Using Google Cloud in Education

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Abstract - In this research the main objective is to enhance a mobile application with its all parts; app runs on the customer device (participating students), mobile app runs on administrative device for instant controlling, communicating and notifications, between the lecturer and his students in encouraging and backing learning management systems since those systems need a student to be updated on the course materials. My project, in its design and development, will show the new IT models as cloud computing, software-as-a-service (SaaS), platform-as-a-service (PaaS), and development languages for mobile computing. I'll be using the Google Cloud Messaging (GCM) service. This enhances the software as a service model. The Google Cloud Messaging service runs on Google infrastructure, which represents the platform as a service model, where no need to introduce or keep a server. Google Cloud Messaging introduces a simple and trusted service that would control all needed of queuing and delivering of messages to sharing number of customers. The administrative as students' mobile apps will be enhanced using Java and will be running on Android target mobile devices.

Keywords: Google Cloud; Education; Messaging; Android

I. INTRODUCTION

As a result for the new millennium, the higher educational system should be suitable for facing the obstacles which brought by the new generations, and for the international competition. That will occur by moving to the existing teaching model to one more suited to the knowledge era. The big problem is how the parents establish an effective learning environment using technology. In addition, how this technology assists the parents to have an instant relation with their students if there is an emergence cases. The connection between children and between children and their parents and information sharing, and co-operation being faster by the technology and information revolutions and the spread of information and communication technologies. Technology raises the ability of people communication in higher education. Learning Management Systems is one example of web-based systems. LMS permits parents and children to have a positive online communication by sharing instructional materials, monitoring class notices, or submitting course assignments. [4]

Cloud computing has happened with new models related to Web 2.0. Most of our universities don't have a good IT infrastructure. In addition, they haven't the capability to train their employers to provide the need for e- learning. So, cloud computing factors the requirement to download and run the applications on the users' computers by introducing service models for educational resource storage and databases, e-mail, educational applications and methods for students and teachers and customers placed around the world included in an educational program.

In addition, it permits the universities concentrates in their primary objectives on teaching, learning, and researching. [2]

II. LITERATURE REVIEW

A. Cloud Computing Definitions

Cloud Computing is defined as a group of IT services that is introduced to the client over a network on a leased base and with the ability to raising or down their service requirements. The Cloud indicates to the process of sharing resources as hardware, development platforms or software) over the internet. It enables On-Demand network access to a shared pool of configurable computing resources. These resources are accessed on a pay-per-use or subscription base. [8]

B. Google Cloud Platform

Google Cloud Platform is a group of modular cloud-based services that permits you to make anything from simple websites to complicated applications. Google provides hosting on the same supporting infrastructure that Google uses internally for end-user outputs as Google Search and also YouTube. Google offers a group of venture solutions and Google Cloud Platform is a component of it. It is stands for work and introduces a group of modular cloud-based services with a host of development methods as hosting and computing, cloud storage, data storage, translations APIs and prediction APIs.

C. Cloud Computing Models

A. Cloud Service Models

The cloud computing service models are Software as a Service (SAAS), Platform as a Service, and Storage as a Service, Infrastructure as a Service, and Business-Process as a-Service. In this model, a pre-made application, along with any needed software, hardware, operating system, and network are offered. Its applications like email of Gmail and email of Yahoo. Facebook is an instance of social networking. The PAAS model is recognized as a layer on top of IAAS, runtimes as java runtimes, Oracle, databases as my SQl, and web servers as tomcat. In PAAS an operating system, network and hardware are provided, and the customer downloads or enhances his own software and applications.

The IAAS model is the main layer that introduces just the hardware and network and interacts with supposed machines, servers, network, storage, and load balancers the client downloads or enhancements its own operating systems, applications and software. Amazon and Sun's cloud services cloud are models of IAAS.

The StaaS is a digital storage on the cloud that permits the users to save and access their data at any time from any place with scalable services. In Business Process as a Service, the customers could choose a set of IaaS, PaaS and SaaS which forms a business model. [7]

B. Cloud Development Models

Cloud services take a lot of shapes: community cloud, private cloud, public cloud and hybrid cloud. Services introduced by a public cloud are introduced over the Internet and are possessed and processed by a cloud provider. Services of this kind are targeted at the public, as online photo storage services, e-mail services, or social networking sites. In a private cloud, the cloud infrastructure is operated only for a determined organization, and is controlled and included by the organization itself or a third party. In a community cloud, the service is participated by various organizations and only made available to those determined organizations. The infrastructure could be possessed by a third party cloud service provider or owned and operated by the organizations. And a hybrid cloud is a group of various deployment tools of resource pooling; it could be a group of public and community clouds. [5]

C. Cloud Management Models

Cloud management model has two essential attributes that are based on trust and tenancy multiuser issues for the data that is stored on the cloud:

Self-managed: Data and applications are stored on the cloud and managed in some way by the consumer himself. Third party managed: Data and applications are stored on the cloud and managed by the third party, for examples Amazon's EC2 and Microsoft's Azure. [1]

D. Mobile-Learning Approaches:

There are two fields to the use of m-learning technologies in education:

Content Approach: because M-learning is an extension of E-learning, so, it has the probability to make learning available and accessible than in e-learning.
Communication Approach: M-learning introduces opportunities of interaction between lecturers and learners, between learners, and between members of communities of practice. Communication and Co-operation act a success role in the learning process.[3]
Mobile Learning Application
It is a small stand-alone program that can be adapted in the mobile environment or in a traditional computer system.
There are a lot of applications use in smart phones which are very useful in education, although, I will mention the most fames App:

• Audible Apps like ANY.DO which makes the users to remember all of the tasks they want to do and get them done. Also, OVERDRIVE makes the users able to read E-books and listen to audio books from their library. Last but not least DRAGON DICTATION that permits the users to speak and see their text and email messages.
• College Apps like Adobe Reader permits the users show and deal with PDF documents, Gmail let the users enter to real-time notifications, use many accounts, and search their entire inbox e-mail, and Blackboard Mobile Learns makes

the users access their courses wherever and whenever they want.
• Enlarging Apps like Zoom Reader they users can extend and read printed text.
Vision helps App that makes you to enhance the contrast to assist you read or see what you want to read by introducing magnification.
• Note Apps like Write Pad which makes handwritten notes into text. Also, Idea Sketch which designs a diagram--mind map, term map, or flowchart and convert it to a text outline.
• Test Preparation Apps like Flashcards which simple in use studying application with material for any class or test.
• Communications Apps like Facebook Messenger is an immediate messaging service and software application that introduces voice and text communication. Google Hangouts free application for live conversations with photos and even group video calls. What's App Messenger is a messaging app available to message and call friends and family. [8]

E. The advantages of using Google App Engine Services

1. Google Apps is updated automatically so the universities can forget about the methods of installing software or patches or to maintain servers.
2. There is no need to buy or keep own servers or client software.
3. Trusted infrastructure: That in terms of computing, storage and application services for web, mobile and backend solutions.
4. Everything can be controlled from a single interface; no need for system administration. [6]

F. The advantages of Cloud Competing in Education

Cloud computing has happened with new models attributable to Web 2.0. Most of our universities don't have a good IT infrastructure. In addition, they haven't had the ability to train their staff to catch the need for E-learning. So, cloud computing elements the need to install and even run the applications on the users' computers by providing service models for educational resource storage and databases, e-mail, educational applications and tools for students and teachers and clients located all over the world involved in an educational program. Moreover, it lets the universities focus in their primary goals on teaching, learning, and researching.[2]

III. RESEARCH QUESTIONS

1- What are the benefits of Using Google Cloud in Education?
2- What are the main steps to design a Google Cloud Messaging?
3- Is the GSM lead to developing students' performance in education?

IV. METHODOLOGY

In this research the researcher will use the practical experience to design a Google cloud messaging application to assess its use in educational purposes.

V. RESEARCH DESIGN

The study adopted a quasi-experimental mixed methods design with the experimental group working on mobile learning activities and the control group following their normal curriculum.
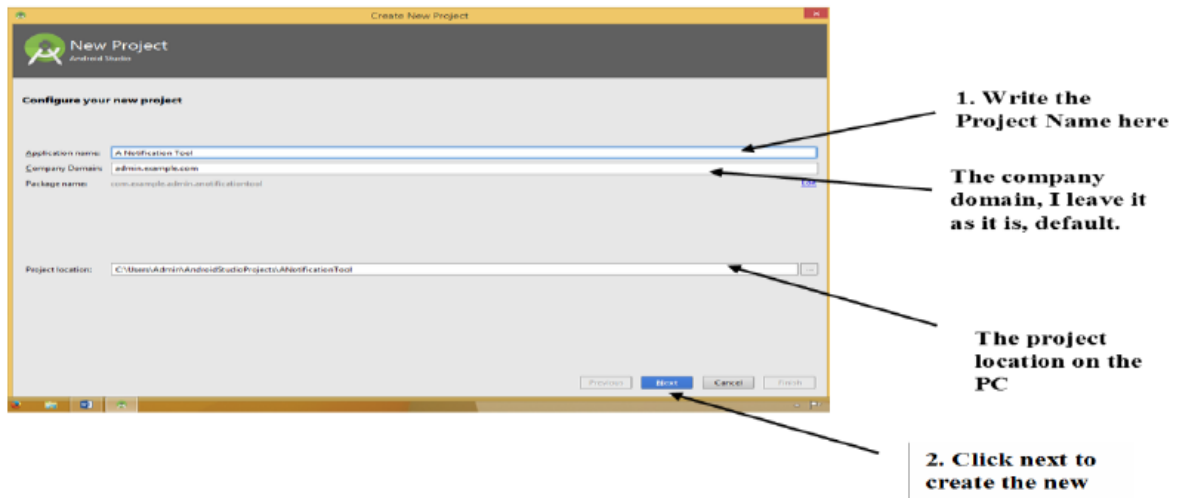
A. Setting Up GCM Client "Android Application"

Figure 1.

To set up Google Client Messaging client, there are various steps to make it consequently. First, start the Android Studio, and then clicks on New Project on the File menu, The New Project dialog box will show as in figure 20.
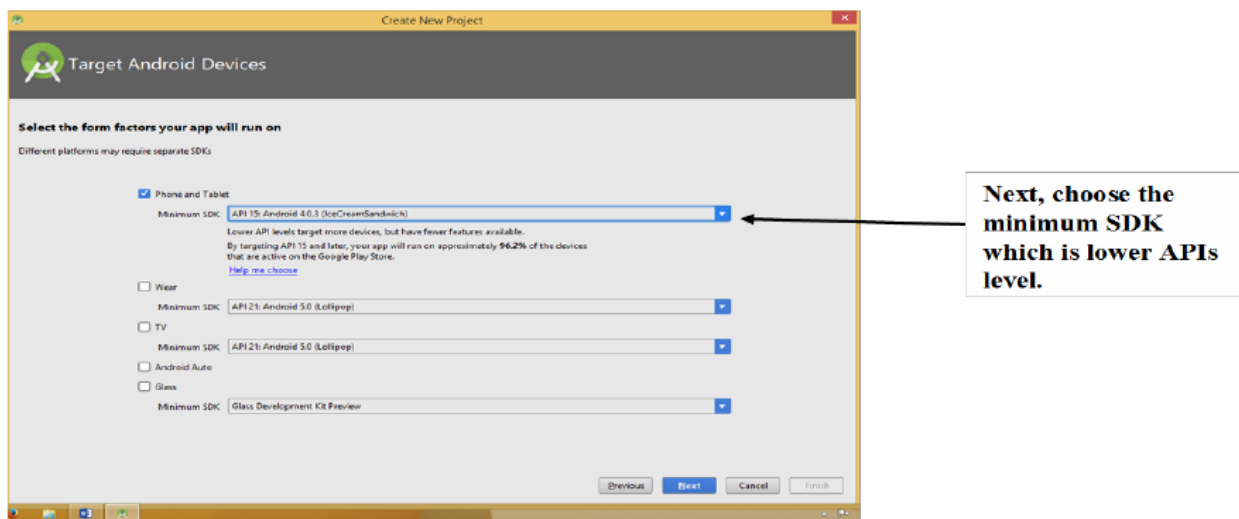

Figure 2. Target Android Device Dialog Box

After performing the pervious steps, then follow the steps in figure 21
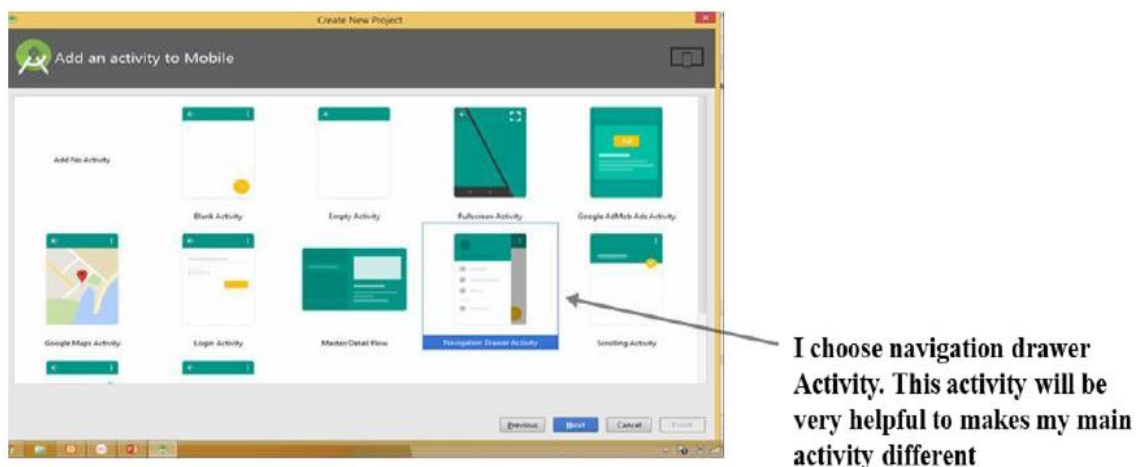
Figure 3. Add an Activity to Mobile Dialog Box
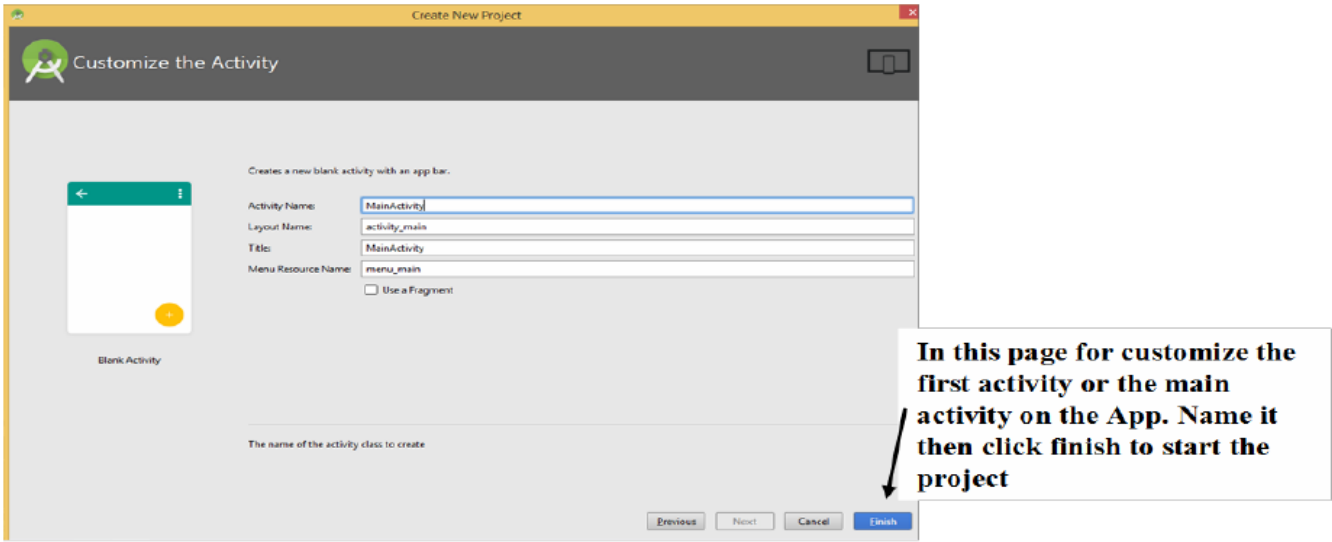
Figure 4. Customize the Activity Dialog Box
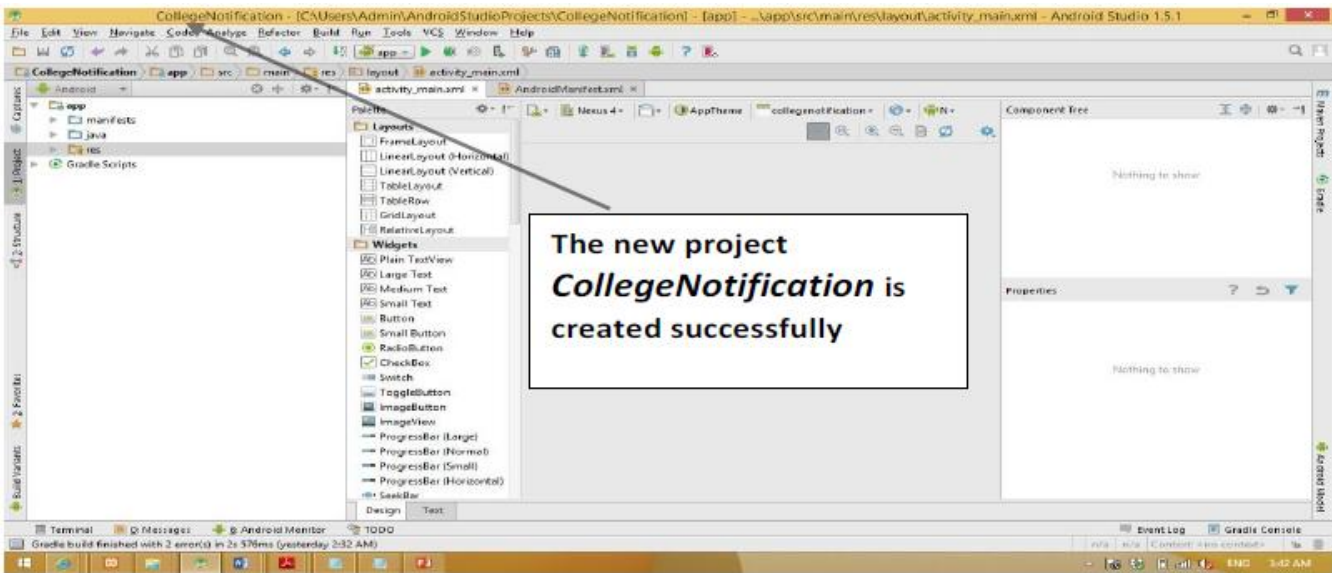
Figure 5. The Project Runs on the Android Studio

B. Setting Up Google Cloud Messaging Server

Download a Local Host Server, Google recommends XAMPP Local host. XMPP is asynchronous App servers for downstream and upstream, that can catch data up to 4 KB of data. XMPP moves an acknowledgment if there any fail on sending the notification, So, download and run the XAMPP; on the XAMPP control panel, begin Apache and My SQL as on figure 25, and 26.
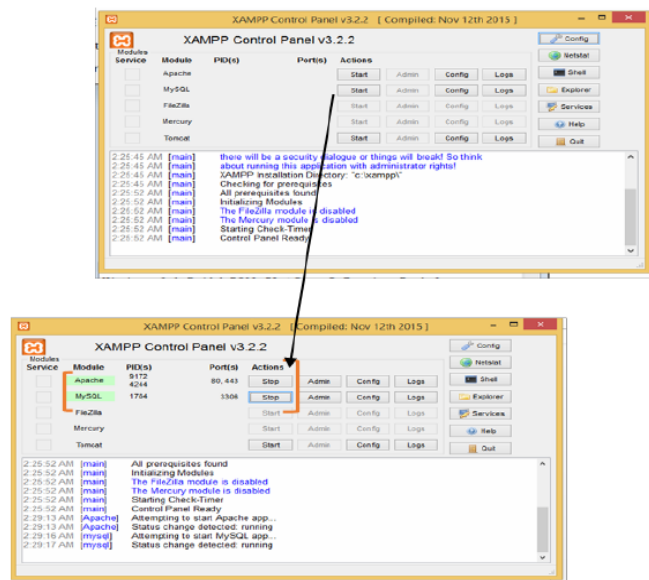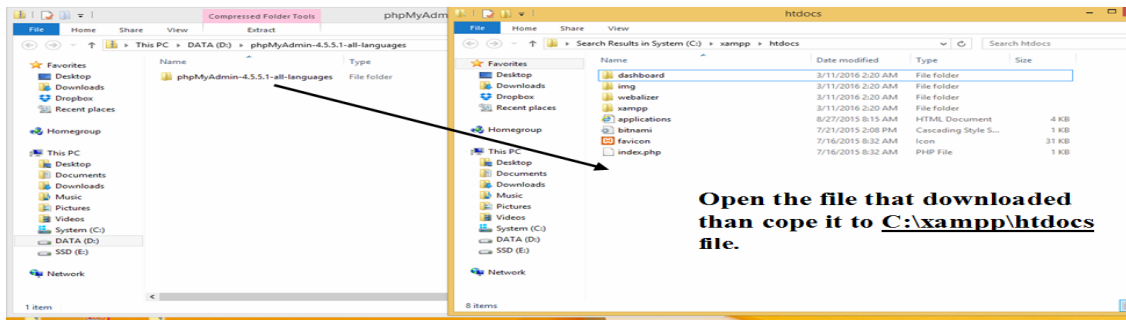

Figure 6. XAMPP Control Pane

Figure 7. PHP My Admin and Ht Doc's Folder

C. Enable CURL

Go and open C:\Program Files\xampp\apache\bin\php.ini; and then Search for extension=php_curl.dll; as appear in figure 27, and 28. Curl is essential to make two server interacts with each other. In my case, Google cloud messaging server and App server
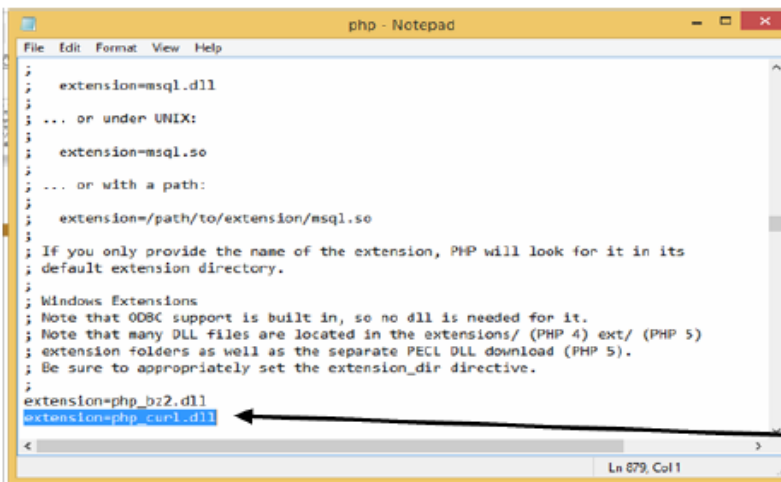
Figure 8. Enable the Curl
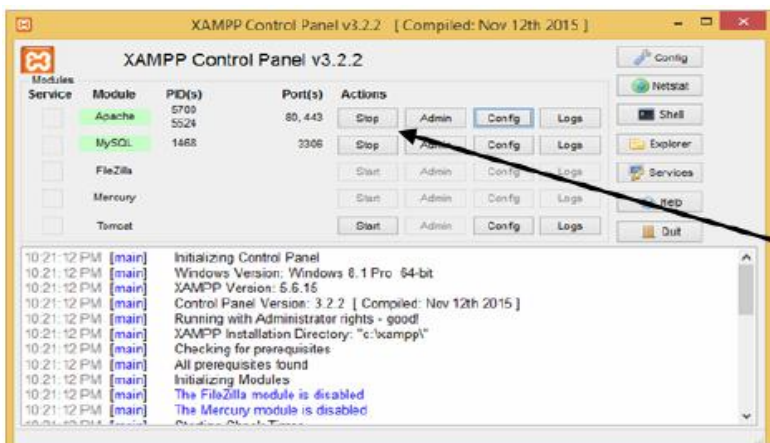
Figure 9. Restart the Apache & my SQL after enable the Curl

After Setting up the development environment; then the environment is ready for development a notification method for Mobile Course Management Campus Guide.

D. Running & Testing an Android Application

- *Run &Test the Local Server*

The admin panel interface for sending notification to the customer app, this interface revealed after running the app local host. The index reflects that there are zero client register, as showing on figure50. The apse verdant baseisemptybecausenooneis register yetas showing on figure51.
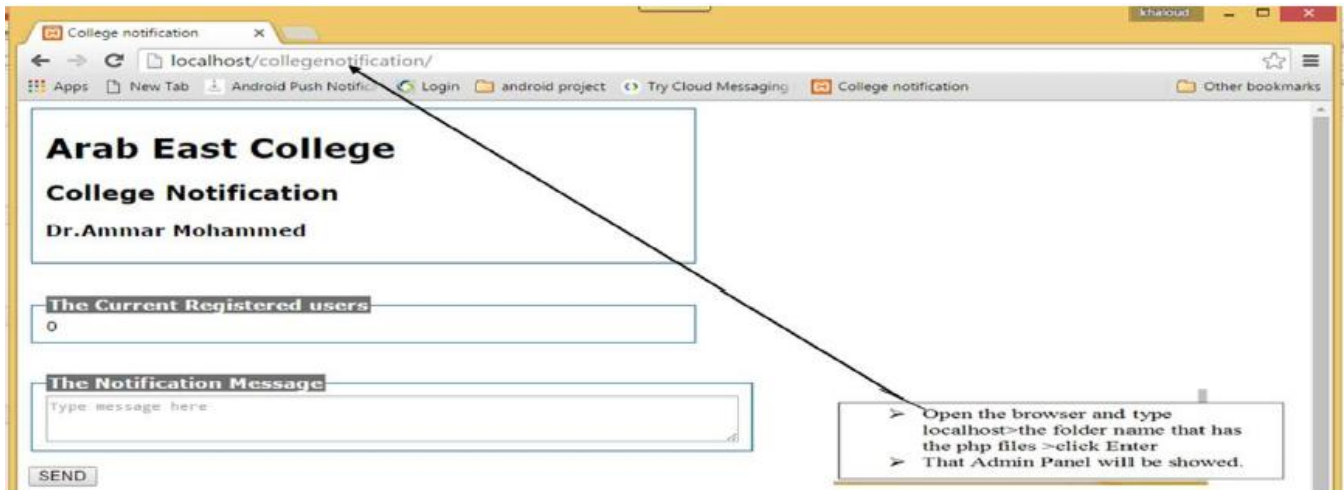
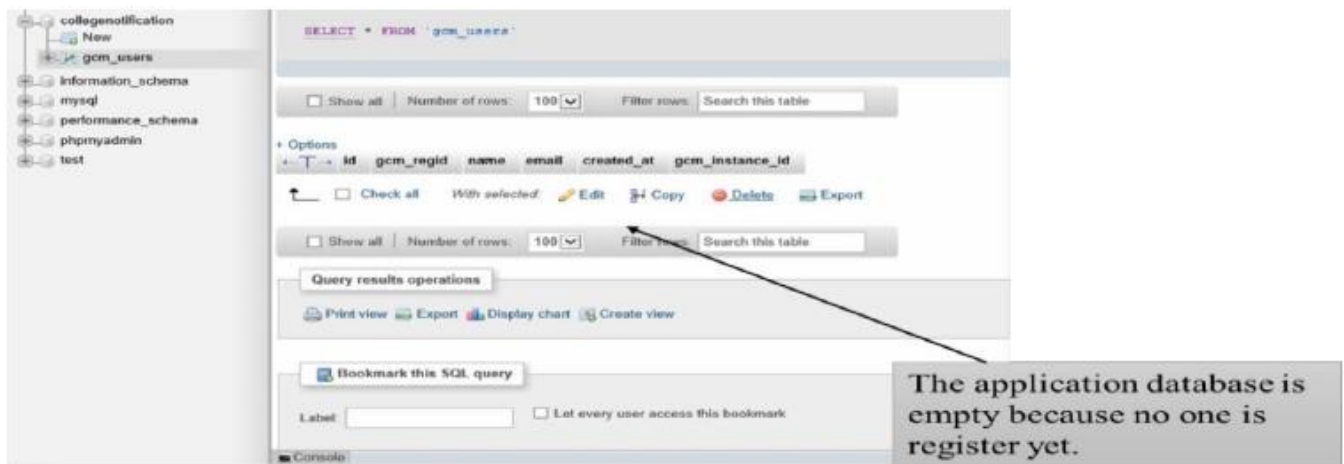**Figure 10. The Admin Panel Page**

Figure 11. The App Database is Empty

The student information who is registered are appears in the app data base. And the admin can send a notification to the client app, which is registered as showing on figure11.

Figure 12. The Application Database Table

6

Figure 13. The Admin Panel Page Show the Number of Registration

Figure 14. Sending the Notification

By choosing the message type and writing the notification on the dialog box then click SEND, the app client will receive the message immediately if he/she is connected to the internet, look at figure 14. And figure 15 shows the validation that is the college notification database has for not sending an empty notification for the students at all. Moreover, the message text will be save on the message history table with the time of sending and the name, the email of the receivers as showing in figure 16.
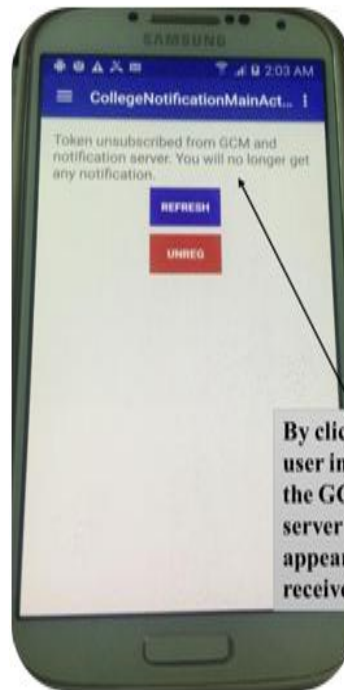

Figure 15. Validation Error

Figure 16. The Message Saving After Sending

Run &Test the App Client

After installing the application from the Google Play, now the student can register with the Google Cloud MessagingandwiththeAppservertogetthenotification.TheappisappearingonthestudentdeviceUI.

By clicking on unregister button, the user information will be deleted for the GCM server and from the app server too. This message will be appear. This user no longer can receive any notification by this app.
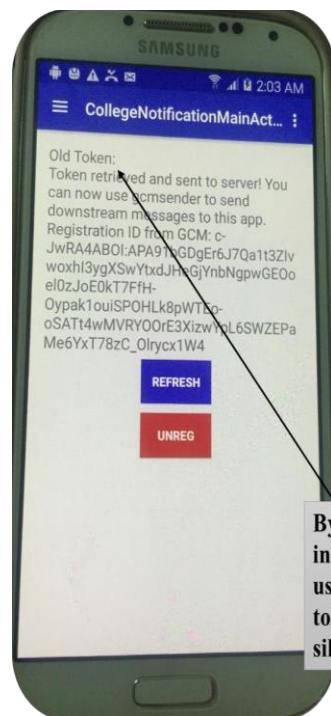
The app now downloaded on the client device. The client is ready to get the registration ID and then receive notification.
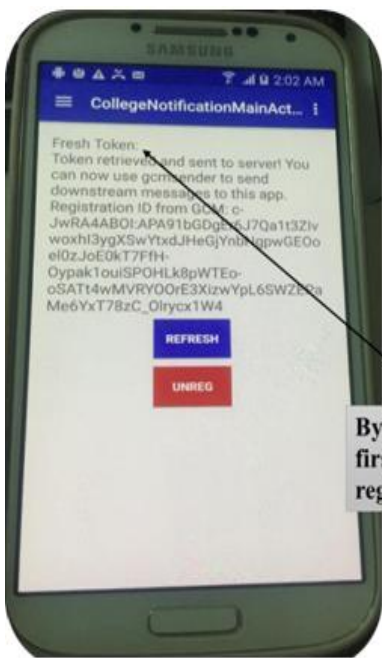
By opening the app for the first time the user will get registration ID (fresh token)

By clicking on refresh button, or log in the app for the second time; the user will get the same reg.id (old token) because his/her information sill kept on the app database table.

VI.   DISCUSSION

The developed mobile app as web application server instructors to send notifications to students using the Google Cloud Messaging service which handles all factors of messages queuing and also it delivers messages to the registered client mobile applications running on target devices.

In reality, using technology as a method in the classroom assists students to obtain their tasks properly. These of technology in the classroom to assist instructors in achieving their learning objectives has become familiar since 1990s. One of the technologies that have been applied for both corporate training and use in institutions of higher education are learning management systems. A learning management system is a software application formed with the particular intent of assisting instructors in achieving their learning objectives of delivering learning content to students.

Most learning management systems face the following criteria: scalability, high availability, interoperability, usability, stability and security. Although, these management Systems needs a student to sign-in to check in any update associated to his courses. A late checking might cause lose something essential related to his course. Since most students hold smart devices everywhere, then it would be a suitable idea to control the course and to notify the student with any update at the suitable time by a message received on the smart device. So, the basic objective of this project is to enhance mobile application wi tha administrative tasks that assists the lecturer to control the course and notify the students sharing in the course with any update associated to the course. In addition, the supposed Application will save the students' privacy by permitting the user, students or parents, interacts with specific methods which is belong to education matters not for social or communication methods.

I tried to develop a mobile app as a web application that serves instructors to send their students notifications messages. The mobile app will be installed by students from Google Play to register and begin to receive notifications messages, the web app will be used by the instructor to send the notification messages. The enhanced mobile app as web app use the Google Cloud Messaging service which holds all factors of messages queuing and delivery to client mobile applications running on target devices, and it is free. The instructor notification messages could be a reminder of deadline of submitting assignments, course lecture cancellation, etc. This web app could also be embedded into Mobile Course Management system. The push notification will instantly show on the client device screen once it's sent by the instructor with no need to open the application.

VII.   CONCLUSION

Learning management systems have been used in a wide range for learning in training and in higher education institutions. Those kinds of systems help instructors in obtaining their learning objective as of delivering earning content to their students. Those management Systems need students to login into the system to check in any update associated to their courses as new assignment, required

quizzes, scheduling. A late checking on the student part might be a method that cause missing something essential associated to his course assignments and requirements. This late checking method can be solved or finished, since most students in these days and most time hold smart devices, by enhancing a mobile application with administrative tasks that assist the lecturer to instantly, at the real time, notify the students sharing in the course with a message sent to the smart device when there is any update associated to the course.

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