

Usability Assessment for Classroom-Based Mobile Application to Enhance Communication

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Abstract—This paper presents the usability assessment for a classroom-based mobile application designed for pre-school classroom with its purpose to handle the administrative task, monitor child's assessment, and supports communications between teachers and parents. This research focus on the usability assessment of the application using quantitative methodology. The assessment involved real users who worked as pre-school teachers and parents who have pre-school children. The results show that 72% participants are agreed that this application is able to enhance communication between parents and teacher. However, severe improvements are still needed in order to further enhance the application as highlighted by the users.

Keywords – Usability assessment; Mobile application; Web application; Pre-school.

I. INTRODUCTION

Communication is one of the substantial actions in every person daily life. With the presents of technology like WhatsApp, Messenger and Telegram, communication become more convenient. Unfortunately, it is limited to a social interaction only. In some situation like education, it is not suitable as a medium for communication. Especially for parents and teachers who will likely mix up their social and work interaction. Therefore, a communication mobile application for classroom (CoMAC) is develop for teachers and parents to create a formal educational environment. CoMAC is a web-based and mobile-based application. It is specially developed for pre-school as a communication medium between teachers and parents. This application allows parents to monitor their children's academic performance regularly. While teachers can manage their classes and keep update about the children and classes.

Currently, usability in software development is seen as the key characteristics to applications' efficiency [1]. Thus, all software applications should be evaluated accordingly in order to identify the product's usability and ease of use. In order to ensure that the application will be well-accepted by the end-users, a crucial testing has been conducted which is the usability testing.

This paper aims to evaluate a pre-school, classroom-based mobile application with real users in order to identify the application's performance and the satisfaction level of the user towards the application. The outcome of the evaluation will contribute to the further application enhancement.

II. LITERATURE REVIEW

Usability is an essential characteristic of software product as it is able to distinguish the quality of products available on the market [2]. The purpose of usability assessment is to identify and correct the usability issues [3]. In most cases, usability testing was performed using qualitative method. However, the test could also be quantitative [4]. By considering several scenarios such as, the design of the application is ready and the aim of the researcher is to track if changes could affect the usability of the application, therefore, a perfect method of usability testing is using both qualitative and quantitative method [4]. The qualitative purpose is to validate if the concept of the application is appealing to the user while quantitative method helps on determine whether the application is still can be use if changes happen [5]. Quantitative methods involve data analysis based on number. However, quantitative method not only emphasize on the objective measures and statistical, but analytical or computational interpretation of data obtained using polls, surveys or questionnaires are also the essence of the quantitative approach. Besides that, quantitative method aims at gathering numerical data and then the result will be generalized across groups of people [6].

Usability assessment can be performed using various methods [7]. Among the methods that have been implemented previously was objective metrics, used to collect the test data [8], measurable matrix method using GTmetrix tools to conduct the test [9], and summative usability evaluation for assessing the counselling mobile application based on quality requirements [10]. Proper requirements elicitation is able to discover both functional and quality requirements [11], which in turn can be used for usability evaluation, due to the importance of software product quality and usability [12]. In its latest implementation, usability testing has evolved and has become more informal [13].

III. USABILITY EVALUATION IMPLEMENTATION

To ensure smoothness, the usability assessment was carried out in a few steps [1]. Initially, preparation of the mobile application which need to be used for evaluation was made ready in the testing environment then test modules and the procedure to be conducted are developed and an online questionnaire is ready. Once everything is ready, the participants are gathered, and evaluation is conducted.

A. Methodology

The methodology used in this research is quantitative research methodology. An online questionnaire has been constructed and distributed among the testing participants. Upon completing the test modules on the application, the participants will be given an online questionnaire to be completed. The test modules will be explained in section III (B). The results and findings then will be analyzed using statistical analysis and presented in section IV.

The usability assessment was conducted with persons who have a teaching and parenting background. The reason is because, the application is aimed to be implemented at a pre-school and the targeted users are the pre-school teaching staff and the parents of the children in the pre-school. The participants were selected based on the association between the participant with the specific Rasta pre-school. The criteria included pre-school teaching staff to evaluate the admin and teacher part in the application. While for the parents' part, the selected participants must have at least a child with age around four to six years old. The testing required the participant to use the technology and answer an online questionnaire. Hence, the participants are expected to have a basic knowledge in using mobile and web application. The research used quantitative method to acquire the results and finding. Therefore, a detailed and comprehensive online questionnaire is prepared beforehand before the actual usability assessment is performed with the selected participant.

B. Application Overview

Before the usability assessment is conducted with participants, researcher need to ensure that both web and mobile application has been completely developed based on the user requirement and is proper for evaluation. The application which is named CoMAC is an application that simplify the administrative task for the admin and teacher of a pre-school. Besides, the application also helps the parents to keep update about the school activities and their children's assessment in the pre- school. The application is built up in both web and mobile view. The web is mainly for the administrative task and the mobile is focus for the parent's usage. Figure 1 and 2 below show the user interface for CoMAC.

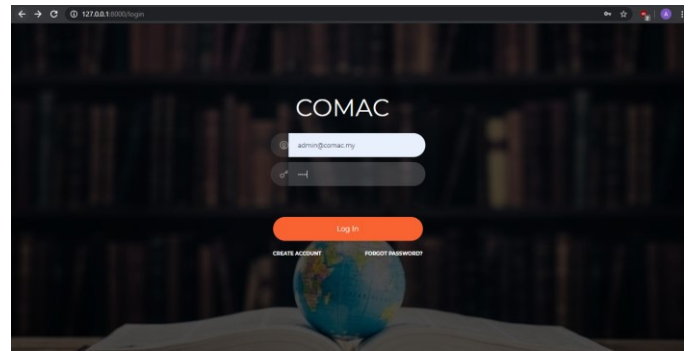


Fig. 1. User Interface for CoMAC Web Application

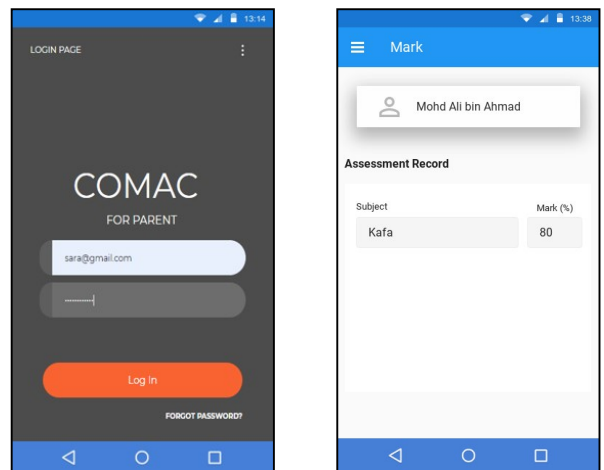


Fig. 2. User Interface for the Mobile Application

After the application has been completely developed, the test modules which need to be carried out for the assessment were identified. A number of 6 test modules have been identified and the description on how to perform the test was explained as per in Table 1.

TABLE I TEST MODULES

Test Module	App Type	Description / Procedure	End User
Registration	Web	Complete the registration form and submit	Parent
		Choose either to approve or reject application from Child Application page	Admin
Login	Web	Complete the login details and click Log In button	Admin and Teacher

	Mobile		Parent
User Management	Web	Create, Update and Delete teacher	Admin
		Update and Delete child	
		Create, Update and Delete subject Add child to subject	
		Create, Update and Delete class Add child to class	
Profile Management	Web	Update profile	Admin and Teacher
Announcement	Web	Complete the announcement form and click Create button	Admin and Teacher
	Mobile	Go to announcement page and ensure the announcement is on the page	Parent
Assessment	Web	Go to subject page, choose subject and student then update the child's mark and click Save button	Teacher
	Mobile	Go to mark page and ensure the children marks are on the page	Parent

C. Selection of Participants

The scope of the testing is to evaluate the application among the Rasta Pre-School employees and customers only due to the purpose of the application itself which was developed according to the request from the pre-school center. Therefore, testing participants were selected among the pre-school employees and customers. The participants were selected based on two different backgrounds with the aim to get feedback from different user perspectives. First, those who with teaching background and second, participants who were also the parents of the pre-school center who have children between age 4-6. Both types of participants have experience in handling pre-school children. Total of 18 participants have been identified, four participants with teaching background and another fourteen participants from parenting background. For the teaching background participants, one of them will act as the administrator while the other three will assess the teacher module.

D. Evaluation

The participants were gathered at the Rasta pre-school center in Johor. Before the testing session started, the researcher first explained about the application flow. Different session was conducted for different types of users, therefore 3 sessions were conducted for admin, teacher, and parents separately but on the same day. The researcher observed while the participants perform the evaluation. Two types of device were used and provided by researcher, which are laptop and mobile phone with android operating system. After the participants completed all the test modules, an online questionnaire was given to the participant. The questionnaire is aimed to see the satisfaction level of the participant while using the application and seek suggestion for enhancement. The set of questionnaire used is shown in Table 2 below.

TABLE 2 ASSESSMENT QUESTIONS

No.	Question	Answer
1.	What is your role in this testing?	i. Admin ii. Teacher iii. Parent
2.	Based on the evaluation and observation made on the application, is the application is easy to use?	1 – Very Hard 2 – Hard 3 – Neutral 4 – Easy 5 – Very Easy
3.	Based on the evaluation and observation made on the application, is the application is easy to understand?	1 – Very Hard 2 – Hard 3 – Neutral 4 – Easy 5 – Very Easy
4.	If you are an ADMIN OR TEACHER, do you agree that the application can help to ease the administrative task?	1 – Strongly Disagree 2 – Disagree 3 – Neutral 4 – Agree 5 – Strongly Agree
5.	If you are a PARENT, do you agree that the application can help to keep update about school activities and help on monitor your children assessment?	1 – Strongly Disagree 2 – Disagree 3 – Neutral 4 – Agree 5 – Strongly Agree
6.	Do you think that this application is able to improve communication between parents and teachers?	1 – Strongly Disagree 2 – Disagree 3 – Neutral 4 – Agree 5 – Strongly Agree
7.	In overall, are you satisfied with the application?	1 – Strongly Disagree 2 – Disagree 3 – Neutral 4 – Agree 5 – Strongly Agree
8.	In your opinion, what are improvement can be made for future enhancement?	Open-ended answer

IV. RESULTS AND FINDINGS

This section describes the result of the assessment conducted with all the participants. There were eighteen participants involved in this testing. One participant represents the admin, two of the participants represent the teacher and the other three represent the parents. The participant roles were shown in Figure 3 below.

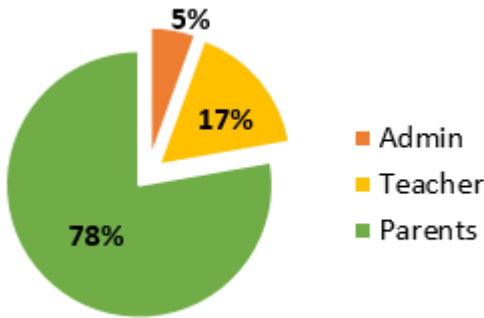


Fig. 3. Number of Participants According to Responsibility / Role

Table 4 shows the satisfaction level of the participant while performing their role on main task. The admin strongly agreed that the application help to ease the administrative task. One of the teachers expressed the same thought as the admin and the other teachers (50%) agreed that that the application help to ease their administrative task. On the parent side, two of them strongly agreed that the application helped them to keep updated about school and children assessment while 9 of them (64.3%) agreed and the remaining 3 (21.4%) felt neutral about the statement.

TABLE 4 RESULT OF SATISFACTION LEVEL OF PARTICIPANT MAIN TASK

Question	Answer					TOTAL
	Strongly Agree	Agree	Neutral	Dis-agree	Strongly Disagree	
Admin and Teacher						
Is the application help to ease administrative task	1 admin, 1 teacher	2	-	-	-	4
Parent						
Is the application helps you to keep updated about school and children assessment	2	9	3	-	-	14

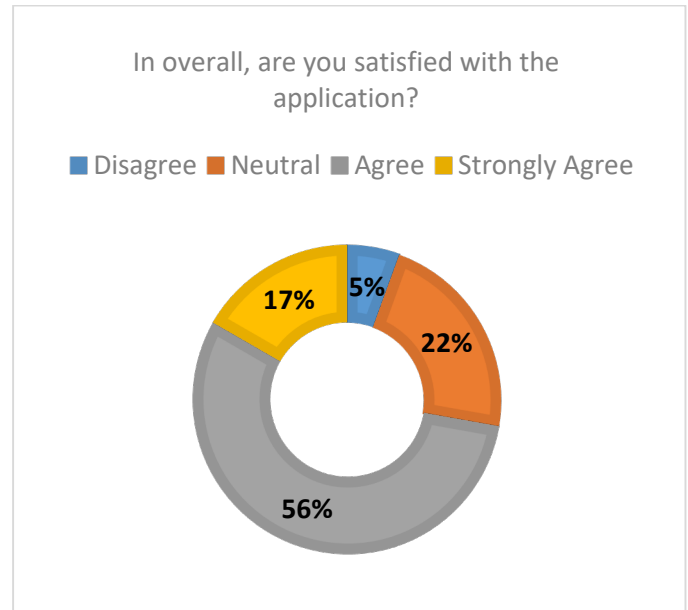


Fig. 4. Result of Overall Participant Satisfaction

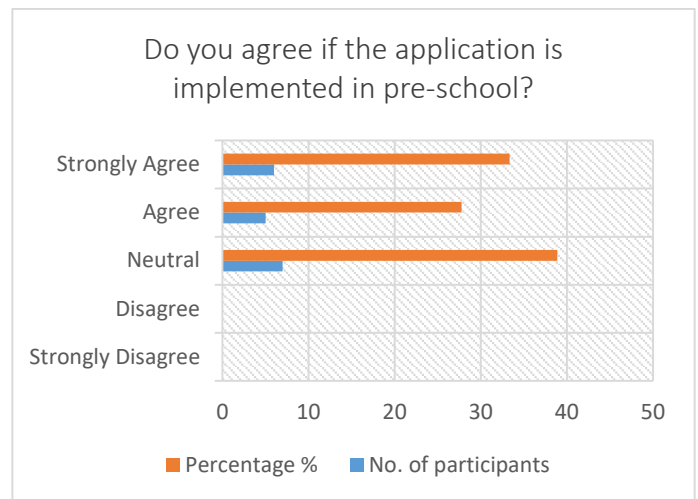


Fig. 5. Result of User Acceptance to Implement the Application in Pre-school

Figure 4 shows the result of overall users' satisfaction towards the application from the participants' perspective. The results show that a number of 3 participants which is equivalent to 17% were strongly satisfied and most of them are satisfied, with 56% score, a total of 10 participants. However, 22% of the respond were recorded as neutral while 1 of the participants (5%) were not satisfied or disagree. Looking at the number, this application was satisfied most of the participants except for one. On the other hand, the findings on users' acceptance to implement the application in pre-school is shown in figure 5. The result shows that a number of 6 and 5 participants were strongly agreed and agreed, which made the percentage of 33% and 28% accordingly. There was however, 39%, seven of the participants were neutral towards the question. In overall, there was zero score was recorded on disagree nor strongly disagree on the implementation of this application in pre-school.

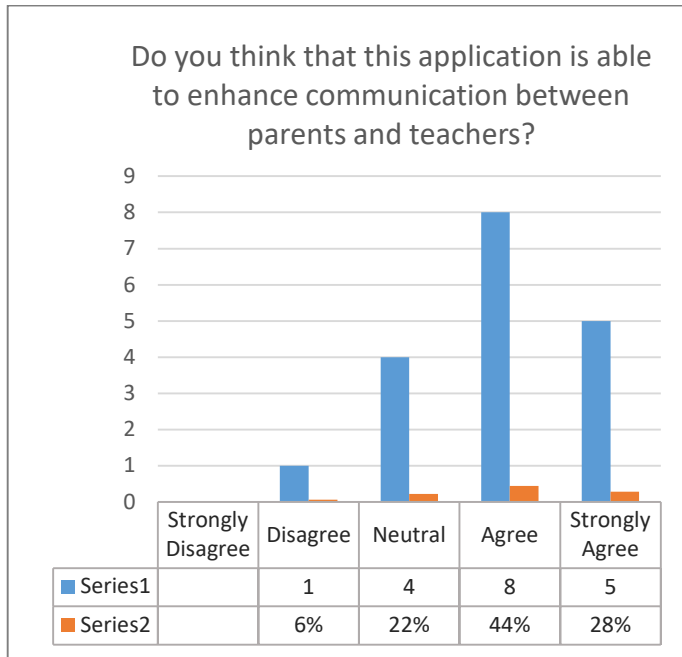


Fig. 6. Results on Communication Enhancement

Figure 6 shows the feedback obtained from the users on the application's ability to enhance communication between parents and teachers. The feedback was gained after the users had the chance to use the application by themselves during the testing session. There was a neutral decision received from 4 participants with 22% in total. Even though there was minimal disagreement on the application's capability in enhancing the parents and teachers' communication with 6% (scores from 1 participant), the result however has recorded quite a high agreement, with 44% and 28% of agreed and strongly agreed accordingly, in which has an equality to 72% of total agreement. Therefore, it can be concluded that this application is able to enhance communication between parents and students in pre-school, and help them to keep update about school activities and monitor their children's assessment.

V. DISCUSSION

From the findings, it can be concluded that the application received positive feedbacks from the participants. The result mostly shows strongly agree and agree. All participants agreed that this application is able to enhance communication between parents and students which make this study achieve its objective. However, there are still a room for improvement to be added in the application. From the survey conducted with the participants, there were several recommendations suggested by the participant for future enhancement. Some of the recommendations are adding or uploading video and photo features for teacher. They also requested to allow parents and teachers to communicate directly using messenger. The usability testing that utilized quantitative methodology help the researcher to get a definite number of satisfaction level from the participant. This result may aid the researcher to have a deeper study before releasing the application to end user or before making any changes and assumption toward the application. To conclude, by performing usability testing, the researcher can identify an overview and perspective from real users who used the

application. Hence, their comment and recommendation toward the application need to be taken into account to ensure that the application is well-receive by the targeted users.

VI. RECOMMENDATION AND CONCLUSION

This study has conducted a usability assessment on a classroom-based application which has been specifically designed for Rasta pre-school center according to their custom requirements. The focus of the testing is to identify the focused user feedback on the application, therefore testing participants were selected among the pre-school employees and customers only. From the findings, it can be concluded that the participants of this testing were satisfied with the overall performance of the application and 72% participants agreed that this application is able to increase the communication between teachers and parents. Overall, usability testing is important to identify the performance and user satisfaction level of the developed application. With the testing, developer can identify the problem that occurs for improvement purposes before it being released to the users. It can be seen from this study that the application still has a lot of room for improvement and enhancement as highlighted in discussion section. Therefore, usability assessment is very crucial for every developer to ensure that their application is well-adapted and well-received by targeted audience as well as public audience.

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