A Mobile Learning Android Application for Beginner Reader in Filipino

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Abstract: The Maestra (teacher)- A mobile learning android application for beginner reader in Filipino is a tool that helps the children learn how to read in their early age and guide them in proper pronunciation. The contents of the application are the basic reading manuals like Abakada. This application can help the young age's excel in class and at the same time practice while they are at home. The application runs on Android platform that has a version of 4.0 or ice cream sandwich up to kit Kat version. Agile Methodology was used in developing the application. It was designed using Adobe Photoshop and Android Studio for its coding. There were two testing tools that were used; these are the conformance testing and performance testing which both passed. In addition, the project was evaluated using the criteria on Android developers' standard. Forty (40) participants evaluated the project, (10) It experts and (30) end user. The result in 10 It experts showed that the application is highly acceptable with the average mean of 3.54. The 40 end users showed that the application is moderately acceptable with the average mean of 3.5.

Keywords: Mobile Learning, Android Application, Photoshop, Android Studio.

1. INTRODUCTION

This study presents the different parts of the project in terms of description and its context, objectives, significance as well as its scope and limitation that give the users a short discussion about the project.

1.1 Project Context:

Android application is one of very common sources of fun and entertainment now a days. Sometimes, people prefer spending much time clicking and using their smartphones or gadgets whenever they are. Hence, game developers and programmers are creating applications that can be easily installed in their mobile gadgets to help users use their gadgets efficiently.

The use of Android application can help the users learn anywhere they are. They need to install the application on Android phone. The users do not need to carry heavy books, because it is simply installed in the Android phone. The application has an audio voice clip, so the user can learn the correct grammars of the word.

The application is user friendly and is resourceful. The readers/users must always be guided by the parents and must be helped if there are words that are hard to read and to pronounce. It can also create bonding time between the parents and their children.

Some students at early age are already fond of using technology. Because of this, it can be possible for them to be distracted, though it has a good benefit. This project can help students to learn and at the same time enjoy while learning.

Even the students will reduce time and efforts in reading a book. The application also addresser their needs, because they would not be bored in reading in this application. This can also help with their relationship with their parents. It can be their way to have a bonding time while using the application.

1.2 Project Description:

The MAESTRA: A Mobile Learning Android Application for Beginner Reader in Filipino The project would guide the children by showing a picture and listening to an audio provided by the application. This will encourage further reading and understanding of the application and will create interesting mobile learning application.

The application has three categories such as "magbasa","makinig","mga alpabeto". It also has an evaluation test or quiz to test the user if he/she really learned anything about the application. There is also a "kredito" for the user to see who created the application that they are using. Lastly, the "lumabas". This button is the exit button for the application.

1.3 Purpose/Objectives of the Study:

The general objective of the study is to develop a mobile learning android application for beginner reader in Filipino.

Specifically, the project aimed to:

1. Design an Android application that has the following features:

a. A user friendly environment;

b. A combined audio, picture for the users to listen to the audio while looking into the pictures. They can choose what module they want to open and every example given has audio clip provided to let the users know how to pronounce every word correctly.

c. A mini video clip about nursery rhymes to familiarize in basic pronunciations;

d. A short quiz at the end to test the users of what they have learned; and

e. Run on Android mobile devices/platform.

2. Create the project using Eclipse as frontend and using Android Studio as back end.

3. Test and improve the developed system using conformance testing and performance testing. To see if the application is useful and can let the children four to seven years old to learn with the use of the application.

4. Evaluate the performance of the system and measure it base on the following criteria, standard design, navigation, install location, audio, UI and graphic, user app/state, stability, performance, media, visual quality.

1.4 Significance of the Study:

This study would be a significant endeavor in teaching children to enhance their reading skills in basic Filipino language. This project would benefit the children and even foreigner who are about to study basic Filipino language. Also, this study will be helpful to children who are taking pre-school for advanced learning. And importantly, this application will educate users and also foreign users who would like to learn and to speak basic Filipino language.

The project aimed to benefit the following.

Children. Who already involved in using smartphones in a very young age to teach them to study while having fun by the modules used by the developer.

Parents. Are assured that this application is a tool that can help their child to learn to read.

Teachers. It helps them in teaching the grade one to grade two students in reading.

2. REVIEW OF RELATED LITERATURE AND STUDIES

2.1 Review of Related Literature:

2.1.1 Android Application:

According to [Burd 2012] Android phones are everywhere. On January 2011, Android became the most popular operating system for mobile phones in the United States, and it is stated in that month," the Android's market share managed to surpass from the Blackberry and the iPhone."[1]

According to [BEAL, 2015]. A mobile software application developed for use on devices powered by Google's Android platform, and he stated that the android applications are available in the Google Play Store (formerly known as the

Android market). According to [BEAL, 2015], in the Amazon App store and on various Android App-focused sites and the applications can run on Android smartphones, tablets, Google TV and other devices.[2]

An application is a program, or group of programs that is designed for the end user. Application software can be divided into two general classes: systems software and application software (also called end-user programs). It is similar to this research that has many functions included such as database, programs and codes.

The researchers developed an Android application as part of the study because they saw that Android applications are being an essential tool now a days for many people. Android application is one of the trends nationwide because everywhere people are using android smartphones as part of their daily living. Perhaps, the population of the Android users grows every year. This research is about developing a useful application for the benefits of the children.

2.1.2 Mobile Learning:

According to [Sharples, 2009], over past 10 years mobile learning has grown from a minor research interest to a set of significant projects in schools, workplaces, museums, cities and rural areas around the world and it is true because everywhere you go there are people who are involved in using mobile learning, and each project has shown how mobile technology can offer new opportunities for learning that extend within and beyond the traditional teacher-led classroom or the manual teaching. [4]

According to [Pachler 20120], Mobile learning is an emerging, and rapidly expanding field of educational research and practice across schools, colleges and universities as well as in the work place. It is true because the ones who will us the mobile learning application are the users who are studying especially the children. It started to attract the interest and imagination of practitioners in all phases of education as well as that of researchers. [5]

According to [Cook 2010], Mobile learning is slowly establishing itself as a field in its own right. However, there still exists a lack of clarity about what best will be easily understood. He also said that there is a need for a separate field of enquiry on mobile learning. [6]

As part of the study, the proponents developed mobile learning Android application, because these days, the users even the youngsters can use high technology gadgets. So the proponents decided to let the child to learn using their Android phones by the use of the developed application. The members of the church could easily have thein formation and will know the announcements they need to know right away.

2.1.3 Software Development Kit (SDK):

According to [Burd 2012], Android Software Development Kit (SDK) contains the libraries needed for developing Android application. It means that, it has the file needed to run the application and according to him the SDK has code for drawing forms on a devices, screen lock for dialing phone number, code for taking pictures with the devices camera and a lot more. [7]

He also said that the kit also contains bare-bones tools for cheating, running and testing android application. Through the barebones tools, by typing instructions can run in the development computers command windows. These tools perform all the logic required to do a full-fledged android development, but he said that the SDK has no friendly user interface for invoking these tools. [8]

According to [Beal 2015], a software development kit that enables developers to create applications for the Android platform which means that, the SDK is a tool to help the developer to run the application in the android platform. He also stated that the applications are written using the Java programming language. [9]

In using the developer's application, one of the very important tools in developing an android application is the SDK (Software Development Kit), because this tool generates the updates of the Android and if the application would be used. In every team, it is very important that the programmers are familiar in using SDK.

2.1.4 Java:

According to [Farrell 2012], Java Programming: Concepts and Application provides the beginning programmer, and it has a guide in developing applications using the Java programming language. Java is the main language needed to program the codes for a program. Java is popular among professional programmers, because it can be used to build visually interesting graphical user interface (GUI) and to create an application. [10]

He also stated that Java also provides an excellent environment for the beginning programmer. This means that the basic programming techniques can be learned using this language. A student can quickly build useful programs while learning the basics of structured and object-oriented programming techniques. [11]

According to [Malik 2012], the terms such as "The Internet" which is unfamiliar few years ago, are now common because of the easy growth of the technology. Java programming language is especially well suited for developing software to accomplish specific task. Before beginning a programming, it is useful to understand some of the basic terminologies and different components of the computer to easily familiarize with Java easily. [12]

The developers decided to use Java as the programming language for the development of the Android application, because in using Java it is easier to use compared to other programming languages in terms of coding the programs. Basic Java knowledge will be enough to code the program.

2.1.5 Graphical User Interface (GUI):

According to [Rimmer 1992], Graphical User Interface is the real time application of visual presentations of otherwise information-based phenomena relating to the operation of computers. GUI is also important, because it will be the body of the application or the software to be developed. It is true that graphical user interfaces traditionally annoy programmers, who see all those graphics as merely typing up both useful memory and processor. [13]

He also stated that graphical user interface requires pretty intimate contact with the innards of the language it's written in. With the use of the interface the design can be easily appreciated. He added that, the bit of assembly language also involved can be handled with either Microsoft's MASM assembler or the Borland TASM package. [14]

2.2 Related Systems:

2.2.1The Development of Filipino Mobile-Learning Made Easy:

According to [Genuino 2013], Filipino Learning made easy is an Android Applications; it is the focus of the capstone project. This documentation is composed of five (5) chapters namely: chapter one (1) introduction, chapter two (2) study of related literatures, chapter three (3) methodology, chapter four (4) project evaluation, and chapter five (5) summary of findings.

[Genuino, 2015], developed a system that could help the user like the foreigners to study the Filipino language easily and to create a Filipino like dictionary. He intended to make an application easier to use for the benefit of others who do not know how to use an android application.

2.2.2 Clueless Lycean:

Visual Novel Game on Mobile Application Lyceum of the Philippines University Cavite According to [Delas Alas 2015], nowadays, there are many kinds of games that the students enjoy playing from mobile phone, and it really became one of the main entertainments for the students. There is a kind of game called a "Visual Novel". It is an application that has a story and at the same time the user plays the game in an Android platform.

Based on the study conducted by Delas Alas, they came up with the study about visual novels using Android platforms. Their goal is similar to the developed; that is to entertain the users while they are learning. Also they used Android phones as a tool in using the application.

2.2.3 Mobidesk 1.0: A Productivity Application for Computer and Android Device:

Peji 2015], in his study entitled: Mobidesk 1.0: A Productivity Application for Computer and Android Device, focused on expanding the usability of the now most used service, the internet and mobile computing, to create a productivity-focused system that will help users to access their files anytime and anywhere.

As stated in the study, they used Android device as a tool in using the application for the benefit of the people who are always using their android phones wherever they go. Similar to the study, the developers target user are the people who are always engaged, in using their android mobile phones as a need in their everyday life.

2.2.4. 100 Maze to Heaven:

An Implementation of Minimax Algorithm in an Android Application Game According to [Balcos 2015], the purpose of this study is not only to entertain the users, but also to harness their thinking skills. 100 maze to heaven in an application game tests the user's thinking skills and definitely entertains them.

This application is a strategic game that can challenge the strategy of the users this which is also similar to this study; it will be useful for the people who want to learn with a thrill using Android platforms. Who also came up with the study of a game that the users can pick knowledge as time they are learning.

2.2.5 Nineveh Academy Cash Disbursement System with SMS Billing Inquiry Mobile Support Application:

According to [Acosta 2013], Nineveh Academy Cash Disbursement System with SMS Billing Inquiry Mobile Support Application is developed to modernize the academy; the main idea is to use the mobile phone technology in the accounting functions, such as the SMS technology.

Based on the study conducted by Acosta, they came up with the study of SMS billing using Android mobile phone and this application can be similar to this research, because used it also an Android mobile phone to run the application

2.2.6 Mobile Learning and Web Application for LPU-Cavite International High School:

According to [Norcio 2014], the study Mobile Learning and Web Application for LPU-C International High School is an online-based system that help communication between student and their teacher concerning academic purposes. Mobile learning environments open a wide range of new and exciting learning opportunities, and envision students who are continually on the move, learn across space and time, and move from topic to topic and in and out of interaction with technology.

As stated in the study, the target users are the students, to make them effortless when communicating with their professors by using their mobile phones. Similar to the study, the beneficiary of this application are the students with the help of the mobile phones running on Android platform.

2.2.7 CAVFARE (Android Application for Cavite Transportation Fare):

According to [Camingay 2014], this study is entitled CAVFARE "Android Application for Cavite Transportation Fare" is an application that provides the fare rates in Cavite. It is beneficial to the commuters, especially to those who are not familiar with the places and for the tourists who want to visit places in Cavite.

According to Camingay, they developed an Android application for the transportation fare of the students who always take a ride in going to school. This study can be similar to the developer research that uses their mobile phones as a tool also the students are the beneficiary of the application.

2.2.8 Lyceum of the Philippines University Cavite Campus Android Web Notification Service:

According to [Bautista 2013], "Lyceum of the Philippines University Cavite Campus Android Web Notification Service" is a web host system which produces data that would help users be informed of news and updates within the school premises.

As stated in the study, they developed an Android web notification service that can help the users to know what are the news and the trends in school. It is similar to this study which uses mobile Android devices as the tool in running the application and at the same time, the students are be the beneficiary of the project.

3. TECHNICAL BACKGROUND

This chapter discusses software that were used and the technology that run the application. It also explains the functionality of every button or flow of the application.

3.1 Technical Definitions of terms:

Android Operating System:

It is an operating system that runs through the Android platform. It is used to power smartphones, tablets, and other mobile devices. It is also an operating system that is use to run the application.
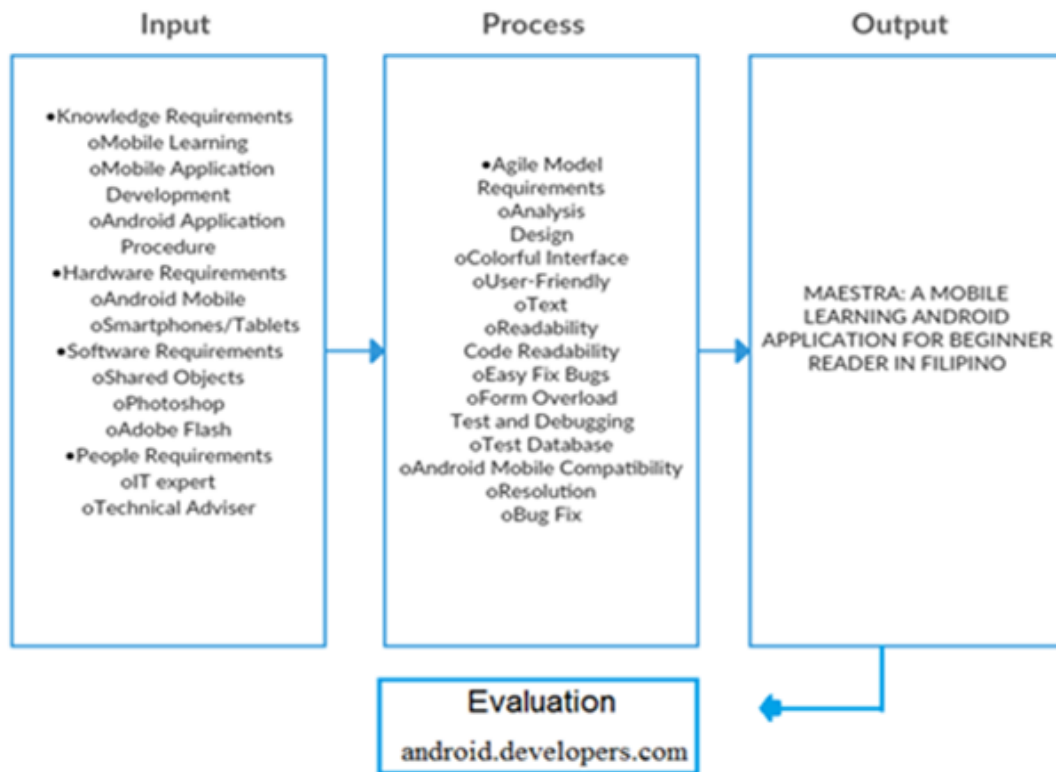
M-Learning:

It describes as a learning tool that can be used to study but not with the use of book, instead with the use of any electronic devices such as smart phone and many more. The developers came up with a project that can be used by Filipino beginner readers but this time, not with the use of book or any other materials rather with their own electronic devices.

Application:

It refers to the software that was built for personal computers or any mobile devices that can be convenient to other users.

3.2 Process Design/Framework:

The conceptual framework of the project will show the Input, Process and the Output of the Application. It will also show the requirements needed in the project.

Figure 1.Conceptual Model Diagram of Maestra: A Mobile Learning Android Application for Beginner Reader in Filipino

The research has used Conceptual Model Diagram to know the flow of the study. This will also help their search to know the results of the evaluation that will be made by the respondents and help them to know what specific area of the system needs improvements.

4. METHODOLOGY

This chapter presents you the methods and concepts used in developing the application. It is composed of different diagrams and step by step guidelines on how to use the particular application, the requirements that the developers met such as deadlines and platforms where the system was used.

4.1 ProjectRequirementAnalysis/Specification:

This study show processes were incorporated in the developed system. This part also explains the different specifications used to develop the project.

4.1.1 Operational Feasibility:

The developers came up with this diagram by identifying why the problems occur.

Eventually, there are many tools and designs to choose that help the project manager to decide of what they used. At the same time, the specifications of the Android devices were considered, such as the Android versions and Graphic Processing Unit that maintain the performance of the Android device. The lower version expects some lags due to the outdated Operating system.

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The platform of the application program runs on Android version 4.0 (Ice Cream Sandwich) up to the 4.4 (Kit Kat), and the platform used is SQLite for its database.

4.1.2 Technical Feasibility:

The technical feasibility study assesses the details and also the excellence in trouble-shooting in long term planning, and also serves a guide for decision making. The technical requirement of the developed application, first in hardware, the developers used Android mobile phones. For software, it is composed of eclipse software or android studio and Adobe Photoshop. This is needed in order to develop an application.

The software requirements in order to use this application are android 4.0 to android 4.4 smartphones or tablets. The hardware requirements are the following; it should be 1G Read only memory (RAM), and it should be an android platform. The smartphones should meet the hardware requirements in order to appropriately run the application.

4.1.3 Schedule Feasibility:

Schedule feasibility used to know the time frame of a proposed project .The researchers used the GanttChart to be able to show the time used by the researchers to finish the proposed project.

Activities	2015				2016			
	June	July	August	September	November	December	January	February
Planning	■	■	■					
Data Gathering		■	■					
Analysis		■	■	■				
Documentation		■	■	■	■	■	■	
Coding			■	■	■	■	■	■
Debugging				■		■	■	
Project Design			■	■	■	■		
Implementation							■	■

Figure 2.GanttChart

Figure 2 shows the calendar of the activities in developing the system and the activities conducted by the developers. First, is the planning. It took three weeks to plan for system or what platforms to be used. The second activity is data gathering that was done during the second up to seventh week. The third is the data analysis that took two weeks. Next, is documentation which was done on the 13th week. The coding was done on the 11th week, and the debugging was conducted within two weeks. The project design was done in three weeks. Lastly, implementation was done at the last two weeks of the month.

4.1.4 Economic Feasibility:

This refers to all the cost and the benefits of the proposed project. It may also refer to the financial model the researchers used. The researchers used CBA or the Cost Benefit Analysis to know the Economic Feasibility of the proposed project. Cost Benefit Analysis refers to all financial cost of the proposed project. It shown how   much the researchers spend in developing the project.

4.3 Project Design:

Project Design refers to the overall design of the proposed project it consists of different diagram the researchers used to describe the project or to show the flow of data in the system.
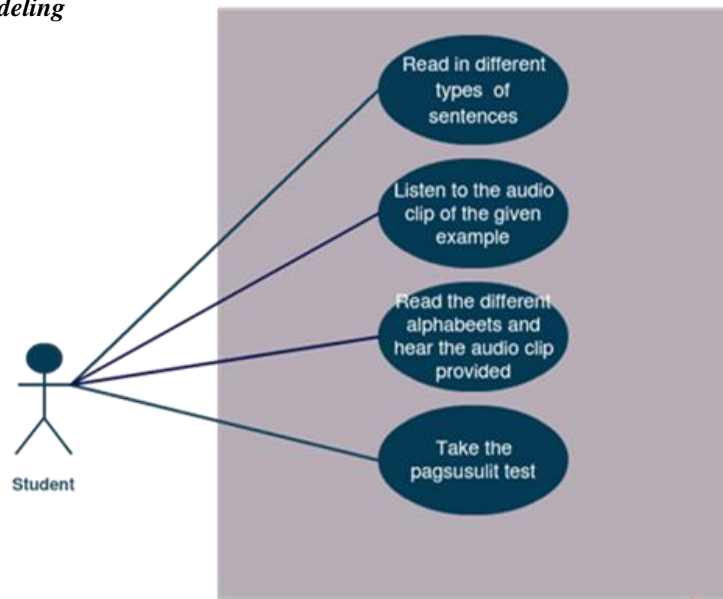
4.3.1Data and Process Modeling

Figure 3. Use Case Diagram

Figure 3 above shows the Use Case Diagram of "Maestra: A Mobile Learning Android Application for Beginner Reader in Filipino, in which all the task that the users can do can be seen. It consists of step by step process in guiding the users about the application which includes form about reading listening and taking quiz phases of the application.

4.3.2 Output and User-Interface Design:

This shows all the forms and reports represented in the proposed project. All the forms are being showed in the system. These shows the different forms and processes of the system.

The Input Process Output Diagram of Maestra: A Mobile Learning Android Application for Beginner Reader in Filipino. It consists of input where the knowledge needed in making an android application is required. On the Process, the agile methodology in making the application. Lastly the Output which is Meastra.

5.   IMPLEMENTATION AND EVALUATION

5.1 Project Implementation Plan:

In this chapter, the summary of findings conclusion and recommendations made as an outgrowth of this study is discussed. This section is about what method the team will be using, until when he developed system will be fully accessible on all of its features and other topic that is related to the implementation. Implementation plan covers the important details, a summary of the main duty effort and some implementation requirements.

5.2 Project Testing and Evaluation:

These are the summary of the result of the test and evaluation that was conducted. It shows in tabular form which includes the computed details of each of these. The test results which

Are done with the use of test cases and evaluation which is done through evaluation instrument with five criteria.

5.2.1 Performance Testing:

The developers used the performance testing to determine the quality and the performance of the application when it was done. In performance testing, the application is tested step by step process, so it can be easily determine if there are bugs and other errors in the application.

5.2.1.1 Conformance Testing:

This section is for the core quality of the software that will be based on the androiddevelopers.com. This explains the basic aspects of quality of the developed application in terms with the installation, functionality and user interaction through sets of quality test and criteria.

5.2.2 Evaluation Instrument:

Evaluation Instruments are the things used to evaluate the developed project. It helps on how the project will evaluate by the user. It also helps in generating the after the system is evaluated.

5.2.2.1 Weighted Mean:

This is the average of the scores– the mathematical center of a distribution. It used symmetrical, unimodal distributions of interval oration scores. The formula for mean is:

$$\bar{x} = \frac{\sum wx}{n}$$

Where:

Σx= sum of all value of observation per weight

x= represents the value of observation per weight n= number of scores

w=weight (5,4,3,2,1)

5.2.2.2 Standard Deviation:

The standard deviation is a measure of variability used to identify whether the SD is homogenous or heterogeneous. The formula for standard deviation is:

$$S = \sqrt{\frac{\sum (\bar{x} - x)^2}{n - 1}}$$

6. RESULTS AND DISCUSSION

Project Testing and Evaluation are the processes that the researchers must fully prepare. In the testing of the system, the System should be error free and the researchers must know what the functions of the system are and how the system will react to the users. The evaluation of the system will be held after the system is tested and the user will give feedback if the System pass or fail a specific function.

6.1 Test Results:

This part shows the summary of the test conducted by the developers using the Performance testing and the Conformance testing. This test results served as a conclusion of the test conducted.

Two different types of test are being done, which is classified as Conformance and Performance testing which is more likely the test that is appropriate to the system which is the android application

6.2 Summary of evaluation:

The project is evaluated according to specific criteria. This part shows the level of system effectiveness in terms of accuracy, efficiency, reliability, security, user-friendliness, flexibility and validity. This part shows the whole computation of the level of system effectiveness in terms of grand mean and standard deviation.

Table 1. Overall Mean and Standard Deviation of the Developed Project

Criteria	Mean	SD	Interpretation
Functionality	3.45	0.45	Moderately Acceptable
Visual Design and User Interaction	3.53	0.48	Highly Acceptable
Performance and Stability	3.51	0.45	Highly Acceptable
Google Play	3.58	0.47	Highly Acceptable
Grand Mean And SD	**3.52**	**0.46**	

The table shows the results from the evaluation of the IT experts and end users to the application. For the Visual Design and Interaction, the application got an average mean of 3.53 and an average standard deviation of 0.48 which are

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interpreted as Highly Acceptable. Next is the Functionality, the application got an average mean of 3.45 and an average standard deviation of 0.45 which is interpreted as Moderately Acceptable. For the next criteria, Performance and Stability, the application got an average mean of 3.51 and an average standard deviation of 0.45 which is also interpreted as Highly Acceptable. Lastly, for the criteria of Google Play which gained the highest score, the application got an average mean of 3.58 and an average standard deviation of 0.47 that is interpreted as Highly Acceptable. Overall, the application got an average mean of 3.52 andan average standard deviation 0.46.

7. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

In this chapter, the summary of findings conclusion and recommendations made as an outgrowth of this study is discussed.

7.1 Summary of Findings:

Based on results of the evaluation of the android application, the respondents strongly expressed their appreciation of acceptance and satisfaction of the developed mobile learning android application. The followings are the findings of the study:

1. In terms of Design and User Interface, the mobile application was rated as highly acceptable. The application show that the application has good visual design that is suited for children.

2. In terms of Functionality, the mobile application was rated highly acceptable. The modules and specified operation run properly and smoothly.

3. In terms of Performance and Stability, the mobile application was rated moderately acceptable. The application performed the operation without error or bugs and with specified time.

4. In term of Google Play, the mobile application was rated highly acceptable. The mobile application can be uploaded at the Google play store by following their standard.

7.2 Conclusions:

The mobile application is developed as user friendly which the user understand the content of the application easily. The application is for children, for them to be able to learn basic Filipino language. It has also buttons that have its own designated functions that make the application run smoothly.

The application has seven modules which are *Mga Alpabeto, Mga Aralin, Makinig, Magbasa, Pagsusulit, Kredito, Bidyo* because of this the user can learn and practice basic Filipino language.

The application is made in 2D graphic design. It gives attractive design or graphic which convince the children to use the application for their learning experience. For example, the teacher in the application the Maestra, it has an animation that will attract the user to enjoy using the application.

The application follows the standards that were given by the Google Play. In which, it will not be allowed to be uploaded at the Google Play Store if the researchers did not follow the criteria that the Google have.

7.3 Recommendation:

Based on the tests and evaluation conducted by the researchers, the evaluators and testers recommended the following:

1. The researchers must add dialog box whenever the user is about to leave the application.

2. The researchers are advised to make the back button more visible.

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