show Fong[1], Lok Li Ching[2], Khor Choon Chiat[3], Nurul Hashimah Ahamed Hassain Malim[4], Mohd Heikal Husin[5] and Manmeet Mahinderjit Singh[6]

[1]*Universiti Sains Malaysia, Malaysia, jsfoong.ucom12@student.usm.my*
[2]*Universiti Sains Malaysia, Malaysia, llching.ucom12@student.usm.my*
[3]*Universiti Sains Malaysia, Malaysia, kcchiat.ucom12@student.usm.my*
[4]*Universiti Sains Malaysia, Malaysia, nurulhashimah@usm.my*
[5]*Universiti Sains Malaysia, Malaysia, heikal@usm.my*
[6]*Universiti Sains Malaysia, Malaysia, manmeet@usm.my*

ABSTRACT. The increasing number of mobile devices consumptions, especially mobile phones and smartphones had caused a growing interest in the user experience research on the mobile platform. However, it is difficult to gain an encompassing understanding of the user experience especially from a localized context. This paper presents our survey finding on the understanding of user experience among USM undergraduates. The research finding identifies that a respondents' field of study has some influence on their understanding of user experience. Overall, the respondents tend to agree that user experience is subjective and based on the individual's interaction with an application. The ISO definition of user experience is discussed and compared with the survey results. The comparison highlights that the definition of user experience is similar with the ISO's definition of user experience.

Keywords: user experience, user satisfaction, application performance, application design

INTRODUCTION

The International Telecommunication Union estimates that there are nearly 7 billion mobile subscriptions worldwide by May 2014. This estimate is equivalent to 95.5 percent of the world population (MobiForge, 2014). The statistic indicates that almost everyone in the world uses a mobile device that indirectly triggers an increased in the development of mobile applications. This increase could evidently be seen in the exponential growth of the mobile application development since the launch of the Apple app store in July 2008 (MobiForge, 2014). The variety of choices of mobile applications makes the mobile application market competitive. Thus, the user satisfaction and experience has become a crucial aspect in determining the success of mobile application (Chen & Zhu, 2011). User satisfaction is referred to as the level of happiness of users while using any products or services (Law et al., 2009). The user satisfaction indirectly reflects the quality of the products or services provided to the users, and it is generally difficult to measure. This difficulty is due to user satisfaction depends on the emotional level of the users while using the product or service (Swallow, Blythe & Wright, 2005). There are external factors that influences the emotion of the users before using the products or

services, and subsequently causes the users to feel satisfied or dissatisfied with the their usage. The interest of users while using mobile applications is imperative from a sustainability perspective. Therefore, the users' satisfaction and experience with the mobile application needs to be measured effectively so the software developer's effort will not be in vain. Many researchers have examined the user satisfaction and experience on mobile application such as Chen and Zhu (2011), Law et al. (2009), Swallow, Blythe and Wright (2005), Osman et al. (2012), Hu and Liu (2010) as well as Arhippainen and Tahti (2003). In the study by Hu and Liu (Osman et al., 2012), they suggested that the 'user experience' could impact the users' perception towards mobile games application. Their findings have been the underlying factor for mobile games developers to consider on a more appealing mobile game design for the users.

The work of Law et. al. (2009) provided the definition of user experience via a survey covering an enormous spectrum of users. These users are researchers and practitioners from academia and industry. Their finding indicates that 'user experience' is dynamic, context-dependent and subjective. Nevertheless, the ISO definition was found to be generally acceptable by their respondents. They also recommended that the "term user experience could be scoped to products, systems, and objects that a person interacts through as user interface". It was also highlighted that their definition is mainly influenced by socio-cultural factors such as countries of origin while years of experience and workplace does not play a major influence. In Malaysia, there are no existing studies, which focus on the interpretation of locals on the term 'user experience' in the context of mobile application. The closest existing study that is related to user experience is a study on smartphone usage by Osman et al. (2012). In their work, it was obvious that most of the smartphone users (60%) are within the age range of 17 – 26 and most of them are undertaking their bachelor degrees (Hu & Liu, 2010). Hence, this paper is aimed at understanding the factors that influence the user satisfaction and experience on mobile application from a local context (Malaysia). The investigation further focuses on Malaysian youths that reside within the specific age group that highly utilizes with smartphones. By identifying the factors that affects user experience on mobile applications, we hoped that this paper would help mobile application developers to have a clearer perspective on specific criterias or requirements that would enhance their mobile application experience.

BACKGROUND STUDY

The emergence of mobile applications has become vital in supporting human needs for information, communication or leisure (Ickin et al., 2012). The quality of user experience in such applications depends on factors such as application interface design, application performance, battery efficiency, phone features, application and data connectivity cost, user routine and user lifestyle (Ickin et al., 2012). These factors was determined after an in-depth investigation on various mobile applications such as Skype, Facebook, eBay, Worldwar and more.

Lim (2013) stated that user experience should be measured based on users' emotional response in terms of the intrinsic, semantic and symbolic attractiveness of a product. Similar observations was made by Chen and Zu (2011) where they highlighted that user experience is related to personal feelings that is subjective and complex. Hence, an accurate assessment of user satisfaction or user experience is made more complicated. Chen and Zu (2011) also hypothesized that the user experience of a user on mobile applications are affected by the user themselves, the software, and their context of use. They then proposed a four-dimension assessment system to capture user experience in an accurate manner. These dimensions are user characteristics, application properties, application system support and context parameters.

Based on Chen and Zu's (2011) case study of a music application reveals that the most influenced dimensions are the application properties and system support. This results are based on their finding that indicates that the overall quality of the application and its properties affect user experience specifically, on the level of quality and acoustic fidelity for the users. The speed of the mobile network and the phone's operating system also seem to be a high concern among the users as well.

Another work by Toshihiko Yamakami (2012) highlighted four factors that affect user satisfaction such as emotion, simplicity, ecosystem in the service and, the iterated improvement of the system. The emotion factor is a strong driving factor for human behavior hence they proposed that the mobile application design should address emotion engineering. On the other hand, emotion simplicity refers to the dissatisfaction felt by the user that led them to stop using the application. The ecosystem in the service focuses on facilitating users in creating their personalized satisfaction system. The last factor highlights the importance of the mobile application to be continuously improved according to the evolving users' requirements.

METHODOLOGY

The target group being focused in this study are university students undertaking their bachelor degrees within the age range of 19 – 25 years old. We decided to utilize our local study environment (Universiti Sains Malaysia) as a case study and distributed our survey online via Google Docs due to the widespread of the students within the campus. The questionnaire was made available to the respondents via a URL link. We promoted the online survey to USM students by posting the link on several Facebook groups that are made for the USM community, including USM Info Sharing Corner and USM Computer Science Intake 2012/2013. Besides that, personalized invitations to some USM students to answer the questionnaire was also made by sending them the link for the questionnaire using the messaging service on Facebook. The response duration for the questionnaire was limited to two weeks.

RESULTS AND DISCUSSION

Respondents' background

A total of 94 respondents from various course backgrounds responded to the online survey. Table 1 shows the general profile of the respondents.

Table 1. General profiles of the respondents

Variable	Frequency	Percentage (%)
My field of study/ expertise is …		
Computer Science	41	43.62
Art	11	11.70
Applied Sciences and Engineering	9	9.58
Other	33	35.11
My understanding with the term "user experience"…		
Fully understand	11	11.70
Mostly	49	52.13
Little	27	28.72
Not at all	7	7.45
My experience with mobile phones		
1 year	3	3.33
2 years	7	7.78
3 years	23	25.56
More than 3 years	61	63.33

There is a variation in the number of years of experience with mobile phones. Many of the respondents reported they had 3 years of experience with mobile phones (mode = 3 years) while most of the respondents had more than 3 years of experience with mobile phones (64.89%). The mean for number of years of experience with mobile phones is 5.88 years while the standard deviation is 16.49. The mean signifies a wide variation in the number of years of experience among the respondents. Among the 61 respondents who reported having more than three years of experience with mobile phones, 12 of them reported having ten years or more experience with mobile phones. Only ten respondents (10.64%) had less than three years' experience with mobile phones where the number of respondents with 1-year experience and two years' experience are 3 and 7 respectively.

From the survey, 11 respondents (11.70%) indicated that they have a full understanding of the term 'user experience'; whereas another 49 respondents reported to understand mostly the meaning of the word. The result shows that most of the respondents had a good understanding of the concept of 'user experience'. However, there were seven respondents who claimed they do not understand the term 'user experience' at all. We are interested to find out if there is any relation between the users' field of study and their understanding of the term 'user experience'.

Table 2. The level of expertise and understanding of 'user experience'

Category	Fully Understand (%)	Mostly (%)	Little (%)	Not at all (%)
Art	27.27	18.18	36.36	18.18
Applied Science	0	44.44	44.44	11.11
Computer Science	12.20	70.73	14.63	2.44
Others	9.09	42.42	39.39	9.09

Based on Table 2, respondents with the field of study in Computer Science had better understanding of the term 'user experience'. This result is indicated by lower percentage of respondents who had no knowledge in 'user experience' (2.44%) and a high percentage of respondents that fully and mostly (82.93%) understand what 'user experience' means. The high percentage might be because Computer Science student are more exposed to the concept of 'user experience' via other applications such as web based, standalone and mobile application. It is also interesting to note that nearly 30% from the Arts field claimed that they fully understand the term. For other categories, there was no significant difference between respondents who had good understanding (*fully understand and mostly understand*) and poor understanding on 'user experience' (*little and no knowledge in user experience*).

User experience results

Table 3 shows 22 statements about 'user experience' that were asked in the survey. Respondents were required to indicate their level of agreement with these statements with a five-point Likert scale. The five point Likert scale for the statements was used to show the respondents' level of agreement with the statement, "1" indicates strongly disagree, whilst "5" indicates strongly agree, and "3" indicates neutral. These 22 statements can be categorized into two main categories, general statements about 'user experience' on mobile platforms and the factors affecting user experience on mobile platforms. The second category is further divided into three factors: user characteristics, context of using mobile applications and product (mobile application) characteristics. The response rate for all the statements were 100%. However, the response of the 7 respondents, who reported having no understanding on the term 'user experience', were excluded from the analysis. There are six statements with mean value higher than 4, which were statement 1, 6, 10, 13, 15 and 17, with the highest be-

ing statement 10 (mean = 4.15). The top two statements with the highest level of agreement indicated there was a common agreement among the respondents that 'user experience' is important for applications. Respondents tend to agree with most of the statements on user experience. Out of the 22 statements on user experience, there were only six statements (27.27%) that obtained at least one "strongly disagree" (point scale = 1) from the respondents. Generally, all the statements receive favourable agreements from the respondents. No wide variation was discovered among the three factors affecting user experience, and the respondents had a similar level of agreement on these three factors though the level of agreement for each statement varies. There are no definite indication which factors was strongly agreed by the respondents.

In general, all respondents agreed that user experience is something subjective and related to the personal feeling. The level of agreement among the respondents on the 22 user experience-related statements were quite similar, and no significant variation were found. Sixteen out of the 22 statements (72.73%) had mean agreement levels somewhere between 3.5 (midpoint between neutral and agree) and 4 (agree). The result indicates that the respondents tend to agree with most of the statements. There was only six statements (22.27%) that obtained mean level of agreements higher than four on the 5-point scale. However, the mean level of agreements of these 6 statements were between 4.05 and 4.15, indicating respondents agree with those statements, but their level of agreements are not strong (5 = strongly agree), and could be considered as mild agreement. The respondents' agreement levels on three factors affecting user experience (context, user factor and product characteristic) were roughly the same, between 3.5 and 4.0.

Respondents' definition of User Experience

The respondents were required to give the definition of user experience and the responds obtained were analyzed to capture what user experience meant for the respondents. Keywords from the users' definitions were analyzed and group into four different categories to understand what the user experience meant for the respondents. The four categories are "What is user experience", "What constitutes a good user experience? (Factors)", "Key ideas about user experience" and "What to measure in evaluating user experience?". Among the 94 respondents who responded to this questionnaire, 13 respondents (13.83%) did not give any or relevant definitions about user experience.

Table 3. Statements on User Experience by category

Category	#	Statement	M	SD
General Statement	1	User experience determines the success of an application.	4.06	0.57
	2	User experience concerns the qualitative value of an application.	3.89	0.48
	3	The design for user experience should be a qualitative approach rather than quantitative approach.	3.75	0.40
	4	It is hard to define what user experience is but we may feel it.	3.70	0.38
	5	User experience is dynamic and flexible. It is not rigid.	3.74	0.40
	6	Application with better user experience would eventually gain a larger amount of users.	4.14	0.61
	7	Perceived enjoyment of mobile application users, when using and after using mobile applications, is a good way to estimate the user experience.	3.92	0.49
	8	Perceived enjoyment of mobile application users could not be measured quantitatively.	3.46	0.25
	9	Understanding the users is crucial for the design of user experience	4.15	0.62
	10		3.80	0.43
	11		3.61	0.33

		User experience is the most important aspect of an application, besides its functionality. User experience covers every aspect of an application or system.		
Factor: User factor	12	Prior experience with other similar applications would affect the user experience	3.86	0.46
	13	People with different backgrounds would have different user experience on the same application.	4.07	0.57
Factor: Context	14	User experience is something context dependent. (Hints: the environment)	3.51	0.27
	15	The characteristics of the mobile hardware (screen size, weight, dimension of the device, etc.) used for the mobile application would also affect the users' experience.	4.05	0.56
Factor: Product characteristic	16	The reputation of an application by other users would have an impact on the user experience of other users.	3.78	0.42
	17	User experience is related by the ease of use, performance and responsiveness of a system.	4.07	0.57
	18	Aesthetic characteristics of an application are crucial to the creation of good user experience and satisfaction.	3.69	0.37
	19	A good user interface is one of the main factors in creating a great user experience.	3.97	0.52
	20	In mobile applications with online functionality, the speed of the Internet connection would have significant effect on	3.92	0.49
	21	users' satisfaction.	3.79	0.42
	22	The ability to customize an application would improve user satisfaction. Mobile application should be improved and updated regularly to meet the frequent changes in the user requirements and environment factors.	3.97	0.52

Answers such as "I don't know", "not sure", and more were excluded from our analysis to ensure the accuracy of the collected data. The keywords from the respondents' definitions were identified and categorized into one of the four categories. Repeated keywords in different respondents' definitions were not shown in the table. Definitions with the same meaning, for example "Easy to use" and "ease of use", were grouped together. According to the analysis as shown in Table 4, the respondents thought that user experience was something personal and concerned personal interaction with the applications. For the respondents, factors affecting user experience in mobile applications were ease of use, functionality and performance of the application and aesthetic value of the user interface. From the definition given by the respondents, user experience involves emotions of the users towards an application making it a qualitative measure.

Table 4. Definition on user experience

What is user experience	**What constitutes a good user experience (factors)**	**Key ideas about user experience**	**What to measure in evaluating user experience**
Users' feelings User based User interaction Subjective Personal opinion	Ease of use Performance responsiveness Creativity Comfortable to use Safe Pleasant to use Convenient	Personalize UI Design Creative environment	Behaviours Attitude Emotions Happiness cum satisfaction Users' preferences

	Easy to learn Speed System fluency Ease of operation Nice interface Pleasant quality functionality Easy handling of application

ISO definition on User Experience

It is interesting to compare the respondents' definitions on user experience with the definition by the International Organization for Standardization. The international standard on ergonomics of human system interaction defines user experience as "*a person's perceptions and responses that result from the use or anticipated use of a product, system or service*" (ISO, 2008). The definition of users experience by ISO is in line with the definitions given by the respondents in terms of the subjectivity of the definition. The respondents agreed that user experience was something personal, and it is the result of an individual's interaction with applications. Besides, the ISO definition and the respondents' definition were also in line about what user experience is. User experience concerns what the users feel as the result from their use of an application. It is qualitative in nature, and varies from person to person. An interesting observation is, the ISO definition included the anticipated use of a product, system or service as part of what constitutes a user experience. However, the definitions given by respondents did not mention any anticipated use of an application. For the respondents, the anticipated use of an application is not a central part of user experience. Note that the ISO definition on user experience applies to product, system or service while the context of this survey is focusing on user experience on mobile application. The ISO definition focuses on a much broader scope while the scope of user experience evaluated in this survey is smaller.

CONCLUSION

This survey paper aimed to discover the understanding of user experience among the Malaysian youth, specifically the undergraduates, as a case study. In summary, we were able to discover what user experience means to our youth, and how the target groups of respondents view user experience. Their level of understanding on the term is very much related to their field of studies. Respondents with field of study/expertise in Computer Science had a higher level of understanding in user experience. Most respondents had viewed user experience as something subjective, and highly personal. This is similar to the ISO definition on user experience. Besides, respondents also tend to agree with the three factors influencing user experience i.e. user factor, context and product characteristics. Further research should look into the understanding of user experience among industrial practitioners and its relation with the field of User Centered Design (UCD).

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