

EDUCATION BY GOOGLE CLOUD MESSAGING

Khaloud A. Alkhaled

Imam Mohammed bin Saud University

ABSTRACT

Recently, android is widely used operating system for smart phones; it is utilized as personal computer also. It includes a touch screen user interface, camera and network monitoring. The feature introduces the ability to cell phone to become a Smartphone. Basically, most of chat application permit user to send instant messages and it also introduce a method to sharing image files in addition. The main objective of this research is to propose a methodology to provide Education tool over Google Cloud Messaging (GCM) and also we presents a survey on timing performance of GCM. The researcher tried to design a project, 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. 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. Using Learning Management Systems in educational climates has simplified the communication between learners and teachers, and it also reflected new challenges as well.

Keywords: Education- Android- Messaging- Google cloud

1. INTRODUCTION

E-learning is a learning method depended on networks and computer devices which are enhancing now in all around the world. There is a special kind of E-learning, M-learning (mobile learning) objectives at the use of mobile devices by individuals at any time. Researchers in the higher educational system consider that mobile learning is a main border that will support today's students by enhance their learning and success. Mobile Learning is considered a combines e-learning and mobility. M-learning has enhanced communication quality between

students and teachers. In addition, Mobile learning encourages students' access remote learning resources. It has a respectable client for collaborative learning. Mobile learning is a new type of learning that permits individuals to learn without limit of place. (Koole, Marguerite, 2010)

The higher educational system should be prepared for what the new millennium will bring and for the problems and challenges which brought by the new generations of students, and for the international competition. That will happen by moving the existing teaching model to one more relevant to the knowledge era. The great challenge is how the tutors create effective learning clients with technology. In addition, how this technology assists the tutors to have an immediate relation with their students if there is an emergence cases. The mobile technology in higher education acts a basic role in education by using the m-learning applications to supplement classroom or distance learning. Mobile learning is the extension of e- learning into wireless/handheld (W/H) computing devices. For the period of 2003 and 2004 it clarified that mobile learning versions has existed which refer a huge introduction of mobile learning. (Motiwalla, Luvai F., 2007)

2. LITERATURE REVIEW

2-1. Google Cloud Messaging

GCM is a service that simplifies messaging between mobile apps and server applications. It permits developers to send push messages to android device from the server. Google Cloud Messaging is a common service as a client/server communication solution for android platform. In these days, most of the smart phones run Android operation system; Android prolonged its domain to wearable device. Both the platforms use GCM for central notifications, GCM remote the queuing of the messages also delivering those messages to the wanted applications. The GCM is a free service enhanced by Google. It is a default push messaging solution for android system. (Yavuz Selim Yilmaz, 2014)

GCM does not refer any time guarantee in its documentation. Although there is a need to reflect the GCM message delivery performance to care developers and researchers from over-depending on GCM (by assuming it is fast and reliable for all cases). We evaluate GCM in real world experience, and at a reasonable scale including thousands of real users. Many authors assess GCM in real life experience, they found that:

- They provide the first comprehensive GCM assessment for a group of real world experiment, as like offline and online experiments which are elaborated depended on the kind of connection and the data service providers.

- Their experiment includes thousands of real users, and the results let researchers make supervised decision on GCM is suitable for their intended use case.
- They clarify that GCM delivers the push notification to a large portion of the subscribers in a reasonable timeframe. They conclude that GCM is not relevant for Time sensitive.

GCM is a service which permits developers to send push messages to Android devices from the server. GCM holds the queuing of the messages as delivering those messages to the needed applications on the devices. GCM is a free service by Google, and it has no quotas. It is the common push messaging solution for the Android platform. In this research, we introduce a survey on GCM message arrival times in order to investigate the real-time properties of GCM. The main objective is to introduce a better explanation of this widely used service. Understanding the performance of GCM is important for developers particularly while enhancing applications for public use. It is also important to know the real-time features of GCM for researchers working on mobile systems as crowdsourcing, question answering and other real-time systems. There is a need to expose the GCM message delivery performance to warning developers and researchers from over-dependence on GCM. We assess GCM in real world experiences, and at a reasonable scale including thousands of real users. Our contributions in this work are as follows: To the best of our knowledge, we introduce the first comprehensive GCM assessment for a variety of real world experiment scripts, namely offline and online experiences which are upgraded depended on the connection kind (Wi-Fi or cellular data) and data service providers. Our experience includes thousands of real users, and the findings make developers and researchers make a supervised decision on whether GCM is relevant for their targeted use cases. We clarify that GCM delivers the push messages to a huge part of the subscribers in a reasonable timeframe. We reflect that the GCM message delivery is unpredictable, namely having a trusted network to Google's GCM servers on the customer device does not by itself guarantee a timely message arrival. We conclude that GCM is not relevant for time sensitive and/or "must-deliver-to-all" app scenarios. (Yan Chen, Penghui Li, 2013)

2-2. Google Cloud Platform

Google Cloud Platform is a set of units' cloud-based services that permit you to create anything from simple websites to complicated applications, Google presents hosting on the same supporting infrastructure that Google utilizes internally for end- user products as Google Search and YouTube. Google introduces a set of enterprise solutions and Google Cloud Platform is a component of it. It stands for work and presents a set of modular cloud- based services with a host of development methods as hosting and computing, cloud storage, data storage, translations

APIs and prediction APIs. (Chen, Pu-Shih Daniel, 2010)

2-3. Mobile-Learning Approaches

There are two approaches to the use of m-learning technologies in education: Communication Approach: m-learning introduces opportunities of deals between students and lecturers, between learners, and between members of communities of practice. Communication and Co-operation act a success role in the learning process.

Because m-learning is an extension of e- learning, so, it has the chance to make learning available and accessible than in e- learning. The most familiar applications on the Internet which make the users able to notice if the other users are logged in to send them messages or notifications in real time is call Instant Messaging. The owners of mobile devices can use their devices to send instant messages which able to transmit more information than the short message service (SMS) messages. IM system can be used as a workable one for communicating and learning in higher education.(Cavus, Nadire, and Hüseyin Uzunboylu, 2008).

Communication is a main part of getting things happened. Instant messaging is a specially good method for connecting with any society because if the objective is online, the message will be received as you send it, instant messaging has an direct back and forth exchange that makes you co-operate in real-time; also, instant messages pop up on the screen, publishing their presence with loud alert tones when you're in the middle of doing something else. May not be the best selection for messaging third parties. Recently, Information Technology has been able to enhance the mobility of the end users by supporting end users predictions and experience in terms of the availability of services in daily life. In the new generation of mobile phones the third party applications act important role in smart phone enhancement. The operating systems as android, IOS, windows, present access to resources, API's for developers to enhance more useful applications for the smart phones. (Popovic, Kresimir, 2010).

There are many call and text blocking application present in many operating system as lightweight push notifications in windows phone 8OS, android OS and iPhone OS. Although, in this research Android will be applied becauseg the software is an open source, and for the familiarity of android smartphone. There are many call and text blocking application introduce in many operating system as lightweight push notifications in windows phone 8OS (Microsoft Push Notification Service) android OS (Google Cloud Message) and iPhone OS (Apple Push Notification Service). Although, I would adopt Android because the software is an open source, and for the popularity of android smartphone. (Litayem, Nabil, Bhawna Dhupia, 2015).

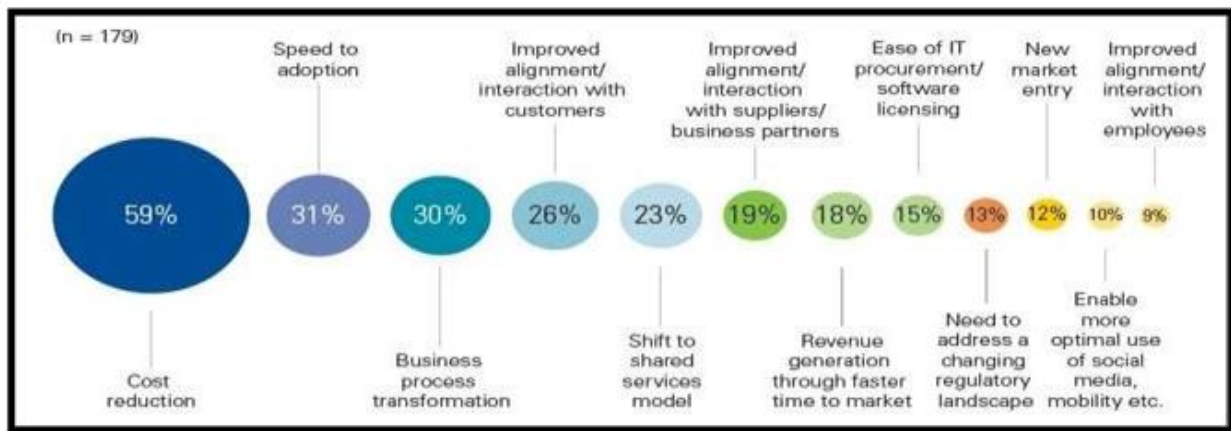
Cloud computing has happened with new models attributable to Web 2.0. Most of our

universities don't have a good IT infrastructure. In addition, they haven't had the ability to train their staff to serve the need for e-learning. So, cloud computing factors the need to download and even 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 located all over the world included in an educational program. In addition, it makes the universities concentrates in their primary objectives on teaching, learning, and researching. (Dimovski, Dime, 2013).

2-4. The Chances of Using Cloud Computing

Firms may select cloud services because they can decrease cost and neglect the challenges of owning and processing computers and networks resources. By selecting cloud services, firms avoids spending on investing on IT infrastructure, or buying hardware and software licenses, and only concentrating on the organizations own business and basic activities. Companies also can benefit from quick outcome on investment, quick deployment of new technologies, quick customization to face new requirements, flexible utilization, and of continued better technological solutions. The client will not worry about developing servers, software, network speed and devices, data storage, applications, and operating systems; not worry about keeping backups, adapting security new patches, not worry about enhancing disaster management policies. (Anshari, Muhammad, Yabit Alas, 2015)

Figure 1: Opportunities of Using Cloud Computing



3. METHODOLOGY

The main methodology used in this research is the practical experience in designing Google cloud messaging application for Educational objectives.

3.1. Research questions:

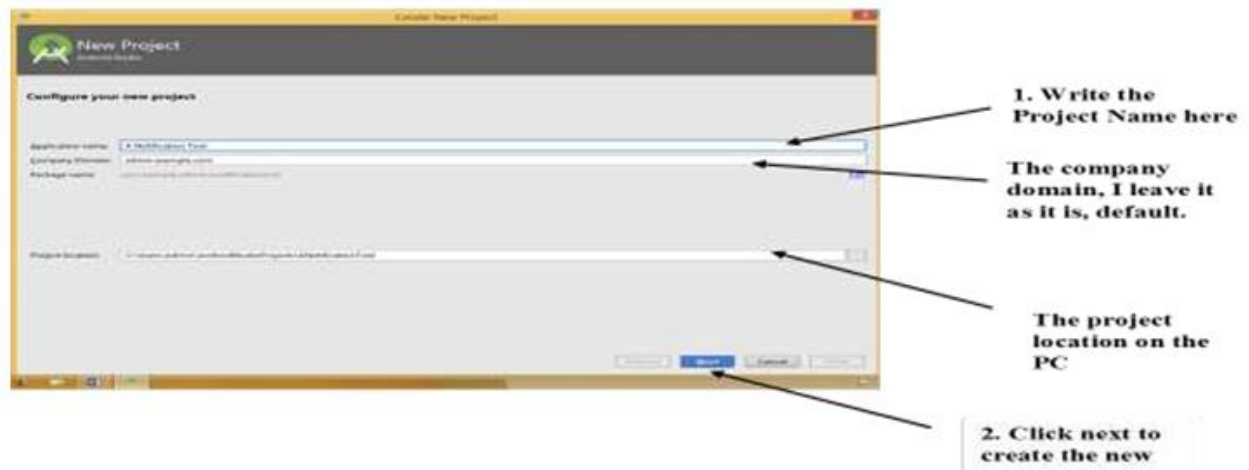
There are basic questions for this research as following:

1. What is the meaning of Google cloud messaging?
2. What are the main steps to design a Google Cloud Messaging?
3. What are the chances of using Cloud Computing?
4. What are the advantages of using Google cloud messaging?

3.2. Research Design

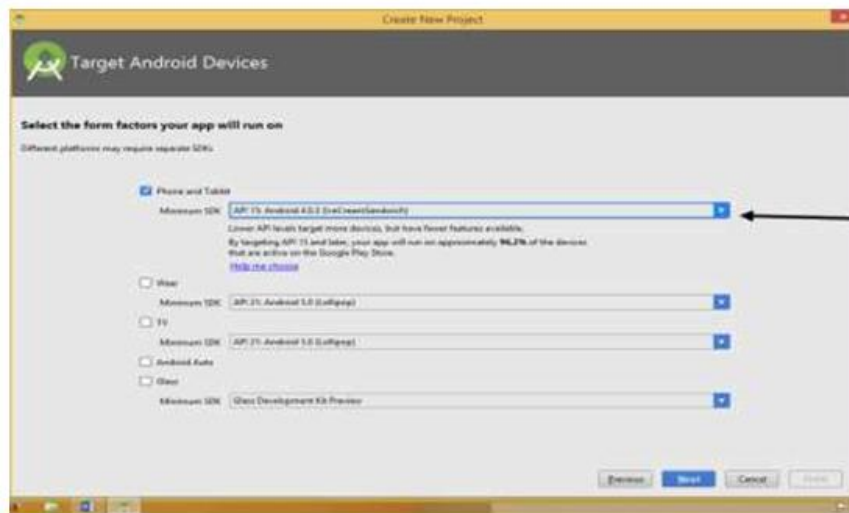
In this research we adopted a quasi-experimental mixed methods design with the experimental group working on mobile learning activities and the control group utilizing their normal curriculum.

Setting Up GCM Client “Android Application”



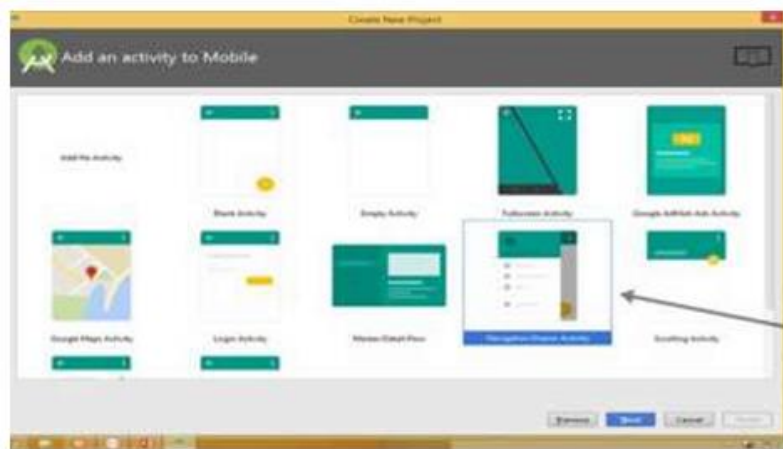
To set up Google Client Messaging client, there are various steps to make it consequently. First, start the Android Studio, and then clicks on New Project on the File menu, The New Project dialog box will show as in figure 20.

Step 1: Target Android Device dialog box



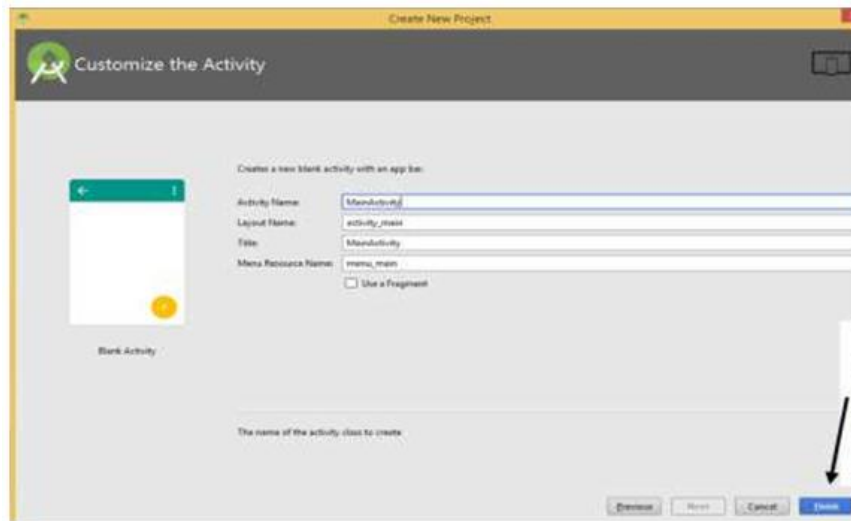
Next, choose the minimum SDK which is lower APIs level.

Step 2: add an activity to Mobile dialog box



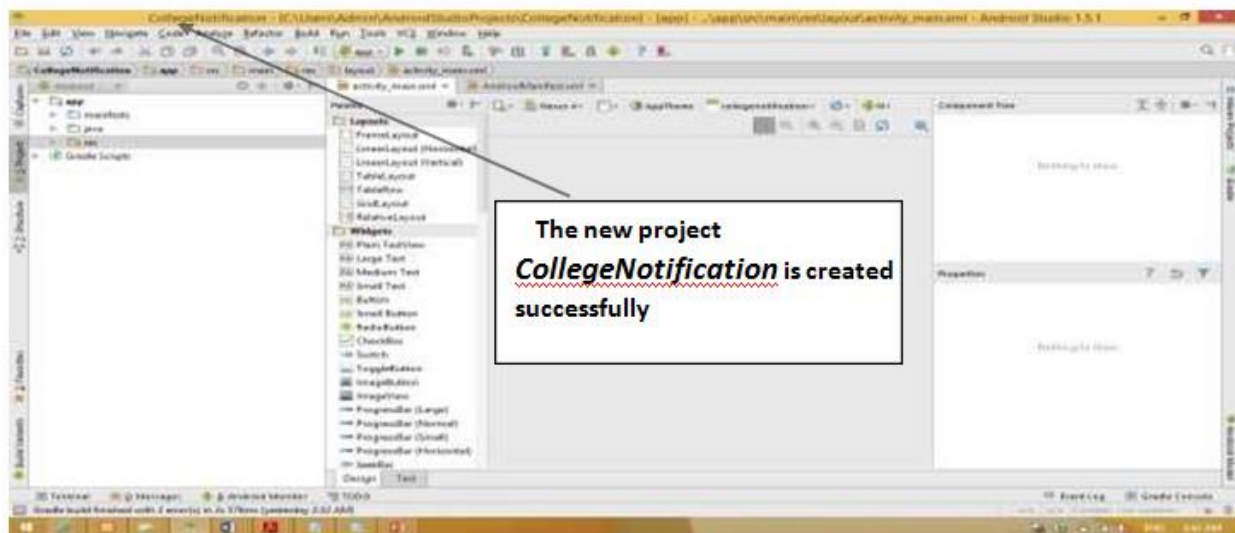
I choose navigation drawer Activity. This activity will be very helpful to makes my main activity different

Step 3: Customize the Activity dialog box



In this page for customize the first activity or the main activity on the App. Name it then click finish to start the project

Step 4: The project runs on the android studio



The new project CollegeNotification is created successfully

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.

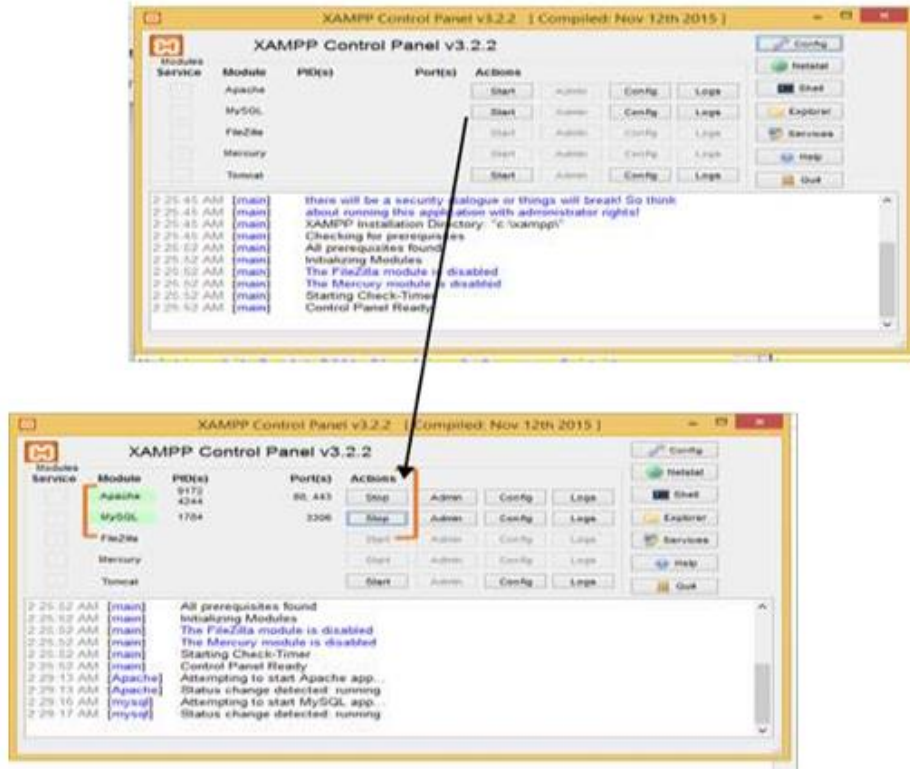


Figure 6: XAMPP Control Pane

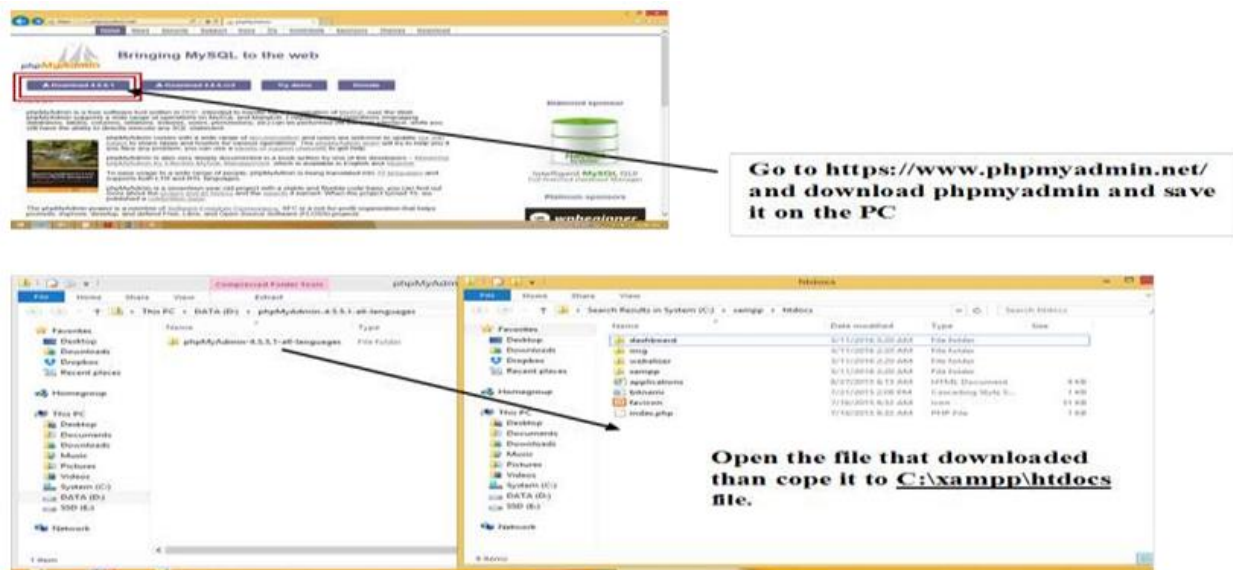
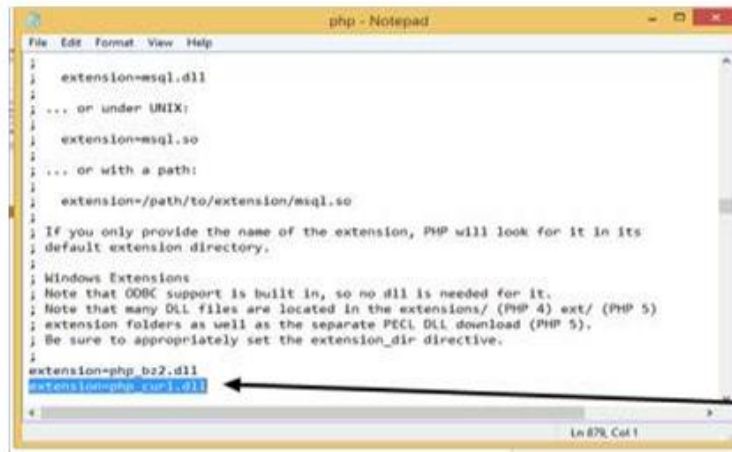


Figure 7: PHP My Admin and ht doc's folder

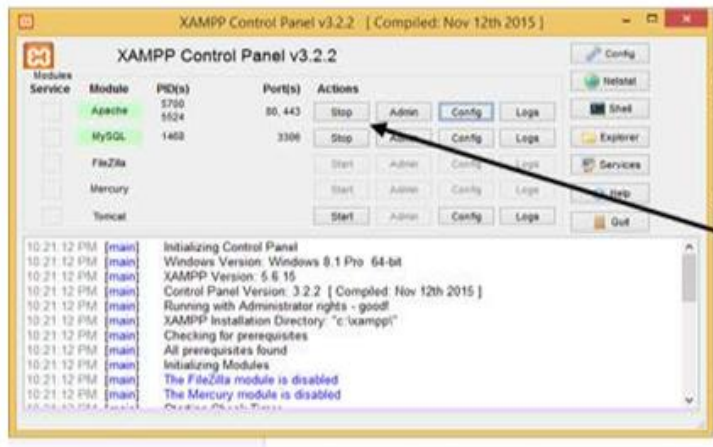
Enable CURL

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



Remove the semicolon to enable the curl

Figure 8: Enable the Curl



Then, restart the apache from the XAMPP control panel, by clicking start to stop then start

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.

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 figure 50. The app sever database is empty because no one is register yet as showing on figure 51.

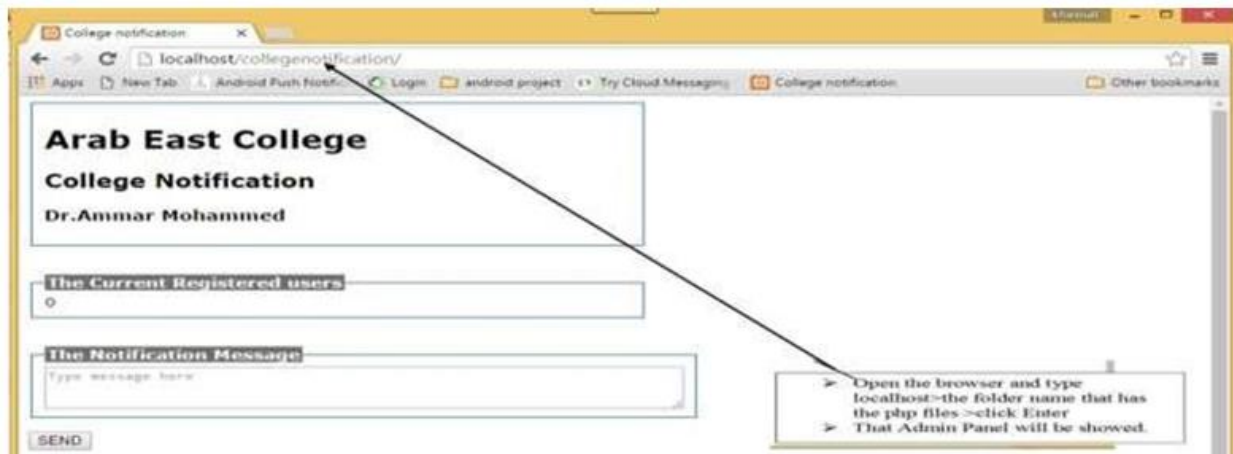


Figure 10: The admin panel page

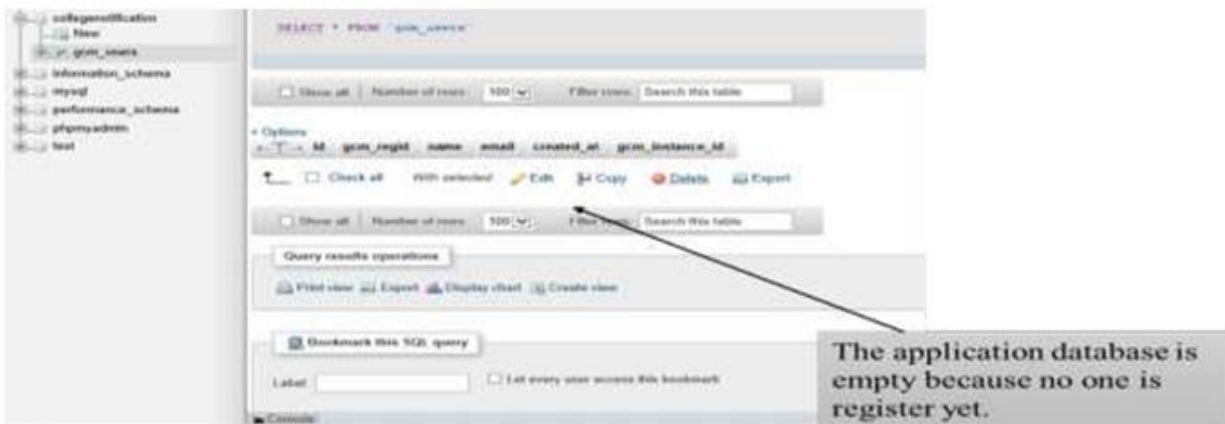


Figure 11: The app database is empty

The student information that is registered is shown in the app data base. And the admin can send a notification to the client app, which is registered as showing on figure 11.



Figure 12: The application database table

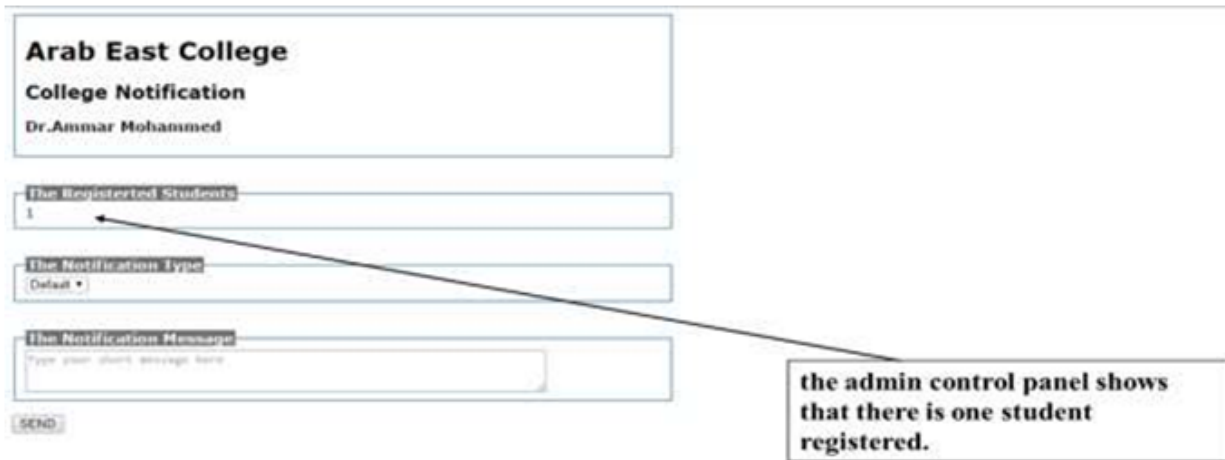


Figure 13: The Admin Panel Page Show the Number of Registration

Figure 14: Sending the Notification

By selecting the message kind and writing the notification on the dialog box then click SEND, the app client will receive the message directly if he/she is connected to the internet, look at figure 14. And figure 15 reflects the validation that is the college notification database has for not sending an empty notification for the students at all. In addition, 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



The screenshot shows a web-based interface for managing messages. At the top, there is a '+ Options' menu. Below it is a table with columns: gcm_id, gcm_regid, message, name, email, and created_at. Two rows of messages are visible. Below the table, there are action buttons: Check all, With selected: Edit, Copy, Delete, and Export. At the bottom, there is a 'Show all' checkbox, a 'Number of rows' dropdown set to 25, and a 'Filter rows' search box.

	gcm_id	gcm_regid	message	name	email	created_at
<input type="checkbox"/>	43	c-JwRA4ABOI	thanks a	khaloud	kh3alkhaled@gmail.com	2016-05-04 09:56:!
<input type="checkbox"/>	48	c-JwRA4ABOI	hello	khaloud	kh3alkhaled@gmail.com	2016-05-04 17:29:~

Figure 16: the message saving after sending

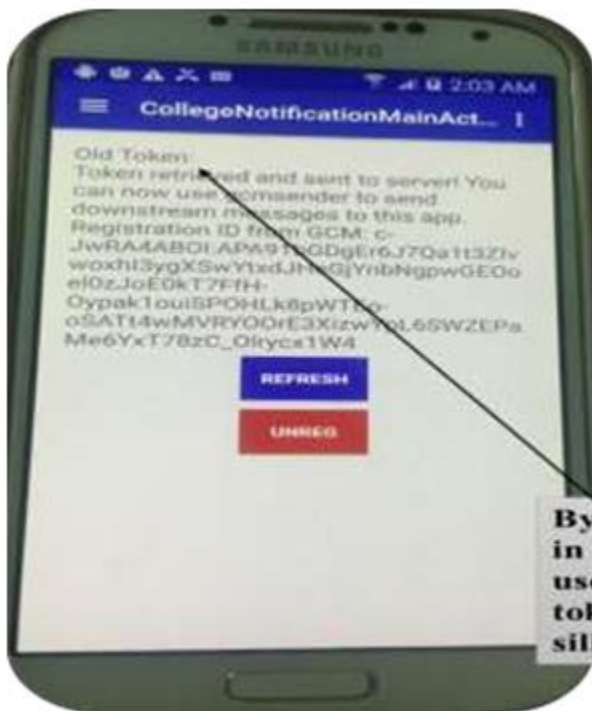
Run & Test the App Client

After downloading the application from the Google Play, now the student can register with the Google Cloud Messaging and with the App server to get the notification. The app is appearing on the student device UI.





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.



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.

4. DISCUSSION

Google Cloud Messaging was a replacement for Cloud to Device Messaging (C2DM). With GCM, app developers can enhance their mobile apps on devices and web browsers and can get simple communication wherever be the place or type of network. With this android platform, sending and receiving push notifications are easy. Thus GCM is an opportunity to every android app developer. Server application for Google cloud messaging can be written in both Java and PHP. GCM is a lone file application in PHP. You can put it in Apache.

GCM android app prerequisites are Google play services in SDK, Google APIs, Google Play Services Lib project as Android dependency, Google Project ID and Register/login with a Google account in the AVD. (Lonn, Steven, and Stephanie D. Teasley, 2009)

Depending on our design we can conclude the main features of Google Cloud Messaging:

- Allow messages exchanges between application server and Android devices using Google cloud.
- New version of C2DM.
- Free and without quota

While GCM show good experience in our online experiment design, not all the devices receive

the GCM messages in a timely manner. GCM may be a good fit for the application scenarios where random multicasting is enough, like crowd sourced question answering systems involving place depended services, and blood donation notifications etc. Although, GCM is not a good fit for the applications where the broadcasting is mission important, i.e. the message arrival to all client devices is important, as emergency alert services, fire alert systems, instant messaging apps. Most learning management systems face the following criteria: scalability, high availability, interoperability, usability, stability and security. 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 a mobile application with 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.

The future work could involve extending the server side to be involved and embedded into a full Mobile Course Management system. Also, I can introduce more properties plus my work to create two methods for notifications; instead on only making the instructor to send a notification message we can permit the customer mobile application to send messages to the server side application utilized by the instructor This app can involve other properties which can be good for users. In addition, I can permit chatting among learners and sharing data. This extension may permit learners to minimize login to the faculty M-Learning Management System to install or upload any files since the extension will introduce only activities. Besides, my project work could be applied to smartphones with IOS by re-developing customer mobile application and customizing the server side web application. In addition, the college can add it to its blackboards.

5. CONCLUSION

The use of Internet has produced the technological conditions for instructors and learners can take advantage from the diversity of online information, communication, co-operation and sharing with others. The integration of Internet services in the teaching practices can be responsible for thematic, social and digital development for the agents included. There are various benefits when we use a Learning Management Systems such as GCM, to encourage the lectures in higher education. We also will consider its impacts for student support and online interaction, leading educational agents to a co-operating of various learning climate, where they can gather face-to-face instruction with computer-mediated instruction, and increases the possibilities for better quantity and quality of human communication in a learning background.

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