

Development And Evaluation Of Android – Based Instructional Material For The Computer System Servicing

Estela L. Dirain, Rosalinda B. Guiyab

Abstract: Learning process adopts changes, the development and evaluation of an Android – Based Instructional Material for the Computer System Servicing was conceptualized and conducted. The study developed an android – based instructional material based on the needs of the students and tested the developed instructional material in terms of usability and functionality. The two-phased study, including the development and evaluation, utilized an Agile development model. Conducted at TESDA – ISAT Ilagan Isabela, the thirty (30) respondents include the TESDA – ISAT Supervisor, two(2) CSS Assessors / Trainers, five (5) IT Specialist, and 22 CSS students. A survey questionnaire, based on ISO 25010:2011, was used to evaluate the developed application in terms of usability and functionality. A 5 – point Likert scale was used to interpret the assessment. The functionality of the application obtained an over-all rating of 4.43 and the usability obtained 4.36 which imply that respondents strongly agreed on the applications performance on functionality and usability. With an overall rating of 4.40, the functionality and usability of the application was found Outstanding.

Index Terms: Android – based Instructional Material, computer systems servicing, development and evaluation of android, instructional material

1 INTRODUCTION

The CSS performance results guide decision makers in formulating policies relative to the progression and promotion of students. These will also determine the performance of the students that need further intervention. Results of this indicator will help them formulate appropriate interventions that aimed the improvement of the education system. The TESDA-ISAT Ilagan, Isabela aimed to respond to such intervention in order to improve instruction and consequently, improve the performance of the students. This intervention has resulted to the use of mobile technologies as it is now being utilized due to its convenience and simplicity. It is not limited to media of communication or entertainment but it is also been utilized as a learning tool. Wirawan (2011) stated that the use of mobile phone technology has not only focused on a media of communication or entertainment but also has been used as a learning media. As majority of students and teachers are using mobile phones in the learning process, the android-based instructional manual for CSS was conceptualized. The application can be used anywhere and anytime. Hence, students and teachers would be benefited in the teaching and learning process.

1.1 Objectives

The study aimed to develop and evaluate an android-based Instructional Material for Computer Systems Servicing.

Specifically, it aimed to:

1. Develop an android-based instructional material for the computer systems servicing that will be based from the needs of the students and with the following features:

- a. Application for the user;
 - b. Application for the administrator;
 - c. Category-based structure;
 - d. Complete user interface for the administrator; and
 - e. Real-time update.
2. Test the developed application in terms of the following:
- a. Usability and
 - b. Functionality

2 PROJECT DESIGN AND METHODOLOGY

The following presents the development model and approach, respondents of the study, locale and population of the study, data instrumentation and research instrument that were utilized in the study. The study used a two-phased process method: the development of the android-based application and its consequent evaluation. The method ensures not only that the application is develop but the development output was assessed as to its congruence use. The development phase included systems analysis, design and development suitable for a development model. The evaluation phase focused on the usability and functionality of the developed android application.

2.1 Research Design

The study made used of an Agile development model by Wijayamanna, 2015. This model promotes continuous iteration of development and testing throughout the software development lifecycle. The method consists of five phases which include planning and requirements analysis, design phase, build phase, testing phase, and evaluation phase which were discussed below:

1. Planning and Requirements Analysis

The researchers collected the instructional material for CSS which were used for the development of the android-based application with emphasis on the needs of the students on the result of their performance. The different features of the application were also identified. Also in this phase, the needed hardware, software and target users were analyzed and validated. The following are the list of software and hardware that were used in the development and implementation of the application.

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Hardware Requirements

The hardware requirements used for the development of the application include a laptop with 4GB RAM, Intel Core i5 2.6GHz processor, and a screen resolution of 1366 x 768. During deployment, any device with a minimum Android OS of Lollipop with at least dual core 1.2 GHz processor, 1 GB RAM at least 20 MB free data storage.

Software Requirements

The software requirements used for the development of the application include Java, XML, and Android Studio. The android studio was used to develop the mobile application and it used two programming language the Java and XML. The XML was used for the design and framework of the application. On the other hand, Java was added to provide interactivity of the application.

User and User Interfaces

The target users of the application were the teachers and students in CSS. The users should know the basic knowledge in using android phones.

2. Design Phase

The researchers created the framework of the application including the design and user interfaces.

2. Build Phases

Actual coding and programming were performed using different tools like Java, XML and Android studio in developing the application.

3. Testing Phase

Unit testing and integration testing were performed wherein the individual components were combined and tested as one application. This testing methodology checked if the application works properly as a whole.

4. Evaluation Phase

The application was evaluated by the respondents in terms of usability and functionality.

2.2 Research Participants

The respondents of the study were the TESDA-ISAT Supervisor, two (2) CSS Assessors/Trainers, five (5) IT Specialists, and 22 CSS students.

2.3 Data Collection Tools and Procedure

Survey questionnaire was used to evaluate the application in terms of usability and functionality. The survey forms were personally distributed to the respondents after they have navigated the functionalities of the application.

2.5 Data Analysis

The Likert scale was used to interpret the assessment of the respondents in the developed application. It has five (5) – point scale which has an equivalent scale and rating as presented in Table 1. Weighted mean was used to tally the rating given by the respondents.

Table 1.
Likert Scale

Rating Scale	Point Range	Description
4.21 – 5.00	4.21 – 5.00	Strongly Agree
3.41 – 4.20	3.41 – 4.20	Agree
2.61 – 3.40	2.61 – 3.40	Undecided
1.81 – 2.60	1.81 – 2.60	Disagree
1.00 – 1.80	1.00 – 1.80	Strongly Disagree

2.5.1 Software Criteria

The software criteria used were based on the ISO 9126 – Software Quality Characteristics. Functionality of the application included the interoperability and accurateness. It measures the capacity of the application on the manner on how it is accessed, interactive and purposive when the application was served. Usability was used to measure the application in terms of understandability, learnability and operability. The physical design covers the layout, graphics, color and text was also considered in this criteria.

3 RESULTS

This presents the android-based application developed which include the features and results of evaluation.

3.1 Application Development

Features / Functionalities of the Application

The application can be shared via SHAREit or Bluetooth. Once shared, install the application. Run the application after its installation.

a. Application for the user

The developed android-based application provides access for the user as illustrated in figure 1. Click on the icon to get started.

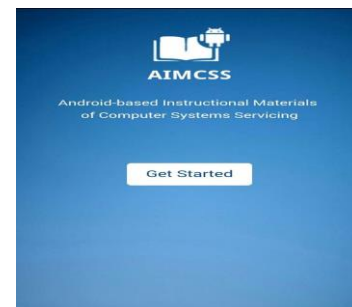


Figure 1. Getting Started to AIMCSS: Android-based Instructional Materials of CSS

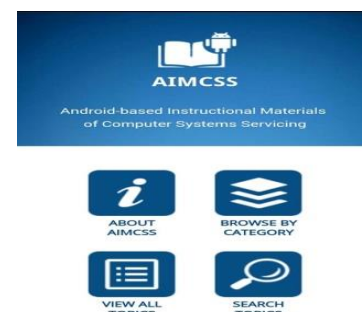


Figure 2. AIMCSS for the User

Figure 2 provides information about the instructional material and the contact persons on the partner agency. The About AIMCSS contains information about the contacts on the identified agency. The Browse Category allows the user to browse the instructional material by category or topic. Included in the browse category is the search button for further searching of the information. The View all Topics allow the user to view all the topics contained in the application. The Search Topics allows the user to search information about the CSS instructional material.

B. Application for the administrator

The developed android-based application provides access for the administrator as illustrated in figure 3. Click on the icon to get started.



Figure 3. AIMCSS for the Administrator

C. Category-based structure

The application used a category-based structure. The structure was based on the result of the research about students' performance on CSS.

D. Complete user interface for the administrator

Figure 4 displays the dashboard for the administrator. To add or edit content of the learning material, select on the learning material.



Figure 4. Dashboard for the Administrator

E. Add nework

Figure 5 allows the administrator to add new topic to the learning material. Enter the title of the material and its contents. You can select on the options to publish the material added.

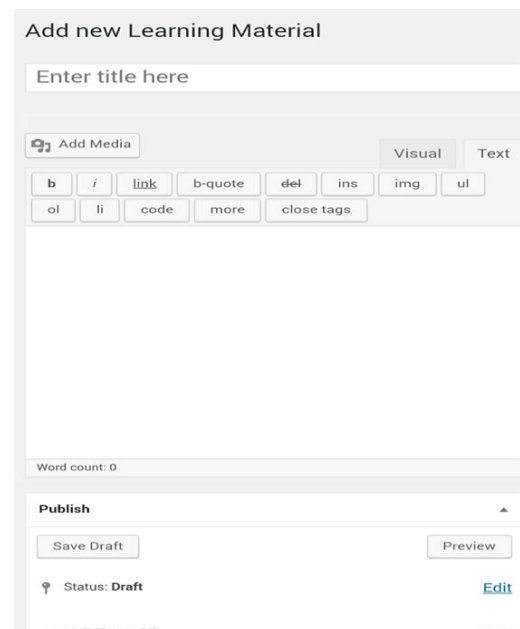


Figure 5. Add New Topic for the Learning Material

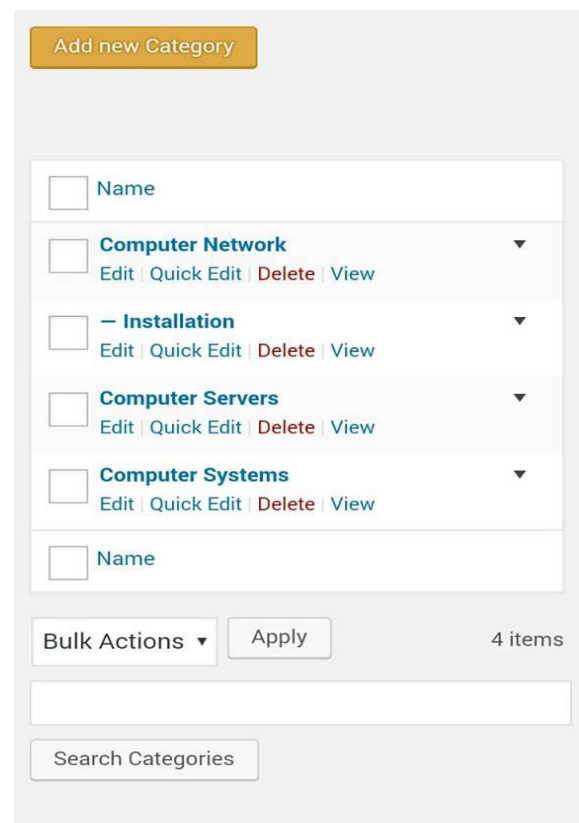


Figure 7. Adding new category or title

Figure 7 allows the administrator to add a new category or title to the learning material. Click on the Add new Category button and enter the name of the category or title.

3.2. Evaluation of the Developed Application

Table 1 reflects the respondents rating on the functionality of the application. As reflected in the table, the functionality of the

application obtained an over-all rating of 4.43 which implies that the respondents strongly agreed on the developed application in terms of its function. The result can be attributed to the performance of students, faculty members, and the availability of facilities.

Table 1.
Respondents' Rating on the Functionality of the Application

Functionality	Weighted Mean	Description
1. The application provides access to the users.	4.55	Strongly Agree
2. The application provides access to the administrator.	4.55	Strongly Agree
3. The application is organize in a category-based structure.	4.55	Strongly Agree
4. The application provides complete user interface for the administrator.	4.25	Agree
5. The application provides real-time update.	4.25	Agree
Overall Weighted Mean	4.43	Agree

Table 2 reflects the respondents rating on the usability of the application. As reflected in the table, the usability of the application obtained an over-all rating of 4.36 which implies that the respondents strongly agreed on the developed application in terms of its use. The result can be attributed to the users as they are knowledgeable in the necessary information needed for the CSS.

Table 2.
Respondents' Rating on the Usability of the Application

Usability	Weighted Mean	Description
1. There is a consistency in the application's color combination, screen layout and font styles.	4.45	Strongly Agree
2. The application is easy to use.	4.43	Strongly Agree
3. The application is simple and elegant.	4.23	Agree
4. The information contained in the application is organized and clear.	4.28	Agree
5. The application provides a clear and simple path to the other contents of the application.	4.23	Strongly Agree
Overall Weighted Mean	4.36	Agree

Table 3 reflects the respondents' summary rating on the functionality and usability of the application which has a weighted mean of 4.40. This implies that the respondents strongly agreed on the functionality and usability of the application.

Table 3.
Respondents' Summary Rating on the Functionality and Usability of the Application

Software Criteria	Weighted Mean	Description
1. Functionality	4.43	Agree

2. Usability	4.36	Agree
Overall Weighted Mean	4.40	Agree

4 CONCLUSION

The developed android-based instructional material for the computer systems servicing motivate the interest of the students through the features that were incorporated such as the level of access a user – friendly structure and interface and having a real – time update as they strongly agreed on the functionality and usability of the developed system.

6. RECOMMENDATION

From the findings, it is recommended that the developed system be utilized to other courses taking up by the students.

7 ACKNOWLEDGMENT

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