An Evaluation of the Effectiveness in Use and Efficiency in use of a Mobile News Aggregator Magazine Application

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Abstract: In this study, the researchers evaluated the effectiveness and efficiency of the Flipboard app, a news magazine application. The usability of Flipboard app was tested by observation. 11 participants (all students of Universiti Utara Malaysia (UUM)), were conscripted for the usability test. The result indicated that all participants completed task 1 (100%). In task 2, 91% of participants completed their tasks. The success rates for tasks 3, 4, and 5 were 82%, 100% and 82% respectively. These show high success rate. In addition, the error rates per tasks were relatively low. These results (success rates and error rates) show that the app has good effectiveness. Also, the task completion time revealed that the app on average is efficient in use. However, since some participants were not able to complete their tasks, some completed with some errors and some expended much time to complete their tasks, it is thenceforth clear that the interface is nonetheless laden with some issues that demands attention.

Keywords: Mobile app, effectiveness in use, efficiency in use, usability testing

I. INTRODUCTION

Over the years there has been an enormous amount of effort put into satisfying users and getting to know their exact needs and what they look for in a software and application. That is why there has been a wide range of usability testing done for products and services in different contexts of use. Before the coming of smartphones, usability testing was only limited to software and web applications on desktops and laptops. But with the advent of mobile smartphones, mobile applications have also come into the picture. As mobile smartphones together with mobile apps become more popular and easily accessible, there are more applications being developed with various purposes and similar apps came from different company and developer.

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This has led to competition and the survival of the fittest to see who can create a mobile application that is most effective and efficient and is also able to satisfy the users enough for them to stick with the app without having the need to go for a similar app that serves the same purpose. This eventually requires the need for usability testing of mobile applications to be able to get the exact requirements of what users expected in an application and also know the features that is suitable for a group of people with special needs whenever they use the particular application. In this study, the researchers focused on the usability testing of Flipboard mobile application. Flipboard is a news aggregator app created and designed by a social network aggregation company based in Palo Alto, California. It aggregates content from social media, news feeds, photo sharing sites and other websites, and presents them in a magazine format, and allows users to "flip" through the articles, images and videos being shared. Readers can also save stories into Flipboard magazines.

This study was designed to investigate the usability of the Flipboard mobile applications.The main objective of the usability testing of the app was to get to know if users are able to perform task given to them on the app. Flipboard mobile application is a very good news and magazine app, but there are not many people who knew about the application or the amount of purposes it serves. Naturally the Flipboard app has robust features but complex layout and navigation which may serves as a problem for users to get accustomed with on a daily basis. The app initially was a web application before a mobile alternative was created. So, most people only knew about the webversion and not the mobile app since the web app is relatively easy to use. The issue is how to get people to familiarize and be accustomed to the use of the mobile app, instead of having to be on a browser before they can check news on Flipboard which maybe a little inconvenient.

Usability evaluation has a primary aim of looking for possible issues the usability of a system has and exploring ways to resolve these issues (Balagtas-Fernandez et al,.2009). A few known literatures (Zhang &Adipat, 2005; Weiss, 2002; Hashim&Adamu 2017) that concentrated on usability testing of mobile applications had proffered possible ways to guide researchers in carrying out their user studies.

According to Balagtas-Fernandez et al, one of the crucial steps in developing software so as to enhancethe quality of a system is usability analysis (see Hussan et al., 2016a; 2016b; 2017a; 2017b; 2018). It is usually a challenge particularly when it is the case of reviewing or evaluating an application that works on mobile devices due to the limitations posed by the device and the inability to get supporting tools and software required to gather the needed usability information. A usability study on smartphones applications can be a daunting work to do. A typical user study scenario gather data through the process of joining an external camera to capture a view of the mobile screen (Duh et al., 2006; Ahmad et al., 2014) or through logging (Kallio&Kaikkonen, 2005).The use of an external camera to observe the screen of a mobile phone is quite hard due to the fact that the phone's screen is small and most of the time the screen is hindered from view by the user (Paterno et al., 2007). Another method to use instead of this is to make use of screen recording application or tool similar to the ones accessible for PC. One correct source of utilizing information is through logging of events. The issue facing using event logging comes from the ways the system is prepared for gathering of data and how the large amount of logged data is extracted and interpreted. The analysis stage includes getting the data that has been processed from the extraction stage and making a break down on which parts of the system the users were having problem interacting with and what can be done to enhance this. Various tools (Kallio&Kaikkonen, 2005; Balagtas-Fernandez et al., 2009; Ivory & Hearst, 2001) are made accessible to help in the simplifying of analysis of the system, but only a few tools for usability analysis of mobile device applications can be found.

II. METHODS

The study invited 11 students (7 male and 4 female) coming from different levels of study at the Universiti Utara Malaysia (UUM). The users were categorized by experience as either experienced users (3 years and above), moderate users (1 - 2 years), and novice users (less than a year) in term of the number of years the users have been using the application. Details are in Table 1.

Table. 1 User Profile

User #	Gender	Study level	Experience
1	Male	Postgraduate	Novice
2	Female	Undergraduate	Moderate
3	Male	Postgraduate	Novice
4	Male	Postgraduate	Novice
5	Male	Postgraduate	Novice
6	Female	Postgraduate	Novice
7	Male	Postgraduate	Novice
8	Female	Undergraduate	Novice
9	Male	Postgraduate	Experienced
10	Male	Postgraduate	Moderate
11	Female	Undergraduate	Moderate

Fig . 2 View of some participants

The users were given the permission to perform the tasks given to them in any position they preferred whether it is by sitting or standing. They were two moderators, one was in-charge of giving the defined tasks verbally to the users and the other was in-charge of capturing the test session with a mobile phone camera. The participants were allowed to use their various mobile devices which can either be android or iOS to perform the tasks so as to make them more comfortable in doing the testing since they are used to their own mobile phones and will prefer it to another type of mobile devices they have never used before. They were allowed to use their various mobile devices also for the purpose of proving that the application to be tested can easily be adjusted to various mobile device preferences and operating systems. The main recording done for each task the participants was doing was through using screen recording capture on each participant's phone. So, before the test started, the participants have to install both Flipboard application and a screen record app (if they do not have the screen record features on their devices) provided by the moderators on their mobile devices. In addition, pictures were taken of every participant while performing their task.
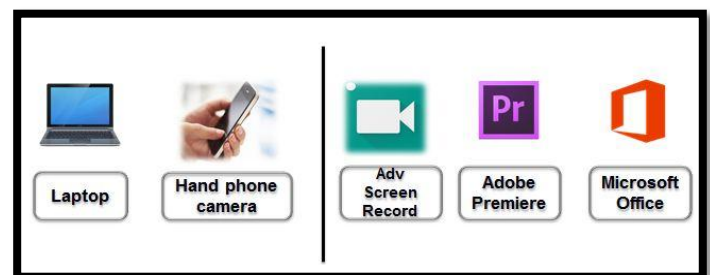

Fig . 1 View of some participants in the application test session

III. METHODS

For study investigates the usability of the Flipboard app in the context of efficiency and effectiveness. Various quiet places were set up both inside the UUM libraryin the postgraduate section of the library which are usually more closed in, private and controlled from outside distractions. Some of the tests were also done at the Smart Reading Rooms that are near the UUM library and also at the Library foyer during the time when it was most quiet. These places were used to serve the purpose of performing the test. The other place used in achieving the field-testing was the student residential hall of DPP Sime Darby and the Student Lounge located around there.

Fig. 3 Display tools used

The 11participants in each session were required to test the Flipboard application by using the touch screen to accomplish 5 tasks. One of the moderators recorded the entire sessions on the phone video while the participants were involved in the tasks. The testing was conducted individually, one user at a time.

The following are the five tasks used in the testing: 1) Register an Account; 2) Add categories of news; 3) Link social media accounts to the app; 4) Follow a magazine page; 5) Create a collection(playlist) of news in profile account. Prior to starting the test, the moderators encouraged the participants to "think aloud" while they are in the process of executing the tasks. The participants were also given permission to move from one task to another task seamlessly if they so wish and this was to be done in order to capture users' behavior at the time of navigating from one task to another. The procedure of this test was based on the following steps: (adapted from the works of Lin, 2015). Step 1: Execution of the 5 tasks by the 11participants who evaluated the Flipboard app. Step 2: The moderator recorded all test sessions using screen recording video app for mobile phone to capture the errors that occurred and the time taken. The measurement involved counting the number of errors the participants made when attempting to complete a task. The task completion time is the time taken to complete a task. The time to complete each task was recorded with a stopwatch and by the screen recording app. Task success (whether or not a participant successfully completed a task)was also recorded. Participants were given up to a specific amount of time to complete each task (see Table 2) (pilot testing was done to determine that the amount of time sufficient for each task completion). Step 3: The numerical data that includes the task time, error frequency and successful rate were analyzed.

IV. RESULTS

Success Rate: All participants completed task 1 (100%). In task 2, 91% of participants completed their tasks. The success rates for tasks 3, 4, and 5 were 82%, 100% and 82% respectively. The result shows that the app has a high success rate indicating good effectiveness of the mobile application. Overall, six out of the eleven participants completed all the five tasks that were given to them (55%).

Task Completion Time: There were five tasks used in the study: Register an Account, Add categories of news, Link social media accounts to the app, Follow a magazine page, Create a collection(playlist) of news in user profile account. Table 2 shows the time taken to complete each task. The time to complete each task was recorded with a screen recording application. The participants were allocated a particular time to finish each task.

Table. 2 Time taken to complete each task

User #	Task1(3Min)	Task2(1 Min)	Task3(4Min 45Sec)	Task 4(35Sec)	Task5(1Min 20Sec)
1	1.26	0.22	1.57	0.18	0.25
2	3.09	3.31	7.16	3.31	1.01
3	1.48	0.51	1.07	0.15	1.53
4	4.12	0.55	1.44	2.49	Not successful
5	3.10	0.27	2.28	2.14	0.40
6	1.33	Not done	2.41	0.15	1.53
7	2.14	0.30	Not successful	0.51	1.38
8	6.06	0.31	5.01	1.23	1.58
9	0.30	2.43	1.13	0.21	2.06
10	1.16	0.13	Not successful	1.30	1.22
11	0.40	1.95	7.35	3.56	Not successful
Total	5.33	5.38	5.47	5.08	5.05

Table 2 shows that not all participants were able to complete their tasks successfully. Only 9 out of 11 of the participants completed task 3. The task steps are: start flipboard>go to my profile> settings> go to accounts> link your social media accounts. The other two participants were unable to find the button to proceed to the fourth step quickly due to complexity of the app's interface where the button does not imply its function, so the users did not know where to click to proceed to the other step. This task has the longest time for operation which is 4 minute and 48 seconds to be precise. On the other hand, task 1 had only one error due to incorrect passwords to register. One error was also encountered in task 4, due to incorrect navigation. The steps to complete task 1 are; start flipboard>get started> go to profile> Sign up> enter email and password> enter full name>enter username. The test result showed that on the average, the app has good efficiency.

Table. 3 Number of Errors for Each Task in the Experiment and Time on Task

Task	Participants	Errors	Time on Task
1	10	1	3.00
2	10	1	1.00
3	9	4	4.45
4	10	1	0:35
5	9	2	1.20

Error Frequency: In this study, the researchers counted the number of wrong actions made by the users when executing a task. An error according to Nielsen (1993) is described as any incorrect user action that does not reach a desired goal. The table 3 shows the findings of the test. For task 1, out of the 11 participants, 10 had no errors, 1 participant made 1 error but all participants completed the task. For task 2, 10 participants made no errors and 1 participant was unsuccessful in doing the task. For task 3, 9 participants produce no errors, 3 participants made 2 errors and 1 participant made4 errors, and 2 participants didnot complete the task.

For task 4, 10 participants had no errors and 1 participant made2 errors, all participants completed the task. For task 5, 9 participants made no errors, 2 participants made 1-2 errors. Table 3 shows the number of errors that occurred for each task in the test.

V. CONCLUSION

In this study, the researchers assessed the effectiveness in use and the efficiency in use of the Flipboard mobile app. The usability of the app was tested by observation.11 participants (all students of Universiti Utara Malaysia (UUM)), were conscripted for the usability test. The result indicated that all participants completed task 1 (100%). In task 2, 91% of participants completed their tasks. The success rates for tasks 3, 4, and 5 were 82%, 100% and 82% respectively. These show high success rate. In addition, the error rates per tasks were relatively low. These results(success rates and error rates) show that the app has good effectiveness. Also, the task completion time revealed that the app on average is efficient in use. However, since some participants were not able to complete their tasks, some completed theirs but with some errors and some expended much time to complete their tasks, it is thenceforth clear that the interface is nonetheless laden with issues that demands attention.

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