



Android Based Course Material Management Application Using University of Benin as A Case Study

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Abstract

In recent times, due to expanding features available for smart mobile devices, it has become inevitable for mobile applications to have an important role in higher education systems. Also, owing to the increasing need for the availability of academic materials, study text and resources in higher institutions of learning, it has become inherently sacrosanct to develop a system that would adequately cater to the myriad of problems associated with the ease of access to educational materials as well as the availability of said materials quickly and in an efficient manner. This paper presents the design and development of a course material management application on the Android Platform using Java Programming Language to give each student access to course content and materials as well as all prerequisite resources quickly and efficiently thereby eradicating stress, limiting cost, and generally encouraging the academic process.

1. Introduction

Mobile Learning or “M-Learning”, means differently to diverse groups, as a subsection of E-Learning, educational technology and distance education, that concentrates more on learning over different aspects particularly learning with the aid of a mobile device. As part of mobile learning definition, it can be said to be, "any kind of learning that occurs usually when the learner is mobile (not at a fixed), prearranged position, or learning that occurs when the learner benefits from the learning opportunities provided through the means of mobile technologies". Mobile learning utilizing mobile gadgets is so far still in its early stage pertaining to both technologies and teaching approaches. Thus, there are still some unanswered questions amongst experts in the field how mobile learning ought to be characterized: such as gadgets and technologies; as far as the portability of students and the flexibility of learning, and regarding the students' involvement of using mobile devices for learning. Most analysts and teachers apparently assume portable learning as the closest relative of e-learning [1] for example, characterizes e-learning as 'learning supported by digital “electronic” tools and media’, and by similarity, mobile learning as 'e-learning that makes use of mobile devices and wireless technologies '.

Using the University of Benin (UNIBEN) as a case study, the current form of course content gathering requires students to physically make an indication and consequently purchase or make photocopies of course materials or getting said material via social media platforms used by the students to communicate between themselves e.g. WhatsApp, of which various issues such as inefficiency in proper management of course materials arises. Also, the stress involved in getting such content via social media is alarming as the student may have to navigate through myriads of chat conversations to retrieve said document. Hence the

need to build a platform that would catalog and present these course materials in an efficient manner. This paper covers the development of a course material management application for the 500 level computer engineering students of the University of Benin (UNIBEN) as its scope.

2. Methodology

2.1 Design Strategy

The Waterfall Model Approach was used in this paper. The waterfall approach is called a linear or a sequential method because it is comprised of different phases with each one leading into to the next. The sequential approach begins at the system level and progress through analysis, design, coding, testing and support.

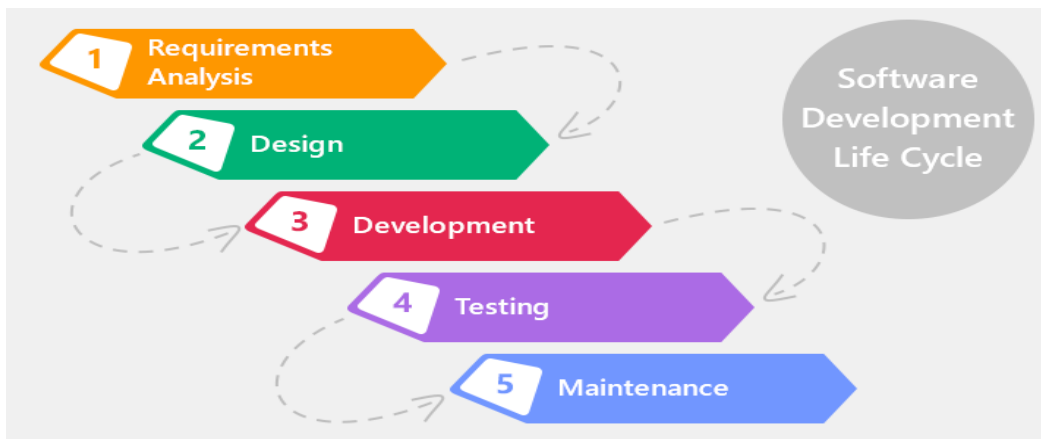


Figure 1 The Waterfall Model

2.2 Requirement Gathering and Analysis

The first thing that was done at this stage was to draw up a requirement specification document that captured all the requirements of the system that was to be developed.

2.3 Preliminary Requirements

Before starting the development of the mobile learning application, different data were gathered such as:

- A list of courses offered by the Computer Engineering Department UNIBEN.
- The instructors' name for each course.
- The general description and the syllabi for all these courses
- The courses' online resources e.g. lecture notes.

2.4 Functional Requirements

It defines a function or a component of a system. Functional requirements are expressed in the form of what the "system must do".

- Users must be able to sign up.
- Users must be able to log into the system
- System must provide an error message in case of login failure.
- System must provide courses in a list.
- View courses general information
- Enroll/Register in a course
- System must publish learning materials
- System will be able to cache online content
- Users must be able to logout of the system at any time

2.5 Non-Functional Requirements

- The mobile learning application should be user friendly.
- The application should be well organized and easy to use by any student.

- The application should be fast and efficient
- The system will request a password for each user account

2.5 System Design

Use Case Diagrams

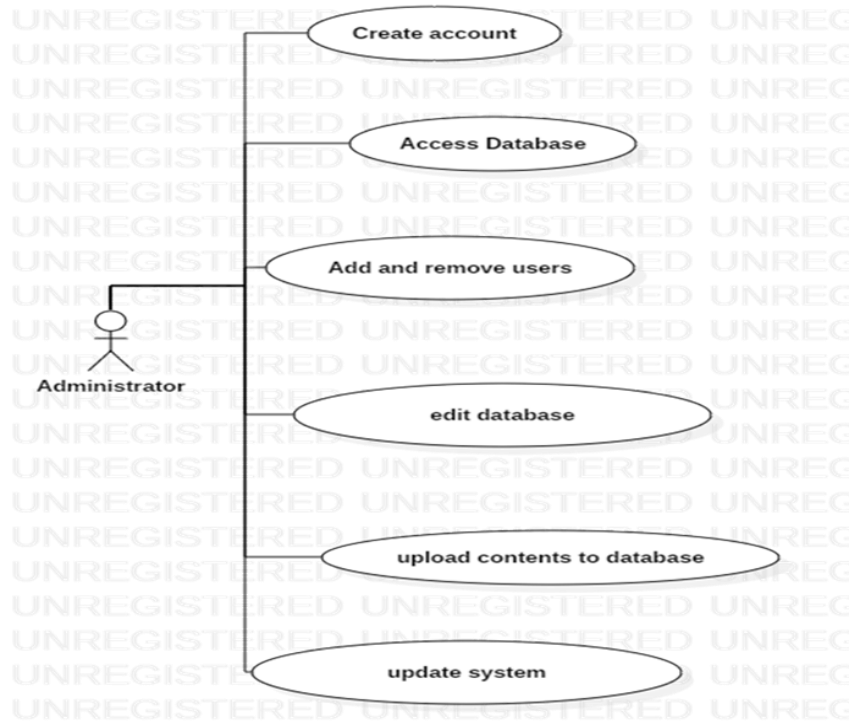


Figure 2 Use case diagram Admin

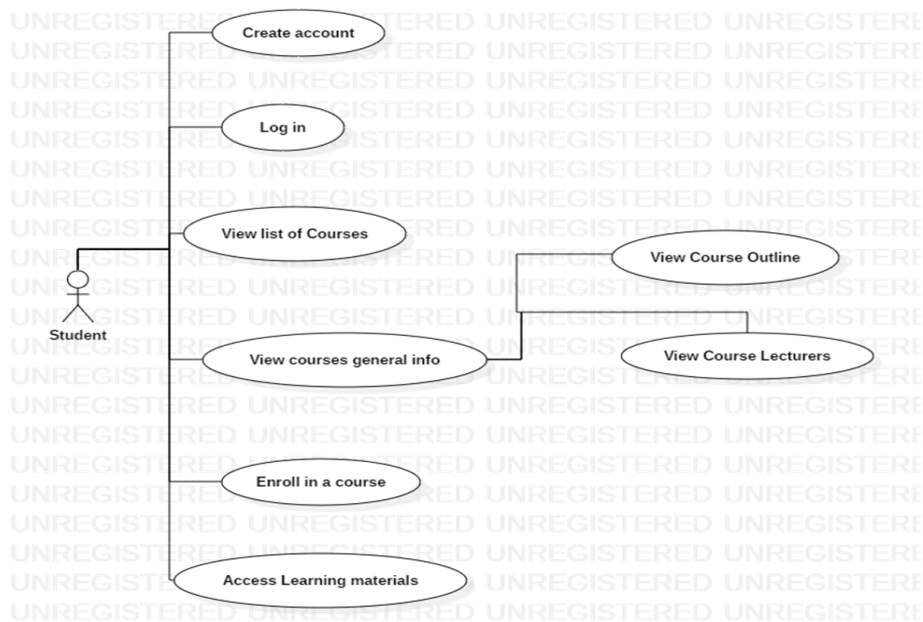


Figure .3 Use case diagram Student

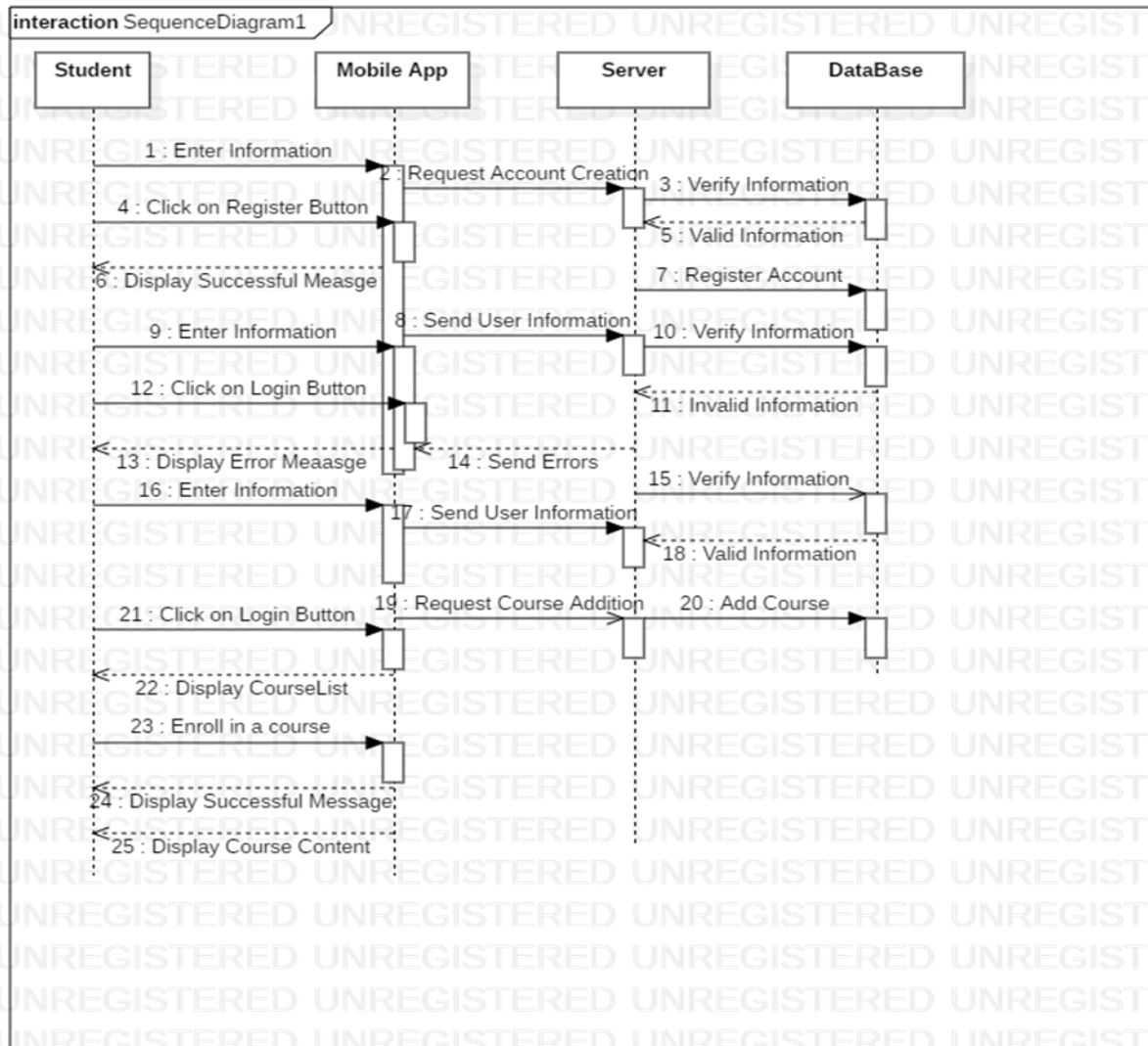


Figure 4 Sequence diagram

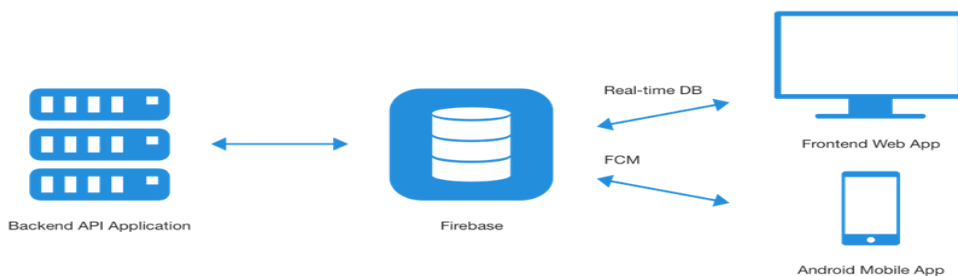


Figure 5 Physical Architecture Design

This 2-tier system architecture design, explains each level of the application and what is made of. The design shows the various operational levels, such as the client level which happen to be the end users, the application level which also happens to be the main application in use. The database tier includes other physical part of the system data management, the database level depicts the logical aspect of the system which contains system files and clients or user’s data as indicated in Figure 5.

Technologies Used

Android Studio IDE, Java Programming Language, Firebase, Extensible Markup Language (XML), GLIDE and Firebase UI

3. Results

Application Screenshots

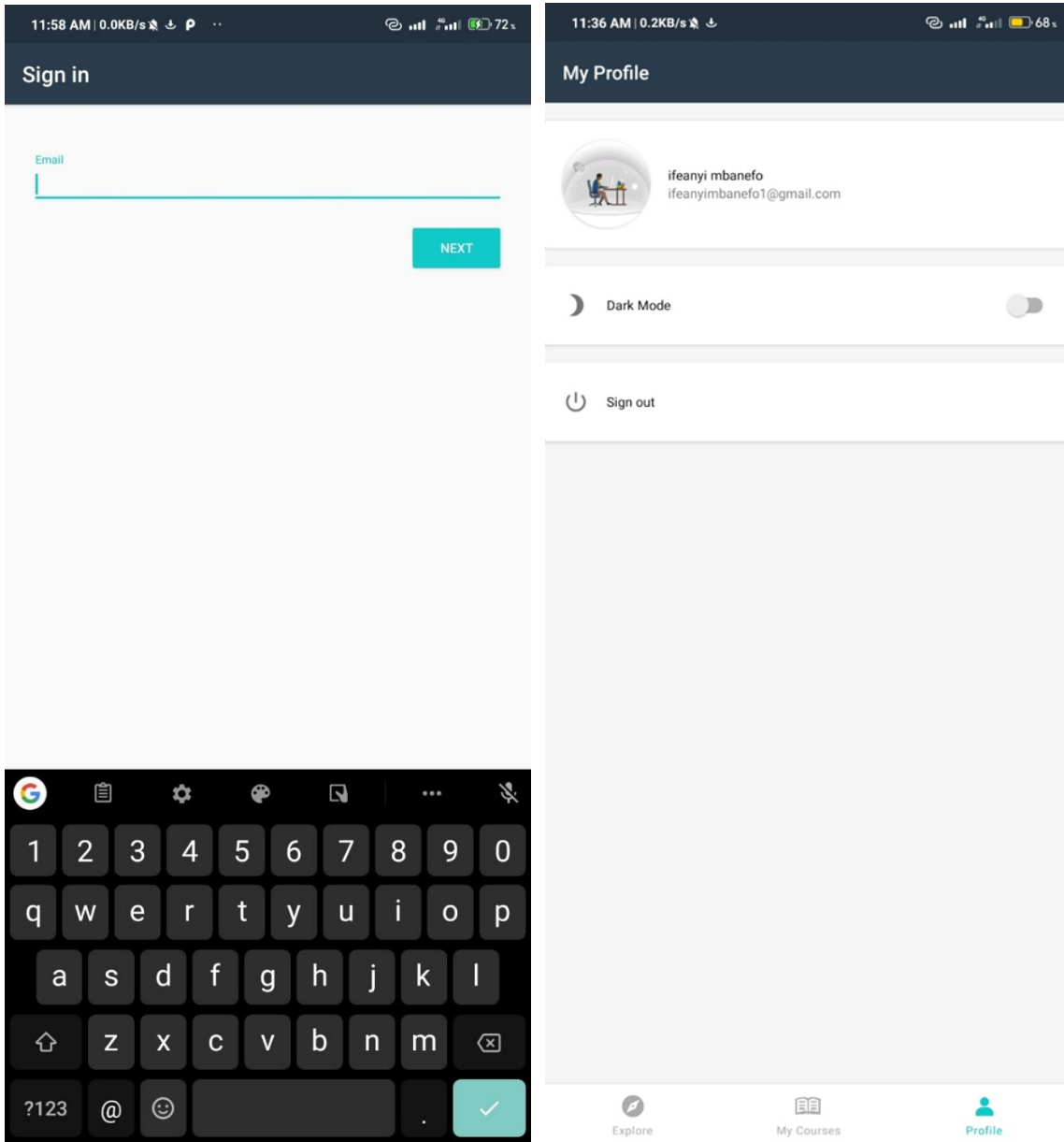


Figure 6 Login / Profile page

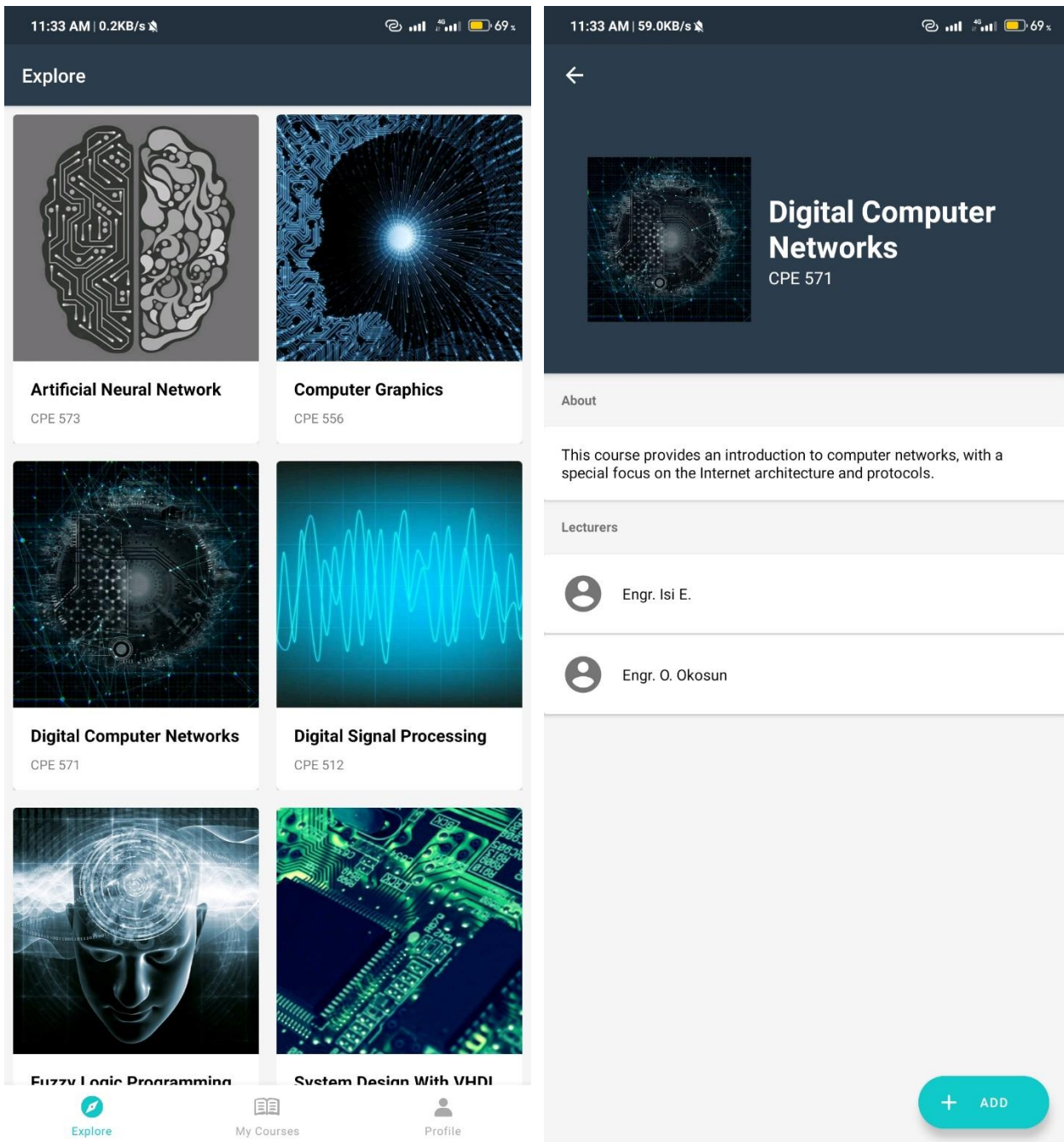


Figure 7 Overview of the Application

Table 1 Application Feature Testing

S/N	TEST	OBSERVATION	REMARKS
1	Access Login Page	Existing user Successfully logged into the system	Successful
2	Access Registration Page	New User got successfully added to the database	Successful
3	Access My Courses Page	User was able to browse through his selected courses	Successful

S/N	TEST	OBSERVATION	REMARKS
4	Access Course List Page	User was able to browse through the list of all courses	Successful
5	Access Course Information Page	User was able to browse through the course information page	Successful
6	Access Course Outline Page	User was able to view the course outline for a specific course	Successful
7	Access Course Material Page	User was able to browse through and download available course materials for offline use.	Successful
8	Add Course to my Course List	User was able to register a course from the list of available courses	Successful
9	Remove Course from my Course List	User was able to unregister a course from his list of courses	Successful
10	Log out	Existing User was able to log out of the system	Successful

As the table above illustrated, the various functional units of the application were tested and remarked to be successful. The registered user was able to provide login details and the server checked to see if those details provided correlated with that in the database and if it did the user was successfully able to login.

The user was able to access the list of all available courses, register and unregister a course, of which on registration he would be provided access to the respective course materials. The user was able to download course materials for offline use. Also, because the application could cache data from the server to the android device, it gave the application a sense of speed even when internet access was limited. Finally, the user was also able to login and out of his account seamlessly.

4. Conclusion

In this paper, a course material management application that made it possible for students to have easy access to their course materials at their fingertips has been presented. The application was platform dependent and as such was limited to only android phone users thereby denying said privileges to other platform users e.g. IOS, Web etc. It is therefore suggested that in subsequent work the application should be made available to other platforms.

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