Manuscript Submitted	Nov 11, 2020
Accepted	Dec 19, 2020
Published	Dec 24, 2020

The Usability and User Experience of Sekolah Pengaturcaraan Mobile Learning

Nurul Ibtisam Yaacob, Muhammad Zahiruddin Rushdi dan Mohd Khairul Mustakim Mustapa Kamal

Faculty of Science and Information Technology, Kolej Universiti Islam Antarabangsa Selangor (KUIS)

nurulibtisam@kuis.edu.my, 1736066@student.kuis.edu.my, khairulmustakim@kuis.edu.my

Abstract

The study aims to analyze the usability and user experience of users that have used Sekolah Pengaturcaraan (School of Programming) mobile learning. Sekolah Pengaturcaraan has been developed using the Android platform. This application provides a new learning medium via mobile platform to deliver content about learning HTML for FSTM students. This is a quantitative research and questionnaire has been used as the research instrument. The questionnaire being used was taken from the previous study with a minor modification. The selection of study respondents based on voluntary methods and a total of 57 data was successfully collected. This study used descriptive analysis to measure the users' perception towards the application usability and user experience. The findings showed that the application was at a high usability level and the users also have satisfied with user experience of the application. This can be seen as the mean score for all questionnaire items are at a high level. As a conclusion, the use of mobile application in learning HTML through Sekolah Pengaturcaraan mobile learning can help in increasing students' interest and motivation towards learning programming much faster and easier, yet interesting and interactive.

Keywords: *mobile application, mobile learning, HTML, usability, user experience.*

1. Introduction

The use of appropriate tools and devices in learning is very helpful in making the learning process more interesting, motivating and easier. Information technology development has created more spaces in designing and implementing IT-based learning. Currently, mobile learning (m-learning) can be considered as a well-established methodology of learning, which has been used for almost 20 years that offers learning at anytime and anywhere (Klimova & Poulova, 2016). This m-learning method is more towards self-learning whereby the users are using mobile devices such as mobile phones, tablet and so on as learning tools (Wagner, 2008).

2. Literature Review

Mobile Application

Mobile application (mobile apps) is a program that can be downloaded into mobile handheld devices which can be used anytime and anywhere (Md. Rashedul et al., 2010). Various mobile applications have been designed and developed for the convenience of users for contacting friends, surfing the

Internet, making file management, organizing schedules, entertainment programs and so on. In this study, Sekolah Pengaturcaraan mobile application has been developed for the purpose of helping the students in learning HTML much faster and easier.

Mobile Learning

Mobile learning (m-learning) is a method of learning that used mobile handheld devices in teaching and learning (Yong & Shengnan, 2010). Traxler (2007) has defined mobile learning as wireless and digital devices and technologies, generally created for the public, used by the users. Mohamed Osman & Cronje (2010) has defined mobile learning as any kind of learnings that takes place in the learning environmental based on mobility of technology, mobility of learners and mobility of learning. It only can make sense when the technology in use is fully mobile and when the users of the technology are also mobile while they learn.

Mobile learning is a form of distance learning whereby the users can easily access educational content on their handheld devices at their convenience (Muhammad Zahiruddin, 2019). According to Vavoula & Sharples (2002), the term 'learning' itself carries the meaning of mobile because learning can take place no matter where, no matter when. Thus, a combination of the words 'mobile learning' refers to the learning process that takes place all the time and is not limited to time and location (Alif et al., 2014). This situation is different from the use of textbooks which is usually a reference at certain time only.

O'Malley & Fraser in Aliff et al. (2014) have mentioned that the key features that should be presented in mobile learning is to focus on the features of mobility and flexible, which can influence the user learning experience. Laptop, smartphone and tablet are among the devices that can be considered as mobility of technology (Ahmad Sobri et al., 2010). Rashidah et al. (2017) stated that the generation nowadays are interested in seeking information or support of learning with the use of mobile technology. Emergence of mobile learning has helped the users involve in active learning.

Usability

According to the Standard of ISO 9241-11:1998, usability means a product that can be used by the users to achieve targets set with the effectiveness, efficiency and satisfaction of the use of the product. Usability is a quality attribute that represents ease of use aspect of the use of a system (Nielsen & Budiu, 2013). There are five quality components of usability which are learnability (easy to learn), efficiency (efficient to use), memorability (easy to remember), errors (safe to use) and satisfaction (easy to use) (Nielsen, 2012). Usability plays a role in assisting system development by having an easy-to-use interface (Xu, 2012). In this study, the usability elements that are going to be measured are element of usefulness, ease of use and user satisfaction.

User Experience

According to Vieka et al. (2018), the user experience is focusing on feelings and emotions of the users and often associated with relationship between user interaction and computerized application system. It is a dynamic feeling of user experience during and after interacting with a system (Hassenzahl, 2008). According to the Standard of ISO 9241-210:2010, the user experience is perception and response of a person when using a product, system or service. These perceptions and responses include emotions, beliefs, preferences, perceptions, physical responses and psychological, as well as behavior and adjustments before, during and after using it.

Sekolah Pengaturcaraan

For this mobile application development of Sekolah Pengaturcaraan (School of Programming), the programming languages that being covered are HTML and HTML5. HTML stands for Hyper Text Markup Language, which is used for developing web pages through various tags like 'heading', 'paragraph', 'table' and so on (Ankush & Aakanksha, 2018). HTML5 is the latest and most enhanced version of HTML.

3. Methodology

This is a quantitative research and questionnaires have been used as the research instrument. The selection of study respondents based on voluntary methods that targeted to the students which already have the basic of programming, that were the students in semester 3, 4 and 5 of IT & Multimedia Division, Faculty of Science & Information Technology, KUIS and a total of 57 data was successfully collected. According to Rosseni (2014), the minimum sample size of 3 to 5 respondents are already sufficient in a situation of system development, but if the number can be increased, that will be much better.

The data collected has been analyzed by using IBM Statistical Package for The Social Science (SPSS). The questionnaire being used was taken from Teh (2015) with a minor modification. The questionnaire was consisted of three sections. Section A was for demographic information that consisted of information of age, gender, program, current semester and devices the respondents used in accessing the application. Section B was about the usability of the application that consisted of 3 elements which were element of usefulness (6 items), ease of use (5 items) and user satisfaction (5 items). Section C was about the user experience that consisted of 9 items.

Respondents were asked to mark on each and every item to indicate their agreement regarding the statement related to the application. The data collected has been analyzed by using descriptive analysis. Descriptive statistics that have been used were frequency, percentage and mean. The scale and interpretation of the mean score of this study which has been used in this study has been taken from Landell (1997) as shown in table Table 1.

TABLE 1. Mean Score Interpretation

Total Mean Score	Level
1.00 - 2.33	Low
2.34 - 3.67	Moderate
3.68 - 5.00	High

4. Analysis And Findings

To ease the understanding, the findings of this study are presented based on 4 elements which are usefulness, ease of use, user satisfaction and user experience.

Demographics of Respondents

The findings of this study in terms of the respondents' background are consist of their age, gender, program, current semester and devices they used in accessing Sekolah Pengaturcaraan application. Demographic analysis of the respondents of this study is shown in Table 2.

TABLE 2. Demographic Analysis of Respondents

			Frequency	Percentage (%)
1	Age	18 years old and below	1	1.8
		19 years old	12	21.1
		20 years old	24	42.1
		21 years old	10	17.5
		22 years old and above	10	17.5
2	Gender	Male	36	63.2
		Female	21	36.8
3	Program	Diploma	47	82.5
		Bachelor Degree	10	17.5
4	Current Semester	3	16	28.1
		4	13	22.8
		5	20	35.1
		Others	8	14.0
5	Devices Used	Smartphone	54	94.7
		Tablet	1	1.8
		Others	2	3.5

Element of Usefulness

The findings of this study in terms of the element of usefulness is shown in Table 3.

TABLE 3. Data Analysis for Element of Usefulness

		Dislike F %	Not Sure F %	Like F %	Mean Score	Level
B1	Design of menu is simple	- -	5 8.8	52 91.2	4.78	High
B2	Screen design is pretty and simple.	2 3.5	15 26.3	40 70.2	4.18	High
B3	Buttons are large and easy to select.	- -	6 10.5	51 89.5	4.73	High
B4	Buttons in the apps works when touched.	- -	2 3.5	55 96.5	4.90	High
B5	Animation and picture used makes learning fun.	1 1.8	16 28.1	40 70.2	4.20	High
B6	Sound used in the apps makes learning easy.	1 1.8	14 24.6	42 73.7	4.30	High
	Grand Mean				**4.51**	**High**

Based on Table 3, it shows the findings for element of usefulness of the application. For item B1 "Design of menu is simple", the total of 91.2% of respondents were agree with the statement. For item B2 "Screen design is pretty and simple", the total of 70.2% of respondents were agree with the statement. For item B3 "Buttons are large and easy to select", the total of 89.5% of respondents were agree with the statement.

For item B4 "Buttons in the apps works when touched", the total of 96.5% of respondents were agree with the statement. For item B5 "Animation and picture used makes learning fun", the total of 70.2% of respondents were agree with the statement. For item B6 "Sound used in the apps makes learning easy", the total of 73.7% of respondents were agree with the statement.

In general, the mean of each item from B1 to B6 in Table 3 shows that it is at a high score level which is between 4.18 to 4.90 and it is strengthened by the grand mean value that was also at a high score level which was 4.51. Therefore, it can be concluded that Sekolah Pengaturcaraan mobile application is useful based on the criteria that have been outlined.

Element of Ease of Use

The findings of this study in terms of the element of ease of use is shown in Table 4.

TABLE 3. Data Analysis for Element of Ease of Use

		Dislike **F** **%**	**Not Sure** **F** **%**	**Like** **F** **%**	**Mean Score**	**Level**
B7	Using menus to go to other screens is simple.	- 	7 12.3	50 87.7	4.70	High
B8	Using menus and buttons to go to other screens is easy.	1 1.8	7 12.3	49 86.0	4.60	High
B9	Buttons such as next and back buttons are placed in the same place for each screen.	2 3.5	10 17.5	45 78.9	4.38	High
B10	Learning using the apps is easy.	- 	9 15.8	48 84.2	4.60	High
B11	Using the apps to play games is simple.	1 1.8	9 15.8	47 82.5	4.53	High
	Grand Mean				**4.56**	**High**

Based on Table 4, it shows the findings for element of ease of use of the application. For item B7 "Using menus to go to other screens is simple", the total of 87.7% of respondents were agree with the statement. For item B8 "Using menus and buttons to go to other screens is easy", the total of 86.0% of respondents were agree with the statement. For item B9 "Buttons such as next and back buttons are placed in the same place for each screen", the total of 78.9% of respondents were agree with the statement.

For item B10 "Learning using the apps is easy", the total of 84.2% of respondents were agree with the statement. For item B11 "Using the apps to play games is simple", the total of 82.5% of respondents were agree with the statement.

In general, the mean of each item from B7 to B11 in Table 4 shows that it is at a high score level which is between 4.38 to 4.70 and it is strengthened by the grand mean value that was also at a high

score level which was 4.56. Therefore, it can be concluded that Sekolah Pengaturcaraan mobile application is easy to use based on the criteria that have been outlined.

Element of User Satisfaction

The findings of this study in terms of the element of user satisfaction is shown in Table 5.

TABLE 5. Data Analysis for Element of User Satisfaction

		Dislike **F** **%**	**Not Sure** **F** **%**	**Like** **F** **%**	**Mean Score**	**Level**
B12	Responses given by apps is clear and helpful.	2 3.5	5 8.8	50 87.7	4.60	High
B13	Help given is useful to me.	1 1.8	10 17.5	46 80.7	4.48	High
B14	Clues given are clear and helpful.	1 1.8	11 19.3	45 78.9	4.43	High
B15	While using the apps, I know where I am now and where to go next.	2 3.5	9 15.8	46 80.7	4.43	High
B16	While using the apps, I am clear of what tasks to finish and how to finish them.	1 1.8	11 19.3	45 78.9	4.43	High
	Grand Mean				**4.47**	**High**

Based on Table 5, it shows the findings for element of user satisfaction of the application. For item B12 “Responses given by apps is clear and helpful”, the total of 87.7% of respondents were agree with the statement. For item B13 “Help given is useful to me”, the total of 80.7% of respondents were agree with the statement. For item B14 “Clues given are clear and helpful”, the total of 78.9% of respondents were agree with the statement.

For item B15 “While using the apps, I know where I am now and where to go next”, the total of 80.7% of respondents were agree with the statement. For item B16 “While using the apps, I am clear of what tasks to finish and how to finish them”, the total of 78.9% of respondents were agree with the statement.

In general, the mean of each item from B12 to B16 in Table 5 shows that it is at a high score level which is between 4.43 to 4.60 and it is strengthened by the grand mean value that was also at a high score level which was 4.47. Therefore, it can be concluded that the respondents of Sekolah Pengaturcaraan application are satisfied in using the application based on the criteria that have been outlined.

Element of User Experience

The findings of this study in terms of the element of user experience is shown in Table 6.

TABLE 6. Data Analysis for Element of User Experience

		Dislike F %	Not Sure F %	Like F %	Mean Score	Level
C1	While using the apps, the loading time is short.	2 3.5	13 22.8	42 73.7	4.25	High
C2	Animations in the apps can be skipped or stopped.	2 3.5	19 33.3	36 63.2	4.00	High
C3	Use of simple words.	-	5 8.8	52 91.2	4.78	High
C4	Language used is simple.	-	7 12.3	50 87.7	4.70	High
C5	Mistakes made while using the apps can be easily recovered.	1 1.8	17 29.8	39 68.4	4.18	High
C6	Learning how to use the apps is easy.	-	12 21.1	45 78.9	4.48	High
C7	I can remember how to use the apps with ease.	1 1.8	11 19.3	45 78.9	4.43	High
C8	I feel happy learning with the apps.	1 1.8	12 21.1	44 77.2	4.38	High
C9	It is fun to learn using the apps.	-	13 22.8	44 77.2	4.43	High
	Grand Mean				**4.40**	**High**

Based on Table 6, it shows the findings for element of user experience of the application. For item C1 “While using the apps, the loading time is short”, the total of 73.7% of respondents were agree with the statement. For item C2 “Animations in the apps can be skipped or stopped”, the total of 63.2% of respondents were agree with the statement. For item C3 “Use of simple words”, the total of 91.2% of respondents were agree with the statement.

For item C4 “Language used is simple”, the total of 87.7% of respondents were agree with the statement. For item C5 “Mistakes made while using the apps can be easily recovered”, the total of 68.4% of respondents were agree with the statement. For item C6 “Learning how to use the apps is easy”, the total of 78.9% of respondents were agree with the statement.

For item C7 “I can remember how to use the apps with ease”, the total of 78.9% of respondents were agree with the statement. For item C8 “I feel happy learning with the apps”, the total of 77.2% of respondents were agree with the statement. For item C9 “It is fun to learn using the apps”, the total of 77.2% of respondents were agree with the statement.

In general, the mean of each item from C1 to C9 in Table 6 shows that it is at a high score level which is between 4.18 to 4.78 and it is strengthened by the grand mean value that was also at a high

score level which was 4.40. Therefore, it can be concluded that the respondents of Sekolah Pengaturcaraan application had a good experience in using the application based on the criteria that have been outlined.

5. Discussion And Conclusion

In general, this study found that the respondents were very satisfied with the usability and user experience of Sekolah Pengaturcaraan mobile application. This can be seen as the mean score for all questionnaire items are at a high score level. This result has proved that the application has a high potential among students to continue to be used in better understanding and learning HTML. This is in line with the result of the study of Alif et al. (2014) who have mentioned that the user acceptance depends on the aspect of the facility they felt and can be followed by them when using the application. Fetaji et al. (2008) also supported that statement and added that the user acceptance also depends on the extent to which the users feel comfortable in using the application. In fact, the findings of Norman (2004) also found that the users will feel happy and enjoyable when using the application that has good usability feature.

Sekolah Pengaturcaraan mobile learning is simple, yet creative and interactive, and not complex that can cause the users to feel bored. This is in line with Normahdiah (2010) that stated that the application will be easier to use if it has elements that appropriate and accurate and avoids the use of complex elements. The use of interactive and user-friendly application is very important since application that is static and not user-friendly will cause users to become bored (Ahmad Fkrudin et al., 2014). Therefore, the satisfaction obtained by the users is depend on the level of benefits that are easily achievable in the application developed.

Mobile learning has opened a new perspective in utilizing current educational technology. The use of mobile application in learning HTML through Sekolah Pengaturcaraan mobile learning can help in increasing students' interest and motivation towards learning programming much faster, easier, yet interesting and interactive.

Acknowledgment

We would like to express our gratitude to all respondents, i.e. FSTM KUIS students' who were involved in this study. This study cannot be completed without the good cooperation from them. Last but not least, our gratitude also goes to KUIS who had given us a chance to do and to complete the research. Thank you.

References

1. Ahmad Fkrudin Mohamed Yusoff, Mohd Isa Hamzah & Wan Norina Wan Hamat. (2014). Pembangunan Perisian Pengajaran dan Pembelajaran Multimedia Interaktif pengurusan Jenazah Politeknik Malaysia. *The Online Journal of Islamic Education, 2(2): 11-25.*
2. Ahmad Sobri Shuib, Saedah Siraj & Muhammad Ridhuan Tony Lim Abdullah. (2010). M-Learning curriculum design for secondary school: A needs analysis. *World Academy of Science, Engineering and Technology, 66, 1638-1643.*
3. Alif Nawi, Mohd Isa Hamzah & Surina Akmal Abd Sattai. (2014). Potensi penggunaan aplikasi mudah alih (mobile apps) dalam bidang pendidikan Islam. *The Online Journal of Islamic Education, 2(2): 26-35.*
4. Ankush, S. & Aakanksha, S. (2018). Introduction to HTML (Hyper Text Markup Language) - A Review Paper. *International Journal of Science and Research (IJSR), 7(5): 1337-1339.*
5. Fetaji, M., Zamir Dika & Bekim Fetaji. (2008). Usability testing and evaluation of a mobile software solution: A case study. *Proceedings of the 30th International Conference on Information Technology Interfaces.*

6. Hassenzahl, M. (2008). User Experience (UX) : Towards an experiential perspective on product quality. *Proceedings of the 20th International Conference of the Association Francophone d'Interaction Homme Machine.*
7. Klimova, B. & Poulova, P. (2016). Mobile Learning in Higher Education. *Advanced Science Letters, 22(5), 1111-1114.*
8. Landell K. (1997). *Management by Menu*. London:Wiley dan Sons Inc.
9. Md. Rashedul Islam, Md. Rofiqul Islam & Tahidul Arafhin Mazumder. (2010). Mobile Application and Its Global Impact. *International Journal of Engineering & Technology, 10(6): 72-78.*
10. Mohamed Osman M. El-Hussein & Cronje, J. C. (2010). Defining Mobile Learning in the Higher Education Landscape. *Educational Technology & Society, 13 (3), 12–21.*
11. Muhammad Zahiruddin Rushdi. (2019). *M-Learning for Sekolah Pengaturcaraan* [Unpublished report]. Kolej Universiti Islam Antarabangsa Selangor.
12. Nielsen, J. (2012). *Usability 101 : Introduction to Usability*. Retrieved November 9, 2020, from https://www.nngroup.com/articles/usability-101-introduction-to-usability/
13. Nielsen, J., & Budiu, R. (2013). *Mobility Usability* (2nd ed.). California: New Riders
14. Normahdiah Sheik Said. (2010). *Multimedia Integrasi Reka Bentuk Berpusat Pengguna*. Penerbit UPM.
15. Norman, D. A. (2004). *Emotional Design: Why We Love (or Hate) Everyday Things*. New York: Basic Books.
16. Rashidah Rahamat, Parilah M. Shah, Rosseni Din & Juhaida Abd Azizi. (2017). Students' Readiness and Perceptions Towards Using Mobile Technologies for Learning the English Language Literature Component. *The English Teacher, 16, 69-84.*
17. Rosseni Din. (2014). *Pembinaan & Permodelan Sistem Pengajaran*. Bangi. Penerbit Universiti Kebangsaan Malaysia.
18. Santoso, H., Schrepp, M., Yugo Kartono Isal, R., Utomo, Y., & Priyogi, B. (2016). Measuring User Experience of the Student-Centered e-Learning Environment. *The Journal of Educators Online, 13(1), 142-166.*
19. Teh Yew Pin. (2015). *Evaluation of Design Guidelines: Questionnaire Design for Evaluating Children Educational App* [Unpublished thesis]. Universiti Tunku Abdul Rahman.
20. Vavoula, G. N., & Sharples, M. (2002). KLeOS: A personal, mobile, Knowledge and Learning Organisation System. In Milrad, M., Hoppe, U. Kinshuk (eds.) *Proceedings of the IEEE International Workshop on Mobile and Wireless Technologies in Education.*
21. Vieka Intanny, Insasari Widiyastuti & Maria Dolorosa Kusuma Perdani. (2018). Pengukuran Kebergunaan dan Pengalaman Pengguna Marketplace Jogjaplaza.id dengan Metode UEQ dan USE Questionnaire. *Jurnal Pekommas, 3(2): 117-126.*
22. Wagner, E. D. (2005). Enabling mobile learning. *Educause Review 40(3): 40-53.*
23. Xu, H. (2012). *Tablet application GUI usability checklist: Creation of a user interface usability checklist for tablet applications* [Unpublished thesis]. Södertörn University.
24. Yong, L. & Shengnan, H. (2010). Understanding the factors driving m-learning adoption: A literature review. *Campus-Wide Information Systems. 27 (4): 210-226.*