

The Pin Note Cam: A Mobile Fault and Damage Reporting System

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Abstract : With the development of the information era, people can access information anywhere and anytime using their smartphones with just a simple touch. However, people are sending information about infrastructure damage to media social sites instead of sending it to the correct organization. This is because making a report on infrastructure damage had been difficult for people as they need to follow some procedures and formalities in order to report the infrastructure damage to the relevant parties. Hence, a mobile application is proposed to solve the problem by providing faster alternative with photo capture capabilities and location recognition for the people to lodge and manage their reports on the infrastructure damage. This mobile app is called Pin Note Cam: A Mobile Fault and Damage Reporting System. The methodology used for this mobile application development is Rapid Application Development (RAD) where the requirements were gathered and the questionnaire used was Software Usability Measurement Inventory (SUMI). This questionnaire was carried out to evaluate the usability of the application. The evaluation was conducted on 31 respondents of students, staff, and JPP in UUM. The findings show that the respondents were satisfied with the ease of use and attractive interface design of Pin Note Cam. Hopefully, Pin Note Cam can provide a platform for the students, staff and JPP in UUM to create and manage their report on infrastructure damage. On the other hand, the functionality and the interactiveness of the interface can be improved in the future so that people can create and manage their reports easier.

Keywords: Mobile Application, Report, Infrastructure Damage

1. Introduction

Better conditions of the facilities and infrastructure will provide the students with comfort in seeking knowledge at their respective universities [1]. However, the infrastructure may become defective, worn out or damage as time passes [2]. Hence, the students may report the infrastructure damage to the relevant authorities. Unfortunately, the students lack experience in reporting a report to

the relevant authorities and they do not have the desire to send the report as they must undergo a lengthy procedure to report the damage infrastructure. Due to that, they just take a picture and post it in the social media without properly sending it to the authority. Therefore, a mobile application called Pin Note Cam: A Mobile Fault and Damage Reporting System was created to help the students and staff of University Utara Malaysia (UUM) to report any infrastructure damage that occurs in UUM to Development and Maintenance Department (JPP). The objectives of this study are to develop a prototype of Pin Note Cam: A Mobile Fault and Damage Reporting System to make it easier for the users to report any infrastructure damage in UUM and to test the usability of the Pin Note Cam: A Mobile Fault and Damage Reporting System.

1.1 Background and Related Studies

There were many studies about developing the reporting facilities and infrastructure damage. For instance, [1] aims at developing a mobile web-based application to simplify the reporting process of facilities and infrastructure damage in their college. Their mobile web application allows the users to make a report by fill out a form and take a picture includes with the location of the facilities and infrastructure damage. Thus, with the development of their mobile app, the manual reporting is no longer works as the mobile app provides a much faster, reliably and efficient. Similar to [2], they are also proposed a reporting system called Entitled Facility Damage Reporting (EFDR) complete with location awareness and picture capability for the people to report the infrastructure damage and motivates the people of making a report to the correct organization. Hence, the people will be able to make a report with ease and satisfactory. At the same time, [3] provides an Android application called Infrastructure and Facility Reporting Management Information System (Infiremis) for the students, lecturers and staff of their university which offers features for reporting of the infrastructure damage including a mobile-devices camera and QR code. Moreover, the academic community also can use the Infiremis to monitor the status of the submitted complaint report as well as to track current report and the history of report. Therefore, the students, lectures and staff of their university can create and manage the report with better and easier. As a result, an Android application was developed called Pin Note Cam: A Mobile Fault and Damage Reporting System. The objectives of Pin Note Cam: A Mobile Fault and Damage Reporting is to let students and staff of UUM to report infrastructure damage inside UUM to the relevant authorities which is JPP. So, if they came across any defects in UUM's infrastructure, transportation, environment cleanliness or any daily life disturbances, they can share with the relevant authorities to solve the problems. The main feature of this Pin Note Cam: A Mobile Fault and Reporting System is to let everyone know exactly where and when the problematic area was in that photo taken. The Global Positioning System (GPS) sensor is present in every smartphone that will determine the exact location of the problematic area and the camera can be used to take the problematic area as a visual proof including the date and notes. It allows you to see how accurate the location of the pictures that you are about to take. For instance, if you want to report a pothole or a collapsing tree to the authorities, you just take a picture and send them a report. Thus, developing Pin Note Cam: A Mobile Fault and Damage Reporting System will serve as a handier and convenient app for the users to send complaints to relevant authorities and in the meantime, they can improve the condition of the infrastructure in UUM.

2. Materials and Methods

The materials and methods section, otherwise known as methodology, describes all the necessary information that is required to obtain the results of the study.

2.1 Materials

Specifications and properties of materials, equipment, and other resources used in the current study is described in this section.

- Programming tool used is Android Studio software.

- The post-task questionnaire used is Software Usability Measurement Inventory (SUMI).

2.2 Methods

The methodology used for development of this mobile application is Rapid Application Development (RAD) [4] (refer **Figure 1**). The reason why this study is using RAD is due to lack of time and human resource to develop the mobile application, so a quick time process is needed for every phase in order to develop on time. This leads to greater performance, fast development and efficient communication. This methodology consists of four phases which is requirements planning, user design, construction and cutover.

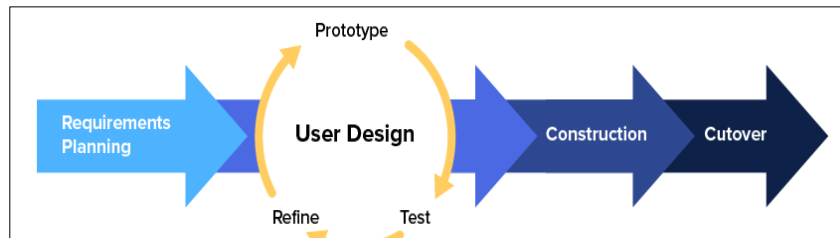


Figure 1: Rapid Application Development (RAD)

In the first phase of RAD, the requirements planning starts from conducting a survey to students, staff and JPP of UUM because most of them act as the main user. The survey will be conducted online of how the students and staff encounter the infrastructure damage in UUM and how the JPP manages the problem in order to get some ideas for developing the app. Next, user design. This is the most important phase, which is to show the users of the prototype of the app to verify whether the requirements are fulfilled in this app. After the requirement justification from the target user, the Android Studio software will be used to transform the prototyping to a real app. The entire Pin Note Cam: A Mobile Fault and Damage Reporting System user interface element will be included in the app based on the user design. In the end of the user design, the prototype of Pin Note Cam: A Mobile Fault and Damage Reporting System, will allow the developer to examine and identify any flows, errors or inconsistencies in overall design before converting into actual version. The third phase is construction. Construction is a phase for testing the prototype. In the testing phase, it will be included with the app testing and user testing. The app testing is tested by developers in intent to find the syntax and logic error. The syntax and logic error on the app will be corrected and rebuilt, until the app is robust. Then, the user only can test the app in term to evaluate the usability, functionality, performance and satisfaction. The evaluated result of the user testing is recorded for the future improvement and enhancement. Lastly, once the testing is complete, the developer will implement for the last time before officially present to the audience. Once everything is completed, this Pin Note Cam: A Mobile Fault and Damage Reporting System will be officially presented as testimonial to the public. Finally, all the related documents and final report are document together.

3. Results and Discussion

The evaluation was conducted on 31 respondents of students, staff and JPP in UUM. The instruments used for the evaluation were the Pin Note Cam: A Mobile Fault and Damage Reporting System and a post-task questionnaire. The post-task questionnaire used was Software Usability Measurement Inventory (SUMI). The post-task questionnaire consists of Section A, which asked the respondents' demographic information, meanwhile Section B, Usability of Pin Note Cam App, Section C, Ease to use of Pin Note Cam App, Section D, Satisfaction of using Pin Note Cam App, and Section E, Interface Design with three choices of Agree, don't know and Disagree.

3.1 Results

This section evaluates the respondents’ responses of the Pin Note Cam: A Mobile Fault and Damage Reporting System usability, ease of use, satisfaction and interface. The following figures display the data of the respondent’s responses in a bar chart.

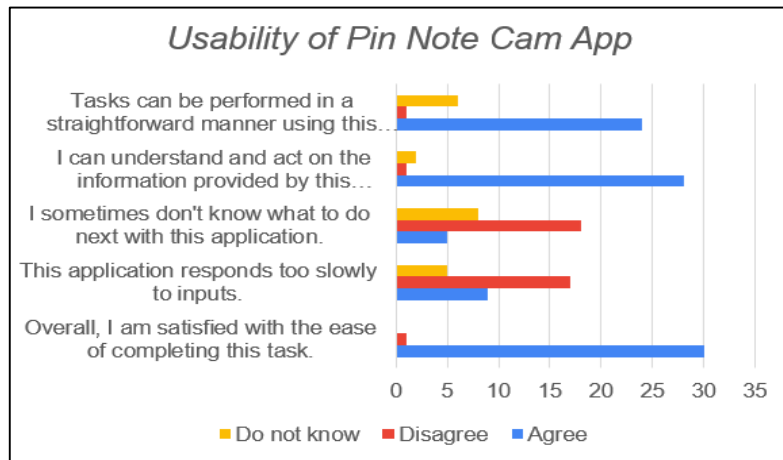


Figure 2: The respondent’s responses on the Usability of Pin Note Cam: A Mobile Fault and Damage Reporting System

Figure 2 shows the respondent’s responses on the usability of Pin Note Cam: A Mobile Fault and Damage Reporting System. Overall, the respondents were satisfied with the ease of completing the task. Moreover, 28 (90.3%) of the respondents were able to understand and act with the information provided by this application. And, 24 (77.4%) answered agree that the task in using the application is in a straightforward manner and do not makes difficult for the respondents to use the application. At the same time, 17 (54.8%) answered disagree on the application respond too slowly to inputs and 18 (58.1%) answered disagree of that they do not know what to do next with this application. Hence with the results represented, it shows that Pin Note Cam: A Mobile Fault and Damage Reporting System is understandable and performed effectively.

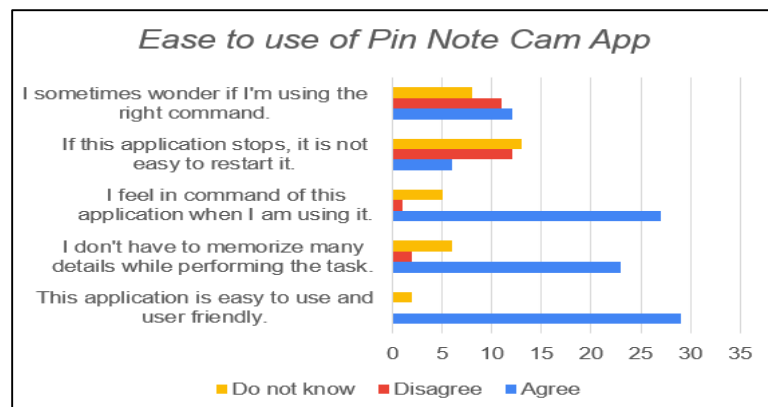


Figure 3: The respondent’s responses on the Ease to use of Pin Note Cam: A Mobile Fault and Damage Reporting System

Figure 3 shows the respondent’s responses on the ease to use of Pin Note Cam: A Mobile Fault and Damage Reporting System. The results indicates that most of the respondents of 29 (93.5%) were agreed that this application is easy to use and user friendly. On the other hand, 13 (41.9%) answered don’t know if this application stops, it is not easy to restart it and 12 (38.7%) agreed that they sometimes wonder if they are using the right command. For this reason, Pin Note Cam: A Mobile Fault and Damage Reporting System should provide more information on using the application. Even though there is need to make an improvement, the respondents 23 (74.2%) were agree that they do not have to memorize many details while performing the task and 25 (80.6%) of them were able to use it easily.

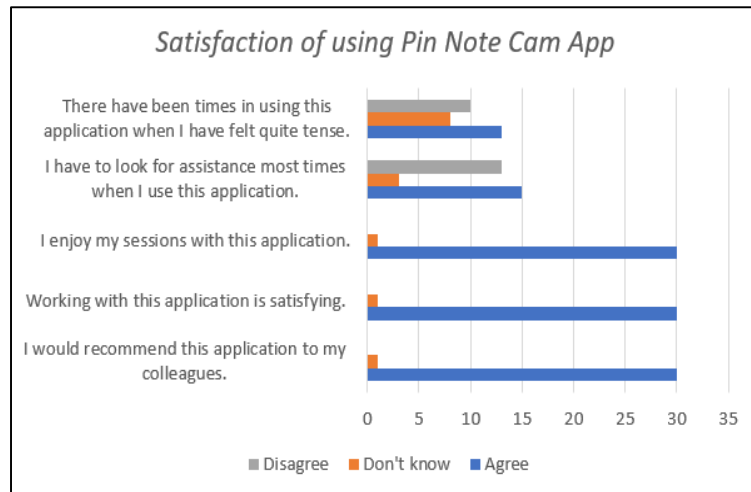


Figure 4: The respondent’s responses on the Satisfaction of using Pin Note Cam: A Mobile Fault and Damage Reporting System

Figure 4 shows the respondent’s responses on the satisfaction of using Pin Note Cam: A Mobile Fault and Damage Reporting System. It appears that most of the respondents are satisfied and enjoy while using the Pin Note Cam: A Mobile Fault and Damage Reporting System. Only 1 (3.2%) of the respondent answered don’t know. In addition, they also would like to recommend this mobile app to their friend and colleagues. This indicates that the application is helpful to people. On the other hand, 13 (41.9%) of the respondents were agreed that the mobile app makes them feel tense and 15 (48.4%) of them were having to look for assistance most times while they are using the Pin Note Cam: A Mobile Fault and Damage Reporting System. In short, Pin Note Cam App provides a satisfaction for the user to use it.

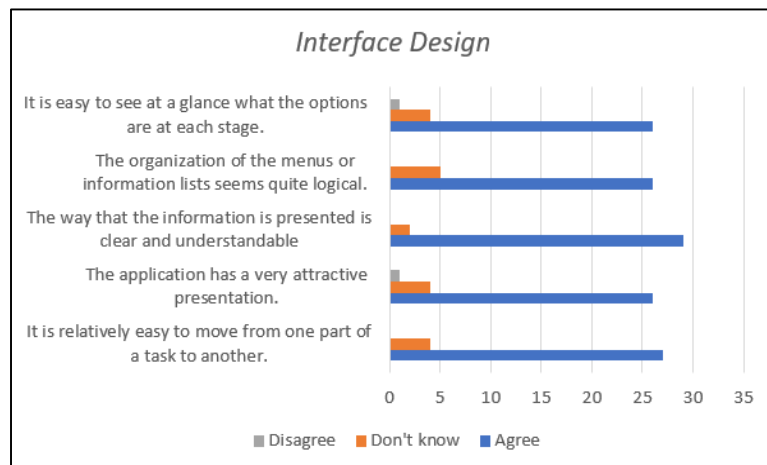


Figure 5: The respondent’s responses on the Interface Design

Figure 5 shows the respondent’s responses on the interface design of Pin Note Cam: A Mobile Fault and Damage Reporting System. For the most part, the respondents were agreed that the interface design of Pin Note Cam: A Mobile Fault and Damage Reporting System were attractive and easy to navigate of what the options are in the interface. Meanwhile, there were 19 (61.3%) of respondents were answered don’t know what the interface design is about and 2 (6.4%) others answered disagree. Hence, the placement of the options in the interface lets the respondent see it easier and makes the right choice.

3.2 Discussions

In general, the respondents were enjoying while using the Pin Note Cam: A Mobile Fault and Damage Reporting System. To summarize, Pin Note Cam: A Mobile Fault and Damage Reporting System provides the satisfaction for the respondents while using the application with the easier and an attractive interface design. Moreover, most of the them would like to recommend this application to their colleagues, indicates that this application is helpful and user friendly.

3.3 Tables

Table 1 below shows the demography information of the respondents.

Table 1: Demographic Information of Respondents

Demographic Information	Respondents
Role in this questionnaire:	
Student and staff	28
JPP	3
Age:	
19 – 25 years old	28
26 – 32 years old	-
33 – 39 years old	1
40 – 46 years old	2
47 – 53 years old	-
Above	-
Gender:	
Male	11
Female	20

Based on the data analysed results, 20 (64.5%) of the respondents were female, while 11 (35.5%) were male. In addition, most of the respondents who participated in this usability evaluation were students and staff with the total number of 28 (90.3%), while 3 (9.7%) were JPP. Similarly, 28 (90.3%) of the data shows that some of the respondents were aged between 19 and 25 years old, 1 (3.2%) were aged 33 to 39 years old and 2 (6.5%) were aged between 40 and 46 years old.

3.4 Figures

The figure below shows the prototype of the mobile application. The prototype is a common way to show the specifications of the application so that the users can give their comments and recommendations while interacting with the prototype. The screenshot of the interface are shown in Figure 6 and 7.

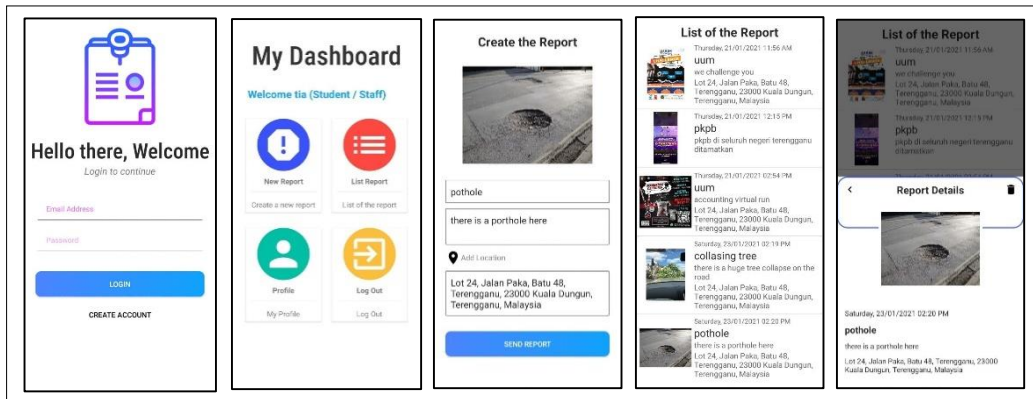


Figure 6: The interface for login, the main dashboard for student / staff, create the report, the list of the report and report details

Figure 6 shows the interface for login, the main dashboard for student / staff, creating the report the list of the report and report details. The user creates the report by taking a picture or choose image from gallery and fill out the details of the report, including the location of the infrastructure damage. The report will be sent to JPP and the user can view and update the report that they had made before.

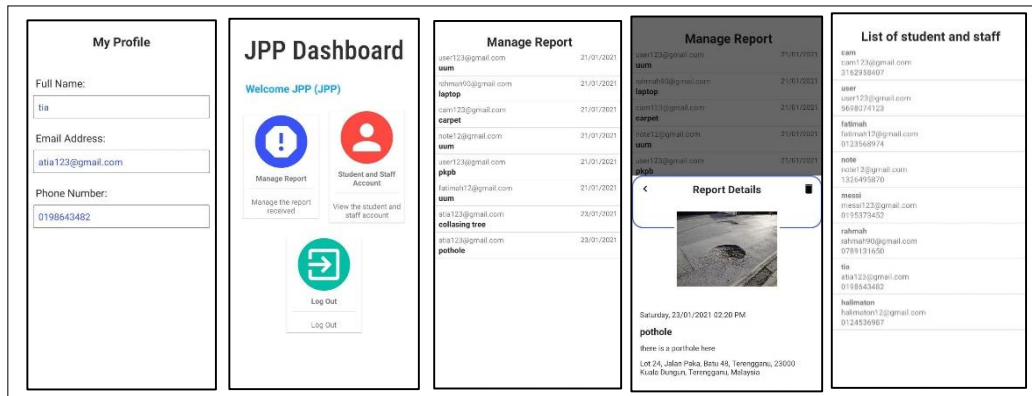


Figure 7: The interface for profile, the main dashboard for JPP, manage report, manage report details and list of student / staff.

Figure 7 shows the interface for profile, the main dashboard for JPP, manage report, manage report details and list of students / staff. The user can view their profile that displays their full name, email and phone number. Next, the interface shows the main dashboard for JPP and the manage report. The JPP can manage the report received and view the student or staff email, the title and the date of the report. The JPP can also manage the report by deleting the report after the action has been made and the report will also be deleted on the list of report of student and staff. Finally, the JPP can view the list of the student and staff that send the report.

4. Conclusion

In conclusion, the respondents were satisfied with the ease of use and the attractiveness of interface design of Pin Note Cam. Moreover, we had successfully developed the intended mobile application and also able to successfully implemented the main requirements for the mobile application. However, the mobile application still need more improvement in terms of more functionality and interactive interface.

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