

Development of Framework and an Application Model for Positive Contribution to Teaching

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Abstract: Applications are essential part of the modern-day world, in view of such fields as education, tourism, medicine, business, travel, architecture, engineering, banking and law, in the past two or more decades the impact of application has been enormous. The purpose of this research work is to develop an android based educational application using web API's to support the educational needs in Nigeria. Agile model of software development life cycle methodology is used with object oriented approach for the development of the application.

Keywords: *Android Application model, Teaching, Framework*

I. INTRODUCTION

Education is one of the mainly significant requirements for a sound life of an individual and that of the entire world. Thus, education an influential tool of political, economic, and social advancement, without education an individual nor a community cannot achieve professional development. Applications are essential part of the modern-day world. In fact, society and culture have to be in tune to meet the challenges of the information age. Application is a power that has changed many ways in which people lives. In view of such fields as education, tourism, medicine, business, travel, architecture, engineering, banking and law, in the past two or more decades the impact of application has been enormous. The way the fields function in this present day is vastly differ from the way they function in the past. But in view of education sector, it seems to have a slight impact of application utilization and far less improvement, than the other fields have experienced. However, the lack of activity and influence of application have been explored by a lot of people (Soloway and Pryor, 2006) [1]. The omnipresent influence of Applications has a rapid improvement in social, technological, economic and political transformation. The area of education has not been unchanged by the insightful influence of applications.

However, innovation of applications has immensely contributed to the quantity and quality of teaching and research and learning in distance and traditional education institutions. Teaching and learning through dynamic attractive and interactive content has been enhances by application and provides opportunities for individualization of instruction. Applications has the ability to enrich, accelerate and deepen skills, engage and motivate students

ability of learning, helps to integrate school experience to practice work, helps to create economic feasibility for tomorrow's workers; strengthens learning and teaching; contribute to the growth of the institution and creates connection between the world and the school (Davis and Tearle, 2002) [2]. Medina (2002) [3] tallied up the advantage of applications in learning as:

- 1) learning process enhancing,
- 2) learning environment enrichment, and
- 3) Availability of education.

The alternative wide range of available media for helping people to learn is provided by web technology. According to Sabry & Baldwin, (2003) [4], progressively more, learning interaction is provided by web technology and educational institution is becoming covenant to it. (Bennet, McKenzie, & Waugh, 2002) [5], Education process beyond the traditional classroom has been expanded with the advances in learning environment of students teaching and learning.

A. PROBLEM STATEMENT

In the period of realistic and competitor science and technology, Nigeria is striving hard to play a leadership role in Africa, there is need to pay further attention to the development of teaching and learning mainly in Nigerian institutions. This entails the implementation of educational applications in the institution system. In the modern time innovation of applications is an important interference to education system in Nigeria. Its intrinsic attributes such as reliability, elevated speed performance, accuracy, and competence to store large quantity of information have provide applicability to human accomplishments including learning, teaching and research in institutions. Education development in Nigeria have some current problems such as: education system is diversified, unstable staff, the poor state of the nation's economy, education procurement politicization, unstable subject and curriculum, and servicing of equipment, poor accommodation of classrooms, subject and laboratories rooms, Irregular power supply, libraries are inadequately equipped, cost of books at all level of education are prohibitive.

II. LITERATURE REVIEW

Over the past years, society and many daily aspects of life have been transformed technologically. The growth among educators and the general public by proliferation of technology has played a more integral role in student's education. (Culp et al, 2003) [6]. The use of educational technology has steadily continued to increase over the years; variety of effort to integrate technology into the curriculum has been made by educators.

The use of individual computer is not restricted to educational technology, other applications and equipment, such as digital television (allowing students to interact with programs at their own pace), videoconferencing, digital cameras and electronic whiteboards can be involved (Jackson. L, 2008; Education Week, 2007; Mc Campbell, 2002; Marshall, 2002) [7]. The decision regarding types of technology that can be use and how to use them have been struggled by Educators. (Culp et al., 2003) [6].

The use of technology in the classroom provides students with the opportunity to, (Jobe& Peck, 2008; Bebell, 2005; Honey et al., 2005; Waddoups, 2004; Gahala, 2001; Healey, 2001) [8]:

- a) The teacher skills needed for future employment will be acquire;
- b) Critical thinking, communication skills and problem-solving development;
- c) Peers collaboration;
- d) Hands-on learning activities engagement; and
- e) Immediate feedback receiving.

ICT provides Teachers to easily administer various educational activities that will engage students in meaningful learning contexts. Furthermore, integrating ICT into learning process can stimulate and motivate students. (Law, Lee, & Yu, 2007) [9].

New knowledge and skills can enhance student learning motivation and how instructors and students interact with learning materials would be effect. (Lee, & Yu, 2012) [9].

A. CHALLENGES TO E-EDUCATION IN NIGERIA

In Nigeria, experiences are accentuating unprepared net to fully exploit the merit of ICT in education owing to some infrastructural challenges; poverty and illiteracy. Prince (2009) [10] stated that, the Network Readiness Index (NRI) study is conducted by the Global Information Technology, covering a total of 115 economies in 2005-2006, to measure the degree of preparation of a nation or community to participate in and benefit from ICT developments. Nigeria was ranked 90th out of the 115 countries surveyed. Likewise, the surveyed in 2004, Nigeria was ranked 86th out of 74 countries which shows a decline in Nigeria preparedness to participate in and benefit from ICT developments. Despite the fact that ICT holds great potentials in supporting and augmentation existing educational as well as national development efforts in Nigeria, several challenges remain (Mac-Ekemanjima, 2009) [11].

These challenges include:

- 1) Computer hardware and software high, and bandwidth access are some of the Inadequate ICT infrastructures.

- 2) Available systems and training facilities for ICT education at all levels Lack skilled man power to manage.
- 3) Students and academics resist to change to more innovative, technology based and learning methods from traditional pedagogical methods.
- 4) Urgent and important survival needs by the institutions are funds by available because the overall education is underfunded.
- 5) In-effective co-ordination of all various ICT programs for education initiatives.

Impact of using innovative applications on teaching and learning Management

Teaching and learning Management process is a very complex one because the students need to build up diverse skills related to critical thinking, communication, psychology, social thinking and economic, making decision etc. One important pedagogical advance gaining credibility through classroom practice and research is students' mutual engagement with computer-based, problem-solving tasks for more valuable learning. This study was conducted in order to reveal which is the impact of using innovative applications within the teaching and learning processes.

Teaching and learning of Management using innovative applications could have positive effects, on one hand, and negative effects, on the other hand. Innovative applications main positive effect for teaching and learning Management, as they are perceived by the teachers and students, are the following:

- a) The students' motivation for learning Management is increased with the help of using application;
- b) Teaching and learning Management method increase their interest for learning Management and catch the attention of the students;
- c) Development of students' skills lead by using applications;
- d) The students' process of thinking critically develops using applications;
- e) Creates the opportunity for students to be active in class, and not passive;
- f) Creates the opportunity for students to solve different case studies, to change the variables in these case studies and to see the results of these changes;
- g) The students are prepared for the knowledge-based society and economy which cannot be understood nowadays without computers in our day-to-day life with the help of using applications;

The computer applications that contribute to the engagement of the students in the process of learning have some characteristics. Figure 1 shows how they are characteristics and how could they contribute to the engagement of the students in the process of learning Management. The use of computer applications in the process of teaching and learning Management is showing to the students some experiences where they acquire not only technological proficiency but also balance between their depth of knowledge and design abilities. Students are given opportunities to work collaboratively with electronic knowledge-creation tools in their learning process to enhance their learning by the force

of opportunity from their teachers. When students mental schemas are encouraged to externalize and clearly communicate their understanding of the interconnectedness of ideas graphically and verbally, then effectively student-designers are engaged in reflective, productive, creative techno literate practices.

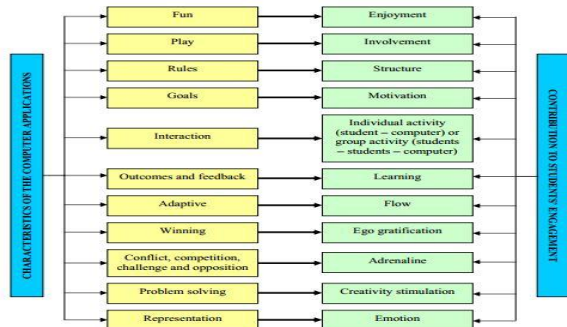


Figure 1: Contribution of the Computer Applications 'Characteristics to Students' Engagement in the Process of Learning.

Teaching and learning Management could have also negative effects from the use of computer application. The computer applications used may properly not work, or may not work at all, or they may carry out to the wrong results in conditions of logical thinking if they are in their first stages of development. The impact for the students learning process and for the professors teaching process is negative in this situation. Both teachers and students could feel bothered because they all had certain potential at the commencement of the lesson.

III. RESEARCH METHODOLOGY

Software development methodology or System development methodology in software engineering is framework that is used to structure, plan, and control the process of developing an information system. (www.itinfo.am, 2014) [12]. Software development life cycle (SLDC) is a framework that describes the activities performed at each stage of a software development project (slideshare.net, 2014) [13].

A. Observation

Following things were observed by site observation

1. Developing the application to work offline.
2. Requirement elicitation technique was used in this project by studying critically.

B. Client Requirement

Table 1: Proposed Client Requirement of the Application

ID	Description	Priority
C1	Application must have comprehensive lecture note based on subject course.	Highs
C2	Application must have questions and answers page	High
C3	Application should run with minimal user interaction	Medium

C. Functional Requirements

The function or component of an application is defined by the functional requirements. Generally, functional requirements

are expressed in the form "system must do <requirement>". The format chosen to present the functional requirements is the following:

ID: The identification number of the requirement.
 Description: The requirement.
 Explanation: An explanation of the requirement especially needed for those which are complex.

Table 2: Functional Requirements

ID	Description	Explanation
FR01	The application must provide a comprehensive lecture note.	The application must provide a comprehensive lecture note of various courses for student learning.
FR02	The application must provide examples of the programs	The application must provide examples of the programs for programming language of any in which the application is build upon.
FR03	The application must provide questions and answers platform	Questions and Answers will enable the student to do more practice.

D. Non-Functional Requirements

The description of not what application will do is done by non-functional requirement, but how the system will do it, for example, system design constraints, performance requirements, application external interface requirements, and software quality attributes.

Below, the most important classes of the non-functional requirements are presented based on their importance: usability, modifiability/extensibility, portability, flexibility, reliability, security, performance, total cost:

The system's related non-functional requirements are given below:

Table 3: Non-Functional Requirements

ID	Description	Explanation
NFR01	The user interface must be easy enough for anyone, all screens should have a similar style.	The buttons, menus and layouts should be the same in all the screens of the application.
NFR02	The application will be able to run on all Android devices.	The application will be developed to run on all Android devices, such as mobiles, tablets.
NFR03	The application will have fast response time.	The application should provide all its operations very fast.
NFR04	The application must be designed to be able to accept new operations and features.	The application must be designer friendly.

IV. SYSTEM DESIGN

The design phase of a software system to construct a solution to the problem as defined in the requirement elicitation process. Design phase establishes an overall architecture by partitioning the software into components, the relationships and dependencies between such components is then established.

Unified Modeling Language (UML) which is used in object oriented system analysis and design will be utilized to model the various components of the system as well as their relationships and dependencies. UML diagram such as use

case, activity diagram and sequence diagram is drawn and to model the system flow and the actor are being drawn to understand how the system works.

A. Use Case Diagram for the Proposed Educational Mobile Application

Overview use case diagram for proposed mobile application

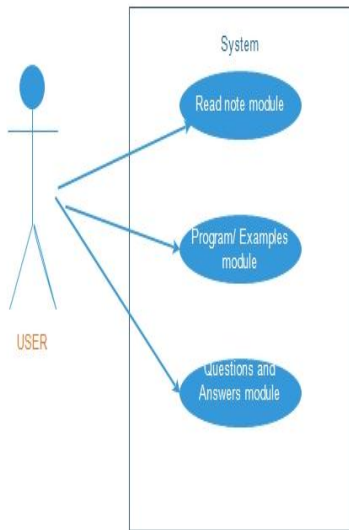


Figure 2: Overview use case diagram of the application.

use case diagram for Read note module

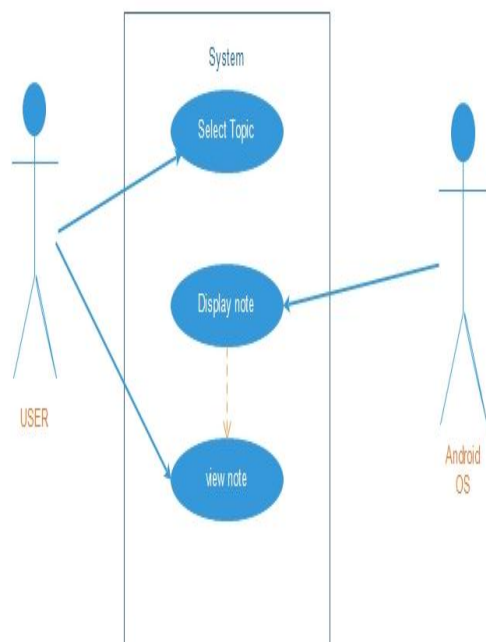


Figure 3: Use Case Diagram for Read Note.

use case diagram for program and example module

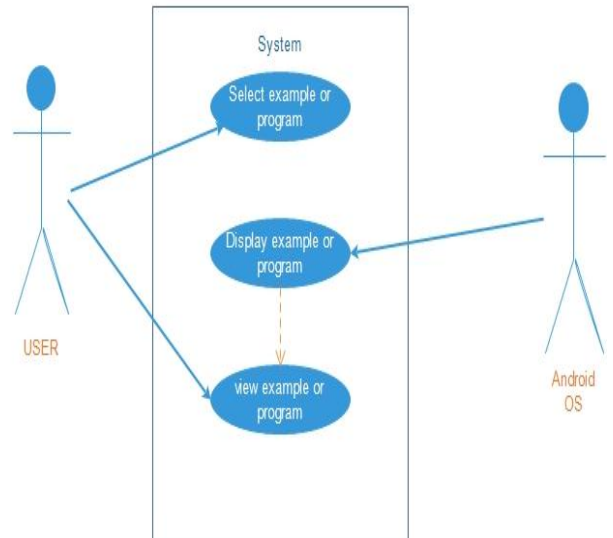


Figure 4: Use Case Diagram for Program and Example Module.

use case diagram for question and answer

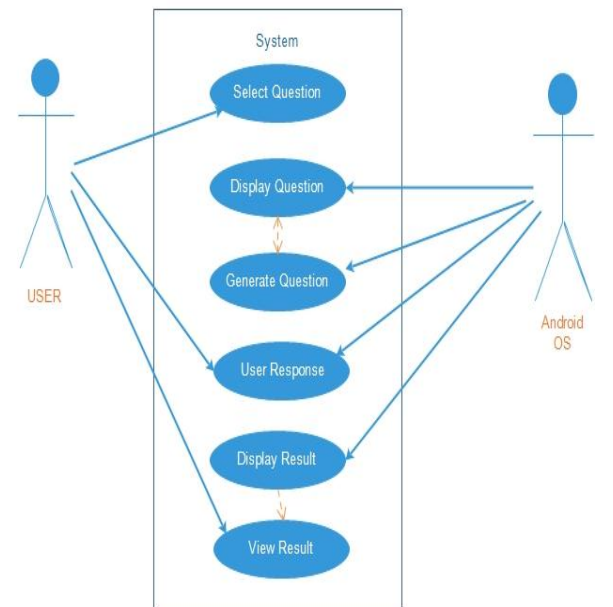


Figure 5: Use Case Diagram for Question and Answer Module.

B. Activity Diagram for the Proposed Mobile Application
 The activity diagram is a UML diagram which describes the workflow of a system. Activity diagrams are dynamic in nature as it the sequence of activities performed in a system and the expected response. Below are the activity diagrams of the proposed system, which is a breakdown of the use case diagram.

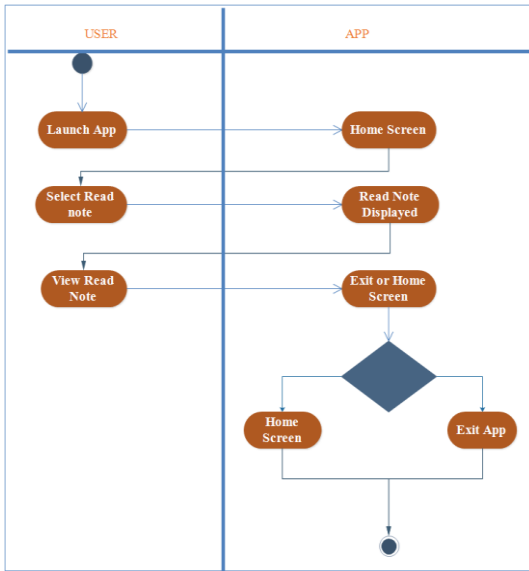


Figure 6: Activity Diagram for Read Note Module.

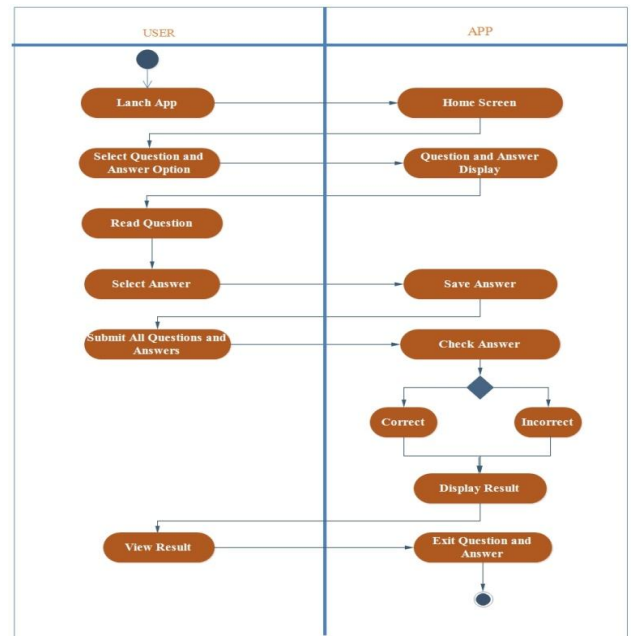


Figure 8 Activity Diagram for Questions and Answers module.

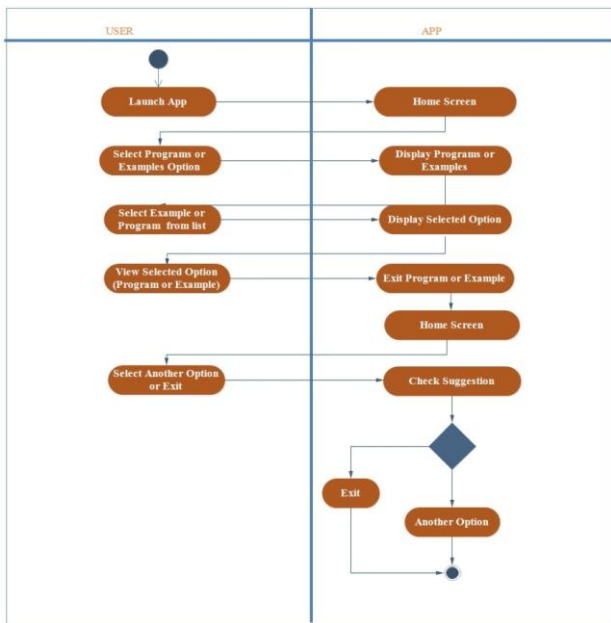


Figure 7: Activity Diagram for Programs and Examples Module.

Sequence diagram for Read Note

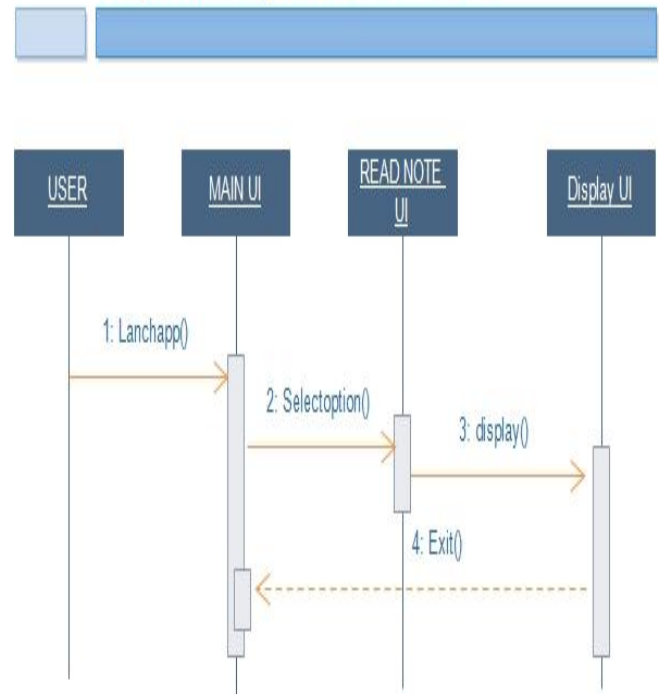


Figure 9: Sequence Diagram for Read Note module.

Sequence Diagram For Study Programs Or Examples.

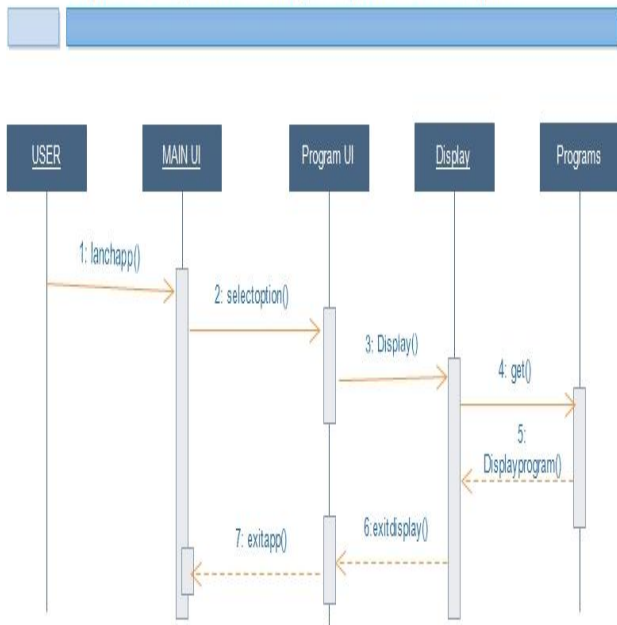


Figure 10: Sequence Diagram for Study Programs

Sequence Diagram For Questions and Answers

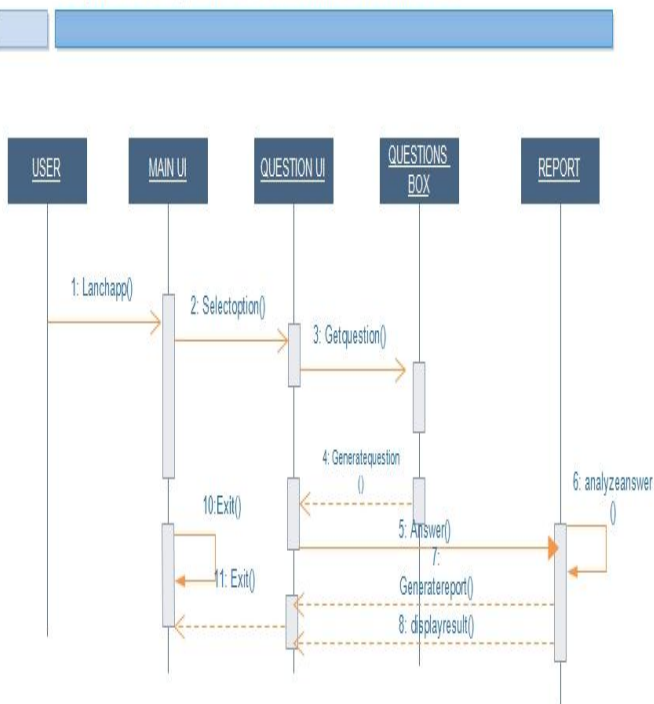


Figure 11: Sequence Diagram for questions and answers module

V. SYSTEM INTERFACE

This section highlights some of the interfaces from the implementation of the system design.

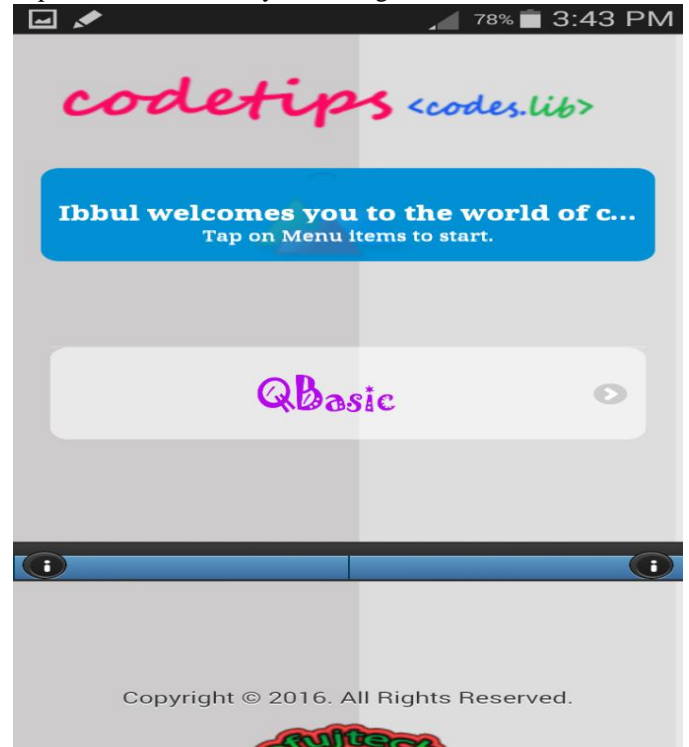


Figure 12: A View of Home Screen.

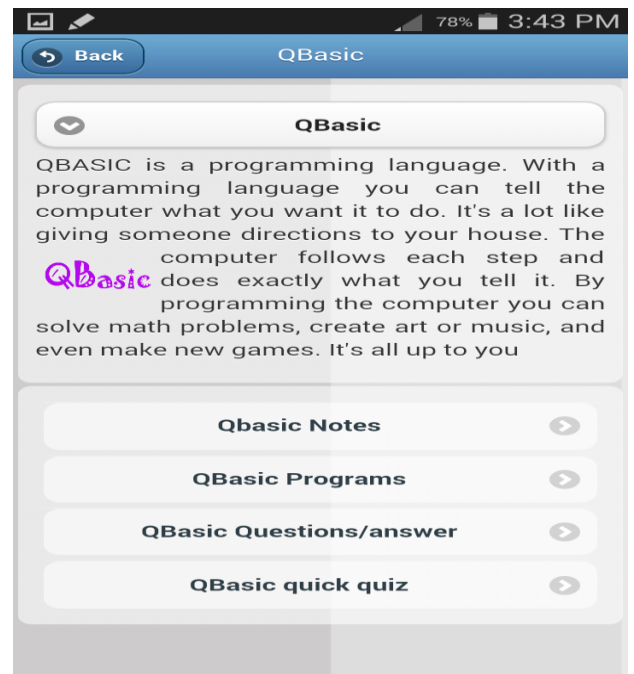


Figure 13: View of Selection Option Form.

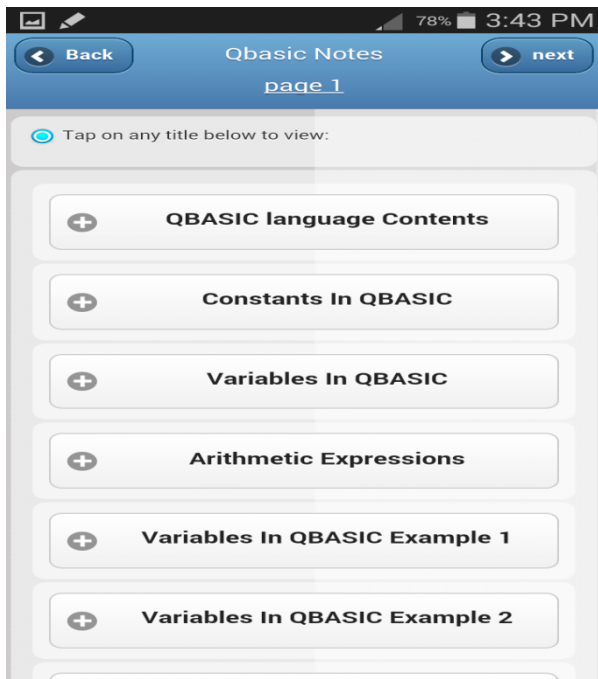


Figure 14: View of Selecting a Specific Topic Form.

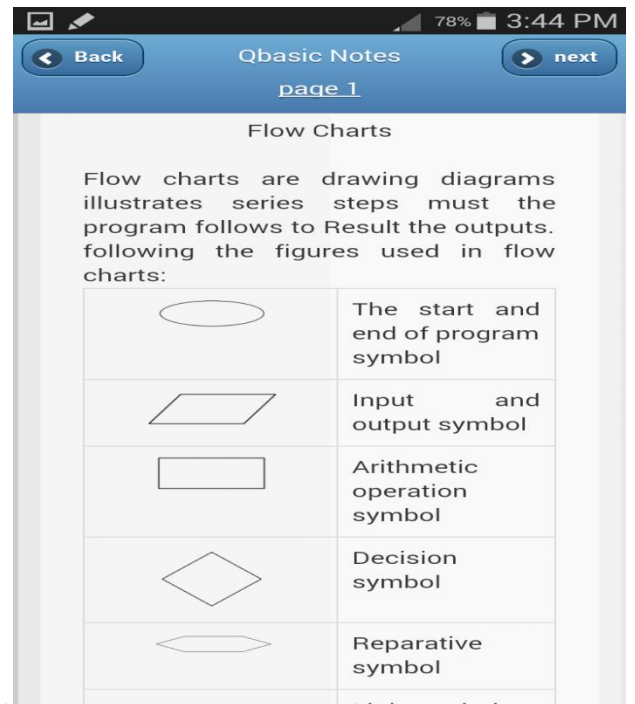


Figure 16: View of a Displayed Specific Topic Note and Symbols Form.

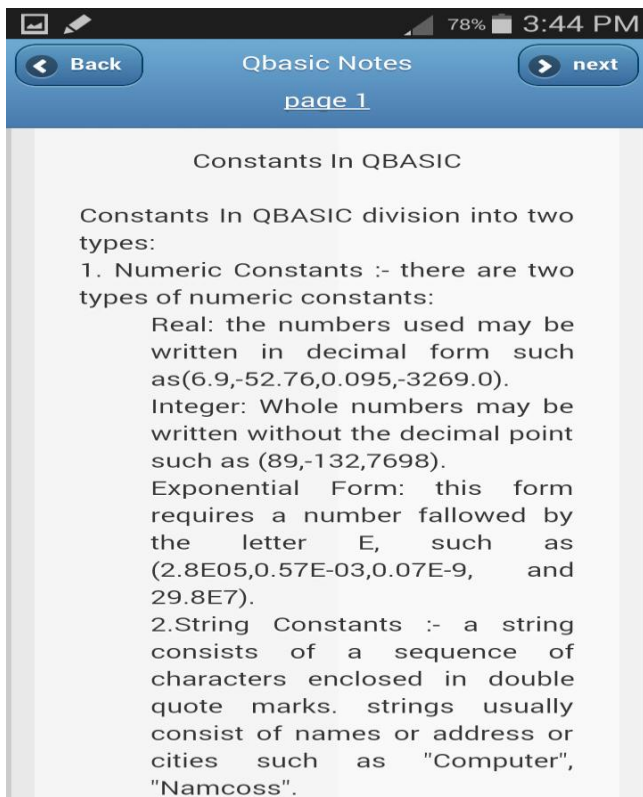


Figure 15: View of a Displayed Specific Topic Note Form.

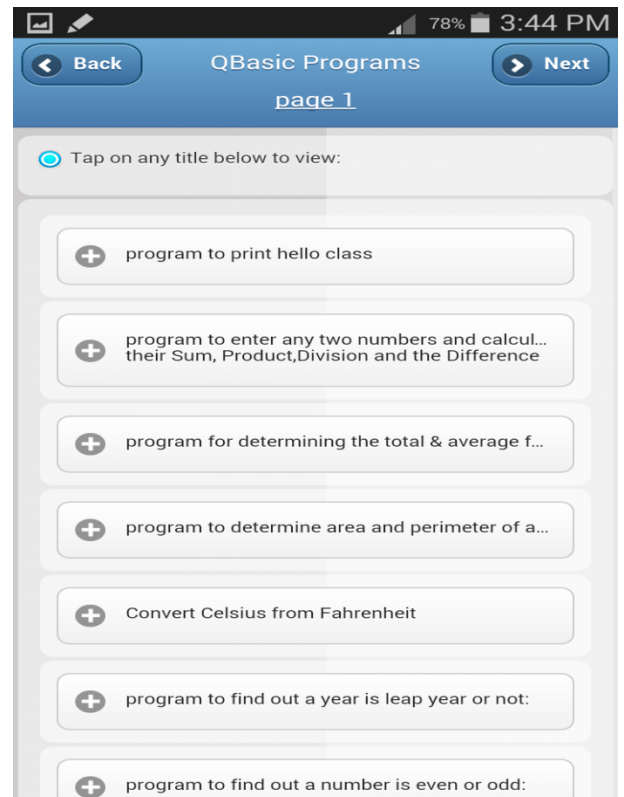


Figure 17: View of Selecting a Specific Program or Example Form.

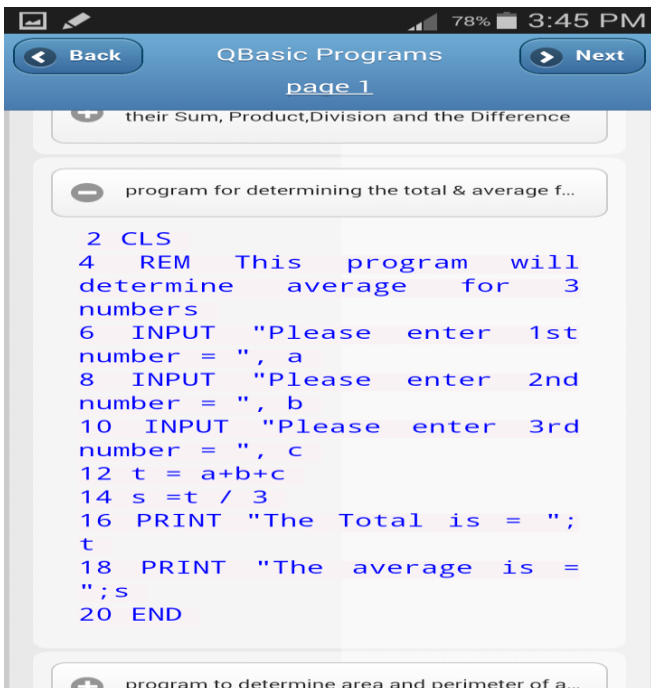


Figure 18: View of Display of a Specific Selected Program or Example Form.

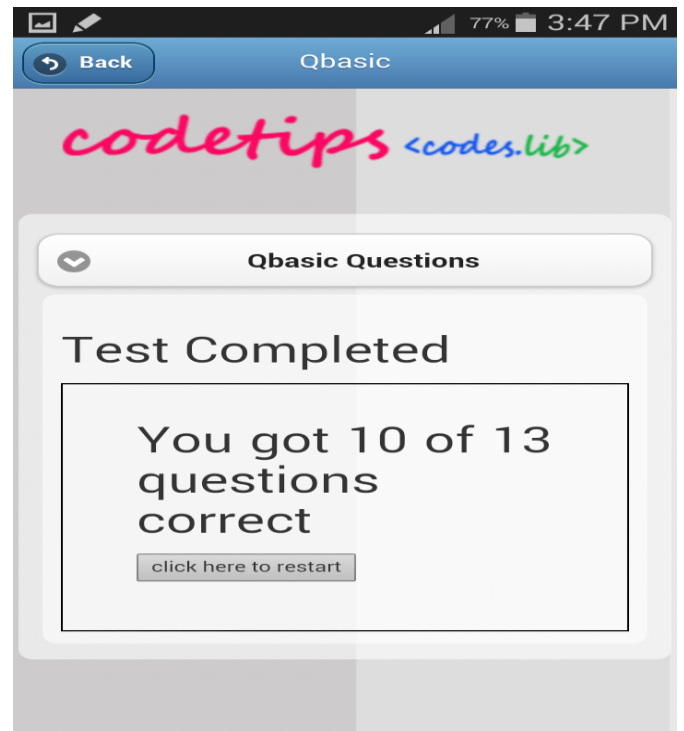


Figure 20: View of Result Display of Question AND Answer Form.

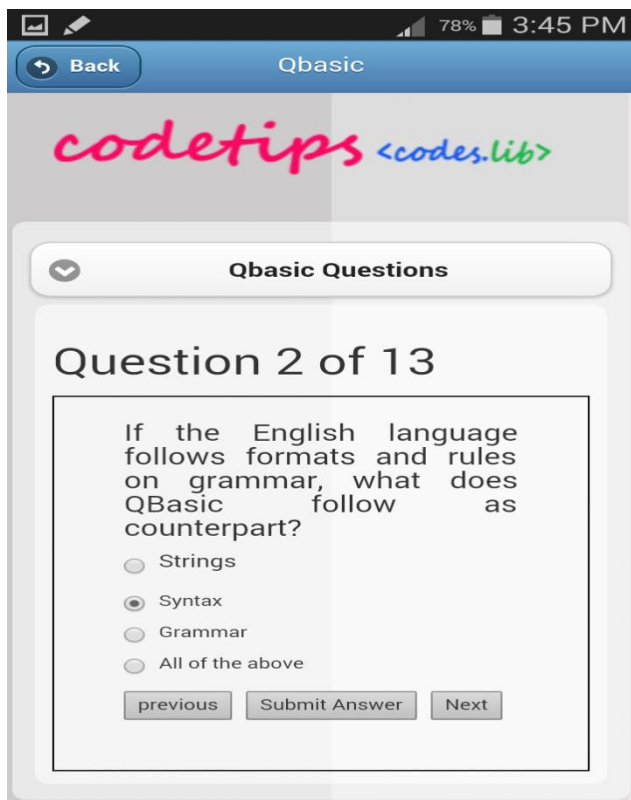


Figure 19: View of Questions and Answer Form.

VI. CONCLUSION

In this project research, we set out to develop a cost-effective solution to tackle the recurrent problem of studying in Nigeria education system by utilizing Android mobile device for studying purpose. The project highlighted the challenges in Nigeria education system and the benefit of using ICT in Nigeria education system.

This project therefore, using information system standard of Software Development Life Cycle (SDLC) model, Agile model and Object-Oriented Analysis and Design, set out to develop a simple and utility system which when installed on mobile device, and possibly enable studying successfully done. Following the Agile Model stages, the Unified Modeling Language (UML) diagram, use case diagram, activity diagram and sequence diagram of each component and the entire system was designed.

Adobe Dreamweaver CS5.5 was the development environment of choice for the implementation stage of this project, as it provides a reach set of free plug-in for the development of android application, the most important plug-in which is the Android Developer Toolkit(ADT) for Adobe Dreamweaver CS5.5. The application developed was tested using one of the tools in the ADT called the Dalvik Debug Monitor Server (DDMS).

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