(ANDROID APPLICATION FOR KIDS)

Project report submitted in partial fulfillment of the requirement for the degree of Bachelor of Technology

in

Information Technology

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to

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CERTIFICATE

I hereby declare that the work presented in this report entitled **" Android Application For Kids"** in partial fulfillment of the requirements for the award of the degree of **Bachelor of Technology** in **Computer Science and Engineering/Information Technology** submitted in the department of Computer Science & Engineering and Information Technology**,** Jaypee University of Information Technology Waknaghat is an authentic record of my own work carried out over a period from August 2016 to December 2016 under the supervision of **(Ms. Ramanpreet Kaur)** (Assistant Professor(Grade II) Department of Information Technology).

The matter embodied in the report has not been submitted for the award of any other degree or diploma.

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We have taken efforts in this project. However, it would not have been possible without the kind support and help of many individuals and organization. We would like to extend our sincere thanks to all of them.

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Our thanks and appreciations also go to people in developing the project who have willingly helped us out with their abilities.

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SUPERVISOR'S CERTIFICATE

This is to certify that the work embodied in the accompanying report entiled "**Android Application For Kids** " has been carried out entirely by the candidate as a research under my direct supervision and guidance. Candidate has fulfilled all requirements.

(Ms. Ramanpreet Kaur)

(Assistant Professor)

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LIST OF ABBREVATIONS

SDK - Software Development Kit

APIs - Application Program Interfaces

GUI - Graphical User Interface

OHA - Open Handset Alliance

GPS – Global Positioning system

LRU – Last Recently Used

MHTML – Mobile HTML

QoS – Quality of Service

WAP – Web Application Protocol

CSD – Circuit Switched Data

OTA – Over-the-Air

LIST OF FIGURES

ABSTRACT

 Devices being used today have become very powerful in recent years. The advancement in processing   power in the smartphones with huge number of features have laid a path of commercial usage of this technology.

As mobile phones end up being more like PCs they have come to supplant objects we tend to hold up under, for instance, checkbooks, coordinators, etc. An application that falls in this category is "**EaZee Learning**".

The prime goal of " **EaZee Learning** " is to make an undeniable Android application which could contain distinctive modules in light of the phases of educating a tyke. The client learns through the modules as well as vivified intuitive lessons(tests) after each module. These intuitive lessons help learner to get the information of the theme with fun. The client can likewise continue from where he cleared out off past time.

 The application is created in Java Programming Language by utilizing the Android Studio

version 2.1.1 which incorporates an assortment of custom devices that help us create versatile

applications on the Android stage .

1. INTRODUCTION

1.1 Introduction

World is contracting with the growth of mobile phone technology. As the number of users is increasing day by day, facilities are also increasing. Starting with simple regular handsets which were used just for making phone calls, mobiles have changed our lives and have become part of it. Now they are not used just for making calls but they have innumerable uses and can be used as a Camera , Music player, Tablet PC, T.V. , Web browser etc . And with the new technologies, new software and operating systems are required.

Operating Systems have developed a lot in last 15 years. Starting from black and white phones to recent smart phones or mini computers, mobile OS has come far away. Especially for smart phones, Mobile OS has greatly evolved from Palm OS in 1996 to Windows pocket PC in 2000 then to Blackberry OS and Android.

One of the most widely used mobile OS these days is **ANDROID**. **Android** is a software bunch comprising not only operating system but also middleware and key applications. Android Inc was founded in Palo Alto of California, U.S. by Andy Rubin, Rich miner, Nick sears and Chris White in 2003. Later Android Inc. was acquired by Google in 2005. After original release there have been number of updates in the original version of Android.

In recent years, the emergence of smart phones has changed the definition of mobile phones. Phone is no longer just a communication tool, but also an essential part of the people's communication and daily life. Various applications added unlimited fun for people's lives. It is certain that the future of the network will be the mobile terminal.

Now the Android System in the electronics market is becoming more and more popular, especially in the smartphone market. Because of the open source, some of the development tools are free, so there are plenty of applications generated. This greatly inspired the people to use the Android system. In addition, it provides a very convenient hardware platform for developers so that they can spend less effort to realize their ideas.

As the smart phones and Android system have gone popular, the operations like listening to music, watching videos, tweeting and some other are moved from the computer to a phone now. The applications on the market today are mostly commercial applications, and contain a large number of built-in advertising. If the user prefers to remove the built-in advertising, a certain price must be paid to reach that and this is not convenient. Meanwhile, because of the unfair competition of IT, many applications built illegal program to steal user information and cause damage to user's personal privacy. Sometimes, users will pay more attention to the user experience of software. Therefore, the development of the application can not only belimited to the function, more attention should be paid to the user's experience.

use of computing technology for learning has been observed in various ways. In the past few decades, electronic learning or e-learning had been adopted and used by public schools and university students in many parts of the world. They were familiar with both the e-learning terminology and technology but in recent years, the rapid progress in mobile technology has created a new area which is known as mobile learning technology. Mobille learning is the next generation of elearning that are based on mobile devices (Sharples, M.,2005). Wireless technologies such as IEEE 802.11, Bluetooth, and GPRS are used in a project for development of informal classroom and eSchoolbag system at the Aletheia University in Taiwan (Chang C., Sheu J., 2007). A pilot case study called Math4Mobile was conducted in a novel environment to support mobile learning (Botzer, G., 2007). The Math4Mobile environment includes cellular applications designed to support mathematics learning. The main steps in development of a distributed mobile learning application for Android presented by P. Pocatilu, F. Alecu and M. Vetrici (2010). The client application communicates with the server using Web services. The prototype developed includes the testing module. Using Web services for mobile learning applications helps the process of development by providing a standardized way of communication between mobile clients and servers. It is a research on how to use mobile devices and mobile application development as a mechanism to teach introductory programming to computer science students (Mahmoud, Q.H and Popowicz, P.,2010). The objective of their research is to integrate mobile devices into computing education that could provide more benefits to the students than other teaching techniques. In their research the approach involves Java Micro Edition (ME) platform and the Blackberry smartphone as a device. The application associated software tools such as Blackberry Java Development. Environment for building Java

ME and Blackberry based applications and Blackberry Smartphone Simulator. There is a project from University of Tennessee at Martin that has developed mobile learning applications for the Google's Android and Apples iOS platforms to be used in electrical engineering courses will be investigated their effects on student performance. These applications are quiz style and touch based applications that ask students questions relevant to electrical engineering subjects. There are several different problems to choose from, including digital logic gate analysis, discrete signal convolution, and digital filter design. Once students complete the work, the score results can be sent to the instructors email automatically (Potts, J, Moore, N and Sukittanon, S., 2011).

1.2 Overview

Our application will be placed in exclusively on android stage telephones. "This application comprises of the vital time e-learning and social designing suspected that give a solid versatile learning application. Just in the event that you're disconnected then moreover one will gain from this application. This application" basically obliges 2 half first half has instructional exercise half wherever the preparation substance square measure put and in second half diagram space(results) is open for client. Current days, a large portion of people utilize these telephones. Along these lines the application has piles Scope space. The applying gives the solid and helpful way for the versatile learning.

The application will work as a tutor to the user. It will fulfill every requirement of the learning phase with toddlers/kids. As the requirements are being filled we have tried to make the application user-friendly given the age group that we are taking as clients.

The title of this project is "EaZee Learning". The atmost purpose of application is to help the user learn fast. It has line graphs included for the results that are being saved in the database at the time of test being finished by the user. The learning curve will help users' guardian to take care of the user learning process by going through these line graphs002E.

When the application is run on an android phone, login page activity is opened for the user registration where the user has to enter the details required to register himself. Registration form will contain fields named as email, parents' phone number. After registration, activity with different subjects is run on the system out of which user can select anyone of them. The subject selected will have different chapters that have some learning material contained in it, these chapters also include tests associated with the material that is provided. The tests are taken by the user which are then saved in the server.

1.3 Android

Fig: Android Nougat

Android is a mobile operating system (OS) based on the Linux kernel and currently developed by Google. With a user interface based on direct manipulation, Android is designed primarily for touchscreen mobile devices such as smartphones and tablet computers, with specialized user interfaces for televisions (Android TV), cars (Android Auto), and wrist watches (Android Wear). The OS uses touch inputs that loosely correspond to real-world actions, like swiping, tapping, pinching, and reverse pinching to manipulate onscreen objects, and a virtual keyboard. Despite being primarily designed for touchscreen input, it also has been used in game consoles, digital cameras, and other electronics. Android is the most popular mobile OS. As of 2013, Android devices sell more than Windows, iOS, and Mac OS devices combined, with sales in 2012, 2013 and 2014 close to the installed base of all PCs. As of July 2013 the Google Playstore has had over 1 million Android apps published, and over 50 billion apps downloaded. Androids source code is released by Google under open source licenses, although most Android devices ultimately ship with a combination of open source and proprietary software. Initially developed by Android, Inc., which Google backed financially and later bought in 2005, Android was unveiled in 2007 along with the founding of the Open Handset Alliance a consortium of hardware, software, and telecommunication companies devoted to advancing open standards for

mobile devices. Android is popular with technology companies which require a ready-made, low-cost and customizable operating system for high-tech devices. Androids open nature has encouraged a large community of developers and enthusiasts to use the open-source code as a foundation for community-driven projects, which add new features for advanced users or bring Android to devices which were officially released running other operating systems. The operating systems success has made it a target for patent litigation as part of the so called smartphone wars between technology companies.

2. LITERATURE SURVEY

The use of computing technology for learning has been observed in various ways, but since the recent years quick advance of mobile technologies a new term has appeared – mobile learning. Mobile learning is a field which combines two very promising areas – mobile computing and e-learning. M-learning has been considered as the future of learning or as an integral part of any other form of educational process in the future. As 'm-learning is quite a new domain there is a lot of work and research that is being going on. People are trying to understand how the mobile devices will help in reaching better education. The domain of mobile learning can include a wide variety of applications and new teaching and learning techniques. A mobile learning could be considered any form of learning (studying) and teaching that occur through a mobile device or in a mobile environment. Different devices that exist and all the devices that are coming up on the market, with their limitations and advancements, provoke different ideas for applying them on learning, thus any device can mean different mlearning. Since the term m-learning appear for the first time lots of research is being done to investigate the cognitive and pedagogical aspects of the usage of mobile devices in education. Investigation had been done also on how useful mobile computing devices could be for reading or for workplace activities , on the basis of studying activity theory. Some authors try to give directions to application designers for the areas, where the mobile devices should be most useful, how and why, according to their experiences with children. Other are trying to achieve conclusions by analyzing the theories of adult informal learning. In some papers some interesting positive sides of using new technologies are underlined i.e. the participants are excited and want to try "new" things. Some findings show that introducing new forms of teaching (even if this means just using a standard tool for drawing on a PDA) make students spend more time in working on that subject, comparing to the other subject. Also overall students' results are becoming better .Meanwhile the new technology gives new chances to students and to teachers to train their ingenuity– students experiment with new tricks and ways to cheat and teachers should meet the challenge. The evaluation and the analyses of m-learning projects until now show mainly positive results. On the other hand there are some doubts if this excitement is, or is not, a temporary side effect. Most of the researchers think that PDAs and other mobile devices should be seen more like extension, rather than replace the

existing learning tools. Moreover not all kinds of learning content and/or learning activities are appropriate for mobile devices.

The most obvious use of mobile devices for educational purposes is a direct application of the elearning techniques on smaller devices instead on a desktop PC. For grown people studying a subject is by default is arranged on courses, lectures, classes, etc. A logical sequence is the development and experimentation on transforming traditional courses in a form appropriate for mobile devices. Few different bodies are working in this direction. An m-learning project concentrated on the testing of the use of WAP technology in higher education is the UniWap project .The team tries to explore the process of creating an operating environment for studying and teaching through smartphones and WAP phones. The Virtual University needs to support the mobility of the participants of the learning process (the students and also the teachers). One phase of the project was to create some working prototypes (courses modules) and to investigate the problems and the value of such courses. The positive results they encountered (easy to develop, willingly accepted and widely used modules) encourage them to continue investigating the new coming technologies – digital imaging with mobile devices, 3G, etc. At Ultralab M-Learning project the team is producing m-learning materials for people with literacy and numeracy problems The great potential is encountered from the cognitive and pedagogical point of view, but as the development is quite trivial (Macromedia Flash), I will not discuss it in details. Once again the preliminary conclusions are that new technologies have great impact on students' interest in the subject studied. In this case this was one of the main wanted repercussions. "From E-learning to M-Learning" is a longtime project that aims to create a learning environment for wireless technologies by developing course materials for range of mobile devices. A discussion about the characteristics of the devices that are proper for learning is made when taking the decision what devices to use in the project. An analogy and differentiation is made between e-learning, d-learning (distance learning) and mlearning and in this context they try to foresee the future of m-learning and the methods and technologies that should be used for successful m-learning. In their tries of finding the best way to apply mobile devices in education people are experimenting with different fields and one of them is language learning. At Stanford Learning Lab an exploration of mobile learning has been done by developing prototypes that integrate practicing new words, taking a quiz, accessing word and phrase translations, working with a live coach, and saving vocabulary to a notebook. They

envisioned that a good approach would be to fill the gaps of time by short (from 30 seconds to 10 minutes) learning modules in order to use the highly fragmented attention of the user while on the move. The research indicates some very useful directions, like the length of the learning materials, the personalization of interaction and the frustration of the user and the decreasing of the perception of the learning materials because of the poor technological implementation (i.e. the technology is not advances enough to use automated voice-controlled navigation through the materials; poor cellular connections and environmental noises can cause imperfect voice recognition, etc.). Other projects are being in progress for creating special learning content for PDAs and WAP and also for developing special programs (like organizers, timetables and etc.) to assist learning with mobile devices.

One of the most straightforward application of the usage of mobile devices as educational supporting tool is messaging. Again few different educational bodies made experiments in this area. At Kingston University (UK) an experiment was undertaken to research the effectiveness of a two-way SMS campaign in the university environment. The team has developed a system that sends SMS to students, registered to the service, about their schedule, changes in it, examinations dates and places, student's marks and etc. After registering the students were automatically separated in 5 different groups. One group was receiving announcements via e-mail, other 3 groups via SMS (but different interaction was necessary in every group) and the last – via web. The conclusions of the experiment were that the students in certain scenarios where a certain type of response is required preferred SMS as a medium to e-mail or web-based announces. They feel the data is more personal and they like this. SMS could be efficiently used in education (m-learning) as a complementary media. As the technology improves (i.e. EMS and MMS, potential more user-friendly interface) the potential increases too. At the University of Helsinki the LIVE (Learning In Virtual Environment) experiments, made with SMS system and with WAP phones, were very positive . The project went on by introducing digital imaging and sharing photos between the participants (teachers). The conclusions were that it is very possible that the introduction of MMS and the other 3G services in the large scene will lead to more and more possibilities for m-learning. Another project on evaluation of a Short Messaging System (SMS) to support undergraduate students was done at Sheffield Hallam University. The experiment was with 67 undergraduate psychology students. The implemented system was again not for learning, but for managing learning activities (to guide, prompt and support the students in their learning).

The findings were overwhelmingly positive, with students perceiving the system to be 'immediate, convenient and personal'. Positive results we re underlined and after the outcomes from a survey in Norway - almost 100% of the students in that University have cell phones and SMS system would be widely accepted . Once again an SMS system was considered to be used to spread information about lectures and classes, corrections in the schedule and etc. In certain cases students find it more convenient than e-mail or WWW as the information this was comes always on time. These projects open two very important issues to be considered in doing further research in the mobile learning domain. The first one is that the current technology gives enough powerful instruments to support some new forms of auxiliary learning tools. They also show the enthusiasm of the students to accept such new technologies.

Ultralab M-Learning project is one of the projects that have a special section dedicated on creation of a WAP portal for educational purposes. The technical aspects in the creation of a WAP portal for educational purposes do not differ from a common WAP portal. As the target users for this project are young people (age 16- 24) with literacy problems, the group studies the problem of keeping the interest of the young adults to the useful learning materials, by exposing also modish and exciting subjects. Once again the pedagogical aspect of education is observed. The positive results of many more systems, developed to combine WAP courses and SMS notification systems, were published by different universities in the last couples of years. Few examples of them are HyWeb at Griffith University Gold Coast, mid-2000 at Minnesota State University, in Canada the NAIT m-learning project, and etc.

Fig: WBL

Tourist and museum guides are often considered as applications in mobile learning domain. They usually refer to newest technologies as location-discovery via GPRS, radio frequency or etc. Part of the already mentioned Ultralab project, is a project called LAND (Location Activated Nomadic Discovery). It explores the possibility to deliver media-rich context-aware information through mobile devices. The generation of 3D landscapes, based on actual position of the mobile device and on additional information could be a useful educational tool. For example students can go in a picnic in the mountain and then ask the system to generate the view of their current position but in the ice age. Of course the use of such application could be more general (not only for educational purposes). Tourist information could be considered as educational, so almost any tourist supporting system could be mentioned in the m-learning domain, but I think it is already differentiated as a separate field of research, so I will not talk about it more here. The Electronic Guidebook is a project, in which mobile web content was specifically created for the Exploratorium museum (an interactive science museum) in San Francisco. Several recurring issues and themes emerged from the analyses such as users' sense of isolation and user attempts to make a seamless experience between real-place and virtual contexts. Teachers felt the mobile web content would be more useful as learning activities before and after museum visits. While majority of users expressed a concern that the handheld would interfere with exhibit play (one hand is always busy in holding the device), these users also reported positive feedback about the mobile web content and demonstrated new ways in which this resource motivated new ways to think and play with exhibits. A little different experiment was made for a museum in Japan , where an interactive guide system was created to familiarize the kids with exhibitions and to attract users' interests by allowing them to interact with the corresponding virtual exhibition on a sensing board, and providing them with its information. The system uses a sensing board which can rapidly recognize types and locations of multiple objects by using RFID (Radio Frequency Identification), and creates an immersive environment by giving users visual and auditory feedback to their manipulations on the board. After analyzing the acceptance of the system the team found that students, kids, but also their parents (surprisingly) enjoyed the system and think it is very useful.

One of the biggest initiatives in the m-learning domain is the one of University of Birmingham – the HandLeR project . The project tries to understand in depth the process of learning in different contexts and to explore the lifelong learning. The stress is on communication and on human-

centered systems design. The main concepts they investigate are concept mapping and knowledge sharing, lifelong learning, wearable learning technologies and conversation between mobile learners. Similar in some concepts to HandLeR is the project undertaken at the Tampere University of Technology (Finland) , where PDAs are used for lifelong learning (mathematical education) of children. The study-content is presented in the form of a game (again the idea of human-centered education is explored) where the pupils can communicate and help each others and the electronic device is used to measure the average students' knowledge level and to adopt the speed of presenting new material to the learners'. To support "Problem-Based" Learning was the aim of KNOWMOBILE project in Norway , where PDAs and smart-phones were used for experiment in medical education of students from the School of Medicine at University of Oslo. The students were put in different environment and were given different devices (some of the students were living together and were having PDAs with possibility to connect to each other; another group of students were able to connect between each other via internet but were working in separate location, and so on). After fe w weeks of experiment the team found out that the students are using the devices mainly to read information from the digital medical handbook (not to retrieve it via internet as was expected) and as communication device (to discuss problems with colleagues but mainly for sending SMS messages and to organize social events after hours). The research (interviews) found that the reason for this was that even the medical students were eager to test the PDAs and investigate how they can be useful in learning they still had some technical difficulties. With proper guidelines and education the students could make it better so these problems are easy to overcome. The next generation devices will help a lot too. They concluded that the PDAs should not be regarded as Personal Digital Assistants, but rather as gateways in complicated webs of interdependent technical and social networks. Research on new forms/tools for collaboration is been going on in different institutions, schools and Universities. In few different projects people are experimenting on the collaborative conceptual mapping and notes-taking systems. An example of such collaborative work is a project that took place at MIT . The team uses PDAs to simulate the real environment (in the form of map) and to use simulation for a game, played by kids. They use PDAs equipped with GPS extensions. The idea is that the virt ual world simulated on the PDA (which has the same geographical characteristics as real world) is "polluted". Kids have to take "virtual" probes from the water and/or air in the polluted area or surroundings, analyze the results, interview people and read information about similar

situations and finally find out how to sublimate the environment. During the game they collaborate by doing different probes and analysis and giving the results (reports) to their classmates or leaving them (probes and reports) in a certain place in the area (map), where other kids can find and use them. The kids have to collaborate because they are forced by time limitations. Advanced wireless technologies (IEEE 802.11, Bluetooth, and GPRS) are used in a project for development of ad-hoc classroom and eSchoolbag system at the Aletheia University in Taiwan. The so called "Paperless education" is being observed together with the acceptance from the students (the term "paperless education" and research on the topic is made also in . The traditional classroom was replaced by the new developed electronic tools (electronic blackboard, rubber, color chalk and so on). Pupils were strongly encouraged to communicate and to learn together (in groups).

In USA the usage of mobile devices by students in K12 classes is widely explored. One of the specifics of the education in K12 is that kids get lots of assignments for collecting data "on the field", for example making questionnaires and collecting few dozens of answers or taking measurements from the temperature near the school, etc. Applications for recording the data and taking notes had been developed for Palms and the pedagogical effect of them is analyzed. Another specific is the usage of TI-83 (a specific science calculator) by more than 80% of the students in US schools. This fact predisposes specific experiments in the classrooms. An example are the experiments with networked TI-83 prototypes that were made in few schools in USA in the math classes. A wired network of series of hubs that were connecting groups of 4 connected handhelds to other such groups was assembled. After revising the acceptable level of reliability in the classroom another prototype version was made. The system had a database server to cue activities and individual student data. It was composed on wireless hubs and an access point which connects students' handhelds with teacher's PC. Using this system students ware involved in group activities. The results of their work (for example the results of an equation) were anonymous (for the students in the class) and in the same time the teacher (on his/her PC) could see right in the classroom who made the mistake and why. The evaluation was made by series of interview of students about their opinion of the usefulness and friendliness of the system. Students find the system very useful; they think that it gives them freedom and comfort - they don't feel ashamed if they don't know the answer and they see that there are other students that have difficulties in understanding. Teachers find the system very useful too.

Students became more active in the class and the new technology gives them (teachers) the opportunity to receive feedback right in the classroom and concentrate on things that are difficult for students to understand. Individual students' results (grades) also rose. The research group from Texas Instruments found this experiment and intends to continue doing their research to find out and to make explicit which design eleme nts of a classroom network have a positive impact on the learning environment. Similar experiments were made in Taiwan , where students were equipped with network-connected PDAs and their achievements were shown on a whiteboard. The results from the pedagogical point of view were again very positive (as the students were very shy they preferred to keep quiet and the teacher could not find out the real level of their knowledge). Compared with traditional classrooms virtual environment and technology motivate more participation and collaborative dynamics between instructor and learners. There are also projects (as COPE at The University of Texas at Austin and already mentioned UniWap project) which observe the use of PDAs in teachers' productivity. The teachers can use the mobile devices to organize their work, keep track on students' performance for long periods of time (i.e. 7 years), but also to analyze their own work and the work of their colleagues by observing pictures, made during lectures.

The overall view on the existing research work and projects in the m-learning domain shows that it most probably applies best to processes, where specific knowledge should be retrieved/accessed in a certain moment, where discussions in distributed groups (i.e. brainstorming) appear, where data is collected or utilized "on the field", and where context-information is strongly related to the learning content. The nature of mobile devices, with their small screens and poor input capabilities leads to the assumption that they can not replace the standard desktop computers or laptops. But the same properties can make them efficient in learning domain, if certain constraints are kept (: - Short, not more that 5-10 minutes long modules. The participants should be able to use their small fragments of waiting time (i.e. waiting for a meeting or while traveling in a train) for learning, like reading small pieces of data, doing quizzes or using forums or chat for finding answers to "on field" questions. - Simple, funny and added value functionality. The computational power and other properties of mobile devices make it difficult to use complex and multimedial content. It should be possible to use an m-learning system without having to read a thick user manual and one should find it more interesting or necessary and useful (or at least equally) to study using this m-learning system in

his/her 5 min. break than playing a game on the same device. - Area/Domain specific content, delivered just in time/place. The mobility should bring the ability to guideline and support students and teachers in new learning situations when and where it is necessary. The dependency of the content can be relative to location context (i.e. the system knows the location where the learner resides and adjusts to it), temporal context (i.e. the system is aware of time dependent data), behavioral context (i.e. the system monitors the activities performed by the learner and responds to them adjusting its behavior) and interest specific context.

3. SYSTEM DEVELOPMENT

Android Architecture

The following diagram shows the major components of Android

Fig: Architecture of Android OS

3.1 Application Framework

Developers have full access to the same framework APIs used by the core applications. The application architecture is designed to simplify the reuse of components; any application can publish its capabilities and any other application may then make use of those capabilities (subject to security constraints enforced by the framework). This same mechanism allows components to be replaced by the user.

Underlying all applications may be a set of services and systems, including:

- ☐ Collective Views that have lists, grids, text boxes, an embedded browser etc.

- ☐ Content provider that change applications to access information from different applications (such as Contacts), or to share their own information

- ☐ A Resource Manager, providing access to non-code resources like localized strings, graphics, and lat files

- ☐ A Notification Manager that allows all applications to show custom alerts within the standing bar.

- ☐ An Activity Manager that manages the life cycle of applications and provides a standard navigation backstack.
- ☐ When the application is run on an android phone, login page activity is opened for the user registration where the user has to enter the details required to register himself. Registration form will contain fields named as email, parents' phone number. After registration, activity with different subjects is run on the system out

of which user can select anyone of them. The subject selected will have different chapters that have some learning material contained in it, these chapters also include tests associated with the material that is provided. The tests are taken by the user which are then saved in the server
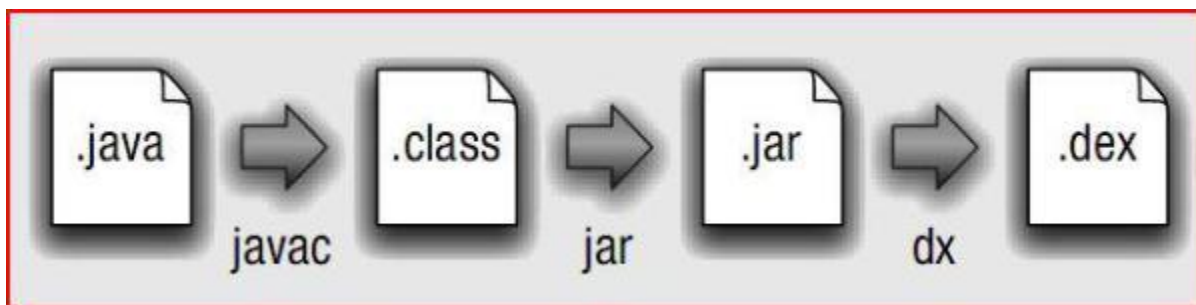
3.2 Libraries

Android includes a set of C/C++ libraries used by various components of the Android system. These capabilities are exposed to developers through the Android application framework. Some of the core libraries are listed below:

- **System C library** - a BSD-derived implementation of the standard C system library (libc), tuned for embedded Linux-based devices

- **Media Libraries** - based on PacketVideo's Open CORE; the libraries support playback and recording of many popular audio and video formats, as well as static image files, including MPEG4, H.264, MP3, AAC, AMR, JPG, and PNG

- **Surface Manager** - manages access to the display subsystem and seamlessly composites 2D and 3D graphic layers from multiple applications

- **LibWebCore** - a modern web browser engine which powers both the Android browser and an embeddable web view

- **SGL** - the underlying 2D graphics engine

☐ **3D libraries** - an implementation based on OpenGL ES 1.0 APIs; the libraries use either hardware 3D acceleration (where available) or the included, highly optimized 3D software rasterizer

Android includes a set of core libraries that provides most of the functionality available in the core libraries of the Java programming language. Every Android application runs in its own process, with its own instance of the Dalvik virtual machine. Dalvik has been written so that a device can run multiple VMs efficiently. The Dalvik VM executes files in the Dalvik Executable (.dex) format which is optimized for minimal memory footprint. The VM is register-based, and runs classes compiled by a Java language compiler that have been transformed into the .dex format by the included "dx" tool. The Dalvik VM relies on the Linux kernel for underlying functionality such as threading and low-level memory management.

At the same level there is Android Runtime, where the main component Dalvik Virtual Machine is located. It was designed specifically for Android running in limited environment, where the limited battery, CPU, memory and data storage are the main issues. Android gives an integrated tool "dx", which converts generated byte code from .jar to .dex file, after this byte code becomes much more efficient to run on the small processors.


Fig: Conversion from .java to .dex file

As the result, it is possible to have multiple instances of Dalvik virtual machine running on the single device at the same time. The Core libraries are written in Java language and contains of the collection classes, the utilities, IO and other tools.

When the application is run on an android phone, login page activity is opened for the user registration where the user has to enter the details required to register himself. Registration form will contain fields named as email, parents' phone number. After registration, activity with different subjects is run on the system out of which user can select anyone of them. The subject selected will have different chapters that have some learning material contained in it, these chapters also include tests associated with the material that is provided. The tests are taken by the user which are then saved in the server.

4. PERFORMANCE ANALYSIS
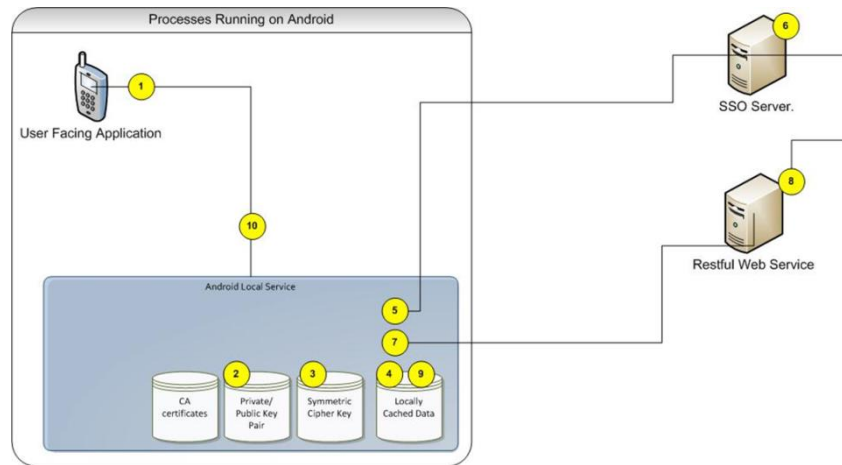
Fig: Android and secure Local Data Storage.

4.1 Lifecycle of an Android Application

In most cases, every Android application runs in its own Linux process. This process is created for the application when some of its code needs to be run, and will remain running until it is no longer needed *and* the system needs to reclaim its memory for use by other applications.

An important and unusual feature of Android is that an application process's lifetime is *not* directly controlled by the application itself. Instead, it is determined by the system through a combination of the parts of the application that the system knows are running, how important these things are to the user, and how much overall memory is available in the system.

It is important that application developers understand how different application components (in particular Activity, Service, and IntentReceiver) impact the lifetime of the application's process.

Not using these components correctly can result in the system killing the application's process while it is doing important work.

A common example of a process life-cycle bug is an IntentReceiver that starts a thread when it receives an Intent in its on ReceiveIntent() method, and then returns from the function. Once it returns, the system considers that Intent Receiver to be no longer active, and thus its hosting process no longer needed (unless other application components are active in it). Thus, it may kill the process at any time to reclaim memory, terminating the spawned thread that is running in it. The solution to this problem is to start a Service from the Intent Receiver, so the system knows that there is still active work being done in the process.

To determine which processes should be killed when low on memory, Android places them into an "importance hierarchy" based on the components running in them and the state of those components. These are, in order of importance:

1. A **foreground process** is one holding an Activity at the top of the screen that the user is interacting with (its onResume () method has been called) or an IntentReceiver that is currently running (its onReceiveIntent () method is executing). There will only ever be a few such processes in the system, and these will only be killed as a last resort if memory is so low that not even these processes can continue to run. Generally at this point the device has reached a memory paging state, so this action is required in order to keep the user interface responsive.

2. A **visible process** is one holding an Activity that is visible to the user on-screen but not in the foreground (its onPause() method has been called). This may occur, for example, if the foreground activity has been displayed with a dialog appearance that allows the previous activity to be seen behind it. Such a process is considered extremely important and will not be killed unless doing so is required to keep all foreground processes running.

3. A **service process** is one holding a Service that has been started with the startService() method. Though these processes are not directly visible to the user, they are generally doing things that the user cares about (such as background mp3 playback or background network data upload or download), so the system will always keep such processes running unless there is not enough memory to retain all foreground and visible process.

4. A **background process** is one holding an Activity that is not currently visible to the user (its onStop() method has been called). These processes have no direct impact on the user experience. Provided they implement their activity life cycle correctly (see Activity for more details), the system can kill such processes at any time to reclaim memory for one of the three previous processes types. Usually there are many of these processes running, so they are kept in an LRU list to ensure the process that was most recently seen by the user is the last to be killed when running low on memory.

5. An **empty process** is one that doesn't hold any active application components. The only reason to keep such a process around is as a cache to improve startup time the next time a component of its application needs to run. As such, the system will often kill these processes in order to balance overall system resources between these empty cached processes and the underlying kernel caches.

When deciding how to classify a process, the system picks the most important level of all the components currently active in the process.

4.2 Additional security notes:

1. The public/private key pair of the user is generated directly on the handset at install time. As such, the private key has never left the phone nor has it been transferred over any network.

2. The certificate of the user must at least be registered once in the SSO application. This could be done at install time of the handset application.

3. "Man-in-the-middle"38 attacks are not possible since the application is deployed with the CA

certificate of the company that will be hosting the web services.

4. If the device is lost, all the locally cached data is completely unreadable. The symmetric key that encrypted this data is also unreadable. The public/private keys that are central to the security architecture are protected by a passphrase.

5. The passphrase is the weakest link in the chain. If the user enters an overly simple password, access could be gained to the private key and hence the locally cached data.

6. That being said, it would be possible to further extend this architecture to store the encrypted symmetric key on the server. This way, even if the passphrase of the private key is compromised, the locally cached data still cannot be accessed. This is because the encrypted strong symmetric cipher key is stored on the server. By the time the passphrase has been cracked, there has been ample time to report the stolen phone and revoke this key from this user account on the server. Furthermore, under this scheme, the key stored on the server is still encrypted. Even if this key is

intercepted in transit it is useless without the user's private key.

7. It is also possible to enforce a strong password policy directly from the handset application.

8. Even if this design is significantly more secure than the previous iteration, to the user, the experience is the same. The user must enter a username and password to prove his identify.

9. We could augment the architecture in yet another direction. The local caching system could also require an SSO token and subsequently request authorization from an SSO system.

4.3 Security and Permissions in Android

Android is a multi-process system, where each application (and parts of the system) runs in its own process. Most security between applications and the system is enforced at the process level through standard Linux facilities, such as user and group IDs that are assigned to applications. Additional finer-grained security features are provided through a "permission" mechanism that enforces restrictions on the specific operations that a particular process can perform.

Fig: Android Security

Android mobile phone platform is going to be more secure than Apple's iPhone or any other device in the long run. There are several solutions nowadays to protect Google phone from various attacks. One of them is security vendor McAfee, a member of Linux Mobile (LiMo) Foundation. This foundation joins particular companies to develop an open mobile-device software platform. Many of the companies listed in the LiMo Foundation have also become members of the Open Handset Alliance (OHA).

As a result, Linux secure coding practice should successfully be built into the Android development process. However, open platform has its own disadvantages, such as source code vulnerability for black-hat hackers. In parallel with great opportunities for mobile application developers, there is an expectation for exploitation and harm. Stealthy Trojans hidden in

animated images, particular viruses passed from friend to friend, used for spying and identity theft, all these threats will be active for a long run.

Another solution for such attacks is SMobile Systems mobile package. Security Shield –an integrated application that includes anti-virus, anti-spam, firewall and other mobile protection is up and ready to run on the Android operating system. Currently, the main problem is availability for viruses to pose as an application and do things like dial phone numbers, send text messages or multi-media messages or make connections to the Internet during normal device use. It is possible for somebody to use the GPS feature to track a person's location without their knowledge. Hence SMobile Systems is ready to notify and block these secure alerts. But the truth is that it is not possible to secure r mobile device or personal computer completely, as it connects to the internet. And neither the Android phone nor other devices will prove to be the exception.

Dalvik Debug Monitor Service (ddms)

Integrated with Dalvik, the Android platform's custom VM, this tool lets manage processes on an emulator or device and assists in debugging. can use it to kill processes, select a specific process to debug, generate trace data, view heap and thread information, take screenshots of the emulator or device, and more.

Android Debug Bridge (adb)

The adb tool lets install application's .apk files on an emulator or device and access the emulator or device from a command line. can also use it to link a standard debugger to application code running on an Android emulator or device.

Android Asset Packaging Tool (aapt)

The aapt tool lets create .apk files containing the binaries and resources of Android applications.

Android Interface Description Language (aidl)

Aidl Lets generate code for an interprocess interface, such as what a service might use.

sqlite3

Included as a convenience, this tool lets access the SQLite data files created and used by Android applications.

Trace view

This tool produces graphical analysis views of trace log data that can generate from r Android application.

mksdcard

Helps create a disk image that can use with the emulator, to simulate the presence of an external storage card (such as an SD card).

dx

The dx tool rewrites .class bytecode into Android bytecode (stored in .dex files.)

activityCreator

A script that generates Ant build files that developing on Eclipse with the ADT plugin, can use to compile r Android applications. If are won't need to use this script.

The title of this project is "EaZee Learning". The atmost purpose of application is to help the user learn fast. It has line graphs included for the results that are being saved in the database at the time of test being finished by the user. The learning curve will help users' guardian to take care of the user learning process by going through these line graphs002E.

When the application is run on an android phone, login page activity is opened for the user registration where the user has to enter the details required to register himself. Registration form will contain fields named as email, parents' phone number. After registration, activity with different subjects is run on the system out of which user can

select anyone of them. The subject selected will have different chapters that have some learning material contained in it, these chapters also include tests associated with the material that is provided. The tests are taken by the user which are then saved in the server.
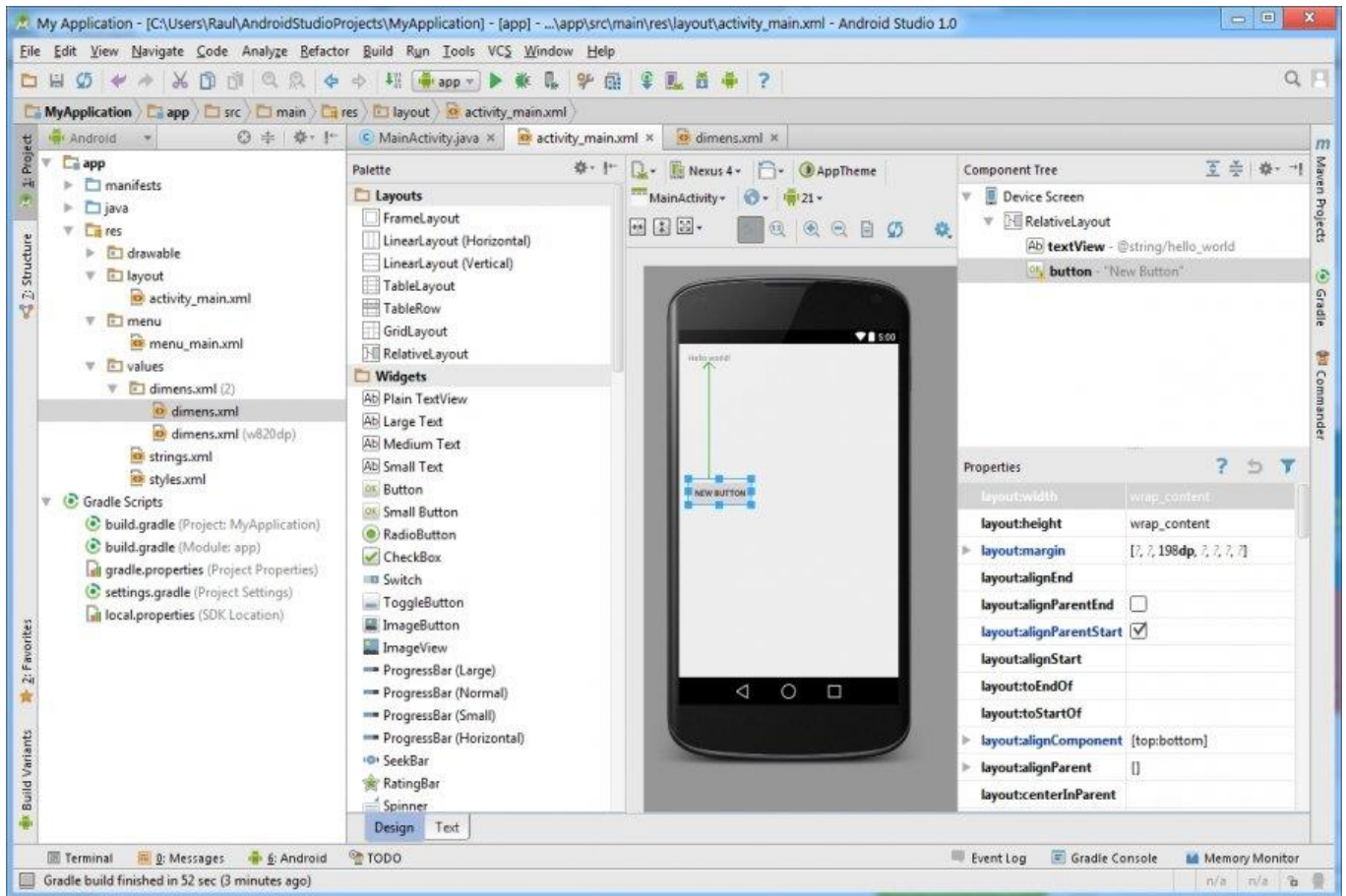
4.4 Project Requirement

Fig: Android Studio

In the development of this application, we have used ANDROID as Front End and Php at Back End and application also has an SQL databse.

Android used at the front end will create beautiful and understandable UI of the application. It contains all the security and permissions that may be required for the development of the application.

Php is used at the back end of the application for admin panel, whenever there is a need to change the content of the application admin would login to panel and using these php files we can add delete the contents necessary for the application.

SQL database saves all the results that are generated after the test has been taken by the user which would be fetched later from the database at the time of calculating learning curve of the user using line graphs that are already present in the Android Studio.
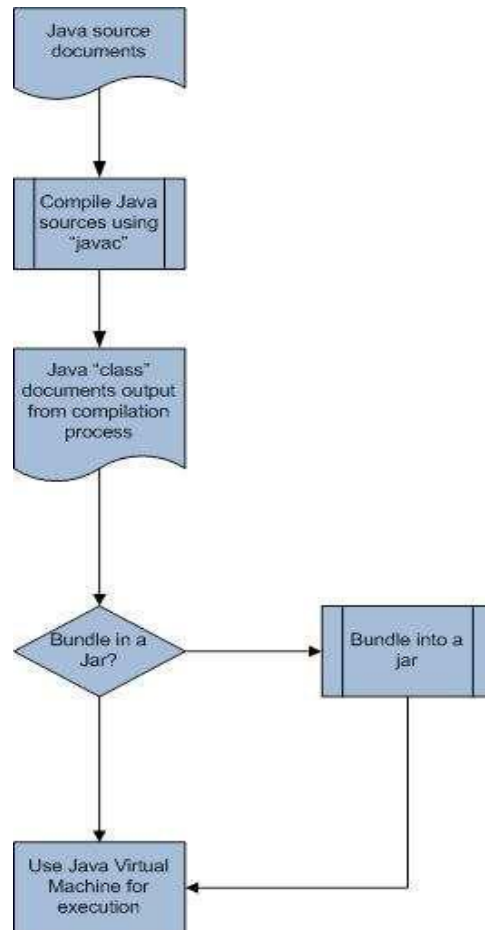
Fig: Java Execution Environment
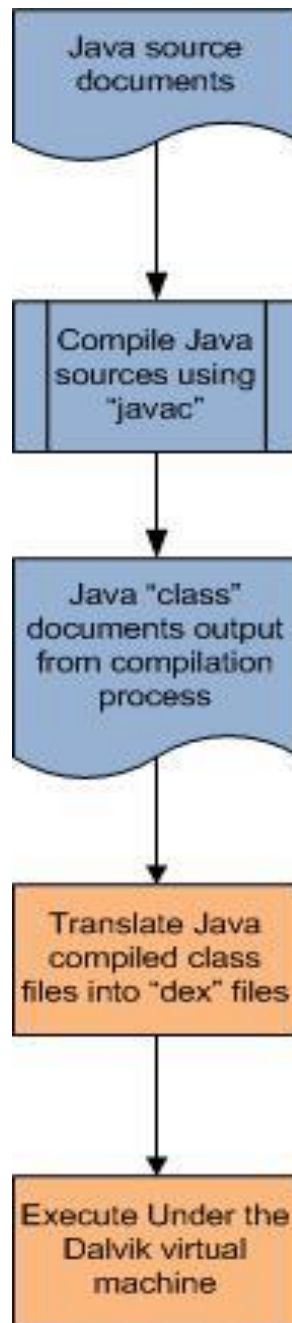
Fig: Android Execution Environment

Above figures represent the regular Java and Android execution paths respectively. It is interesting to note here however is that the Android compilers do not operate on Java language code. Instead, the Android translators work on the resulting Java byte code emitted from a traditional Java compiler.

4.5 The Dalvik Virtual Machines

The Dalvik virtual machine is an interpreter only machine optimized for use on low powered, low memory devices like phones. Notably, Dalvik does not make use of just in time (JIT) Compilation to improve the performance of an application at runtime. Furthermore, Dalvik is not a Java virtual machine. This is because Dalvik is unable to read Java byte code34, instead it uses its own byte code format called "dex". Google claims this format allows battery power to be better-conserved at all different stages of execution of an application. This means that standard Java SE applications and libraries cannot be used directly on the Android Dalvik virtual machine.

Dalvik however stands at the center of the Android value proposition. Its low electrical power consumption, rich libraries, and unified, non-fragmented application programming interfaces make it stand out, or so Google hopes, over the fragmented ecosystem that is Java ME35 today.
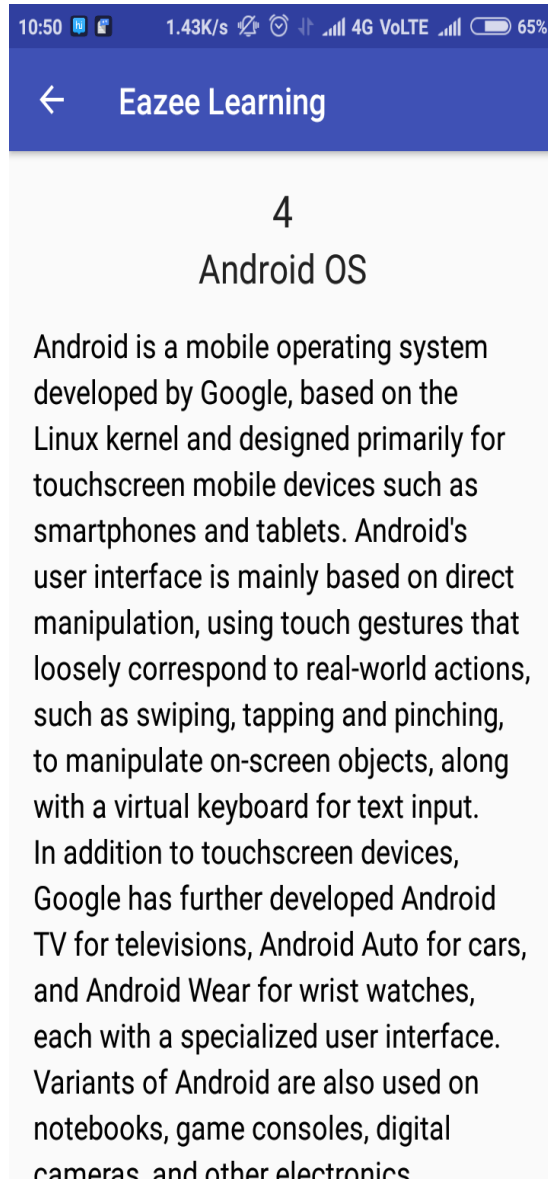
Furthermore, since Dalvik uses the Java programming language but not the Java execution environment (JVM), Google is free to develop Android without the need to license or obtain certification from Sun Microsystems Inc, the legal owner of the Java trademark and brands
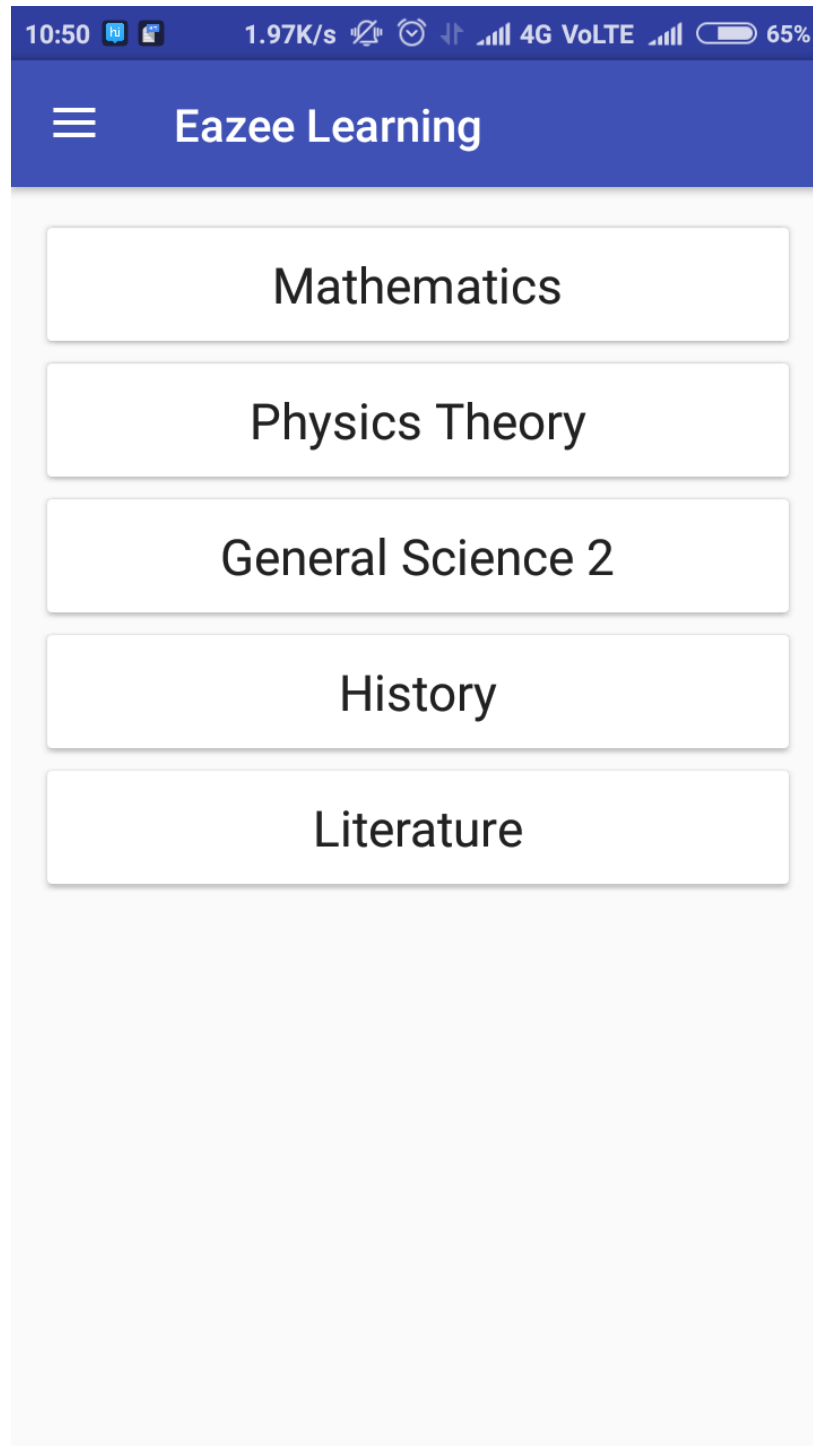
5. APPLICATION DETAILS

5.1 Application User Interface

When the application is run on an android phone, login page activity is opened for the user registration where the user has to enter the details required to register himself. Registration form will contain fields named as email, parents' phone number. After registration, activity with different subjects is run on the system out of which user can select anyone of them. The subject selected will have different chapters that have some learning material contained in it, these chapters also include tests associated with the material that is provided. The tests are taken by the user which are then saved in the server
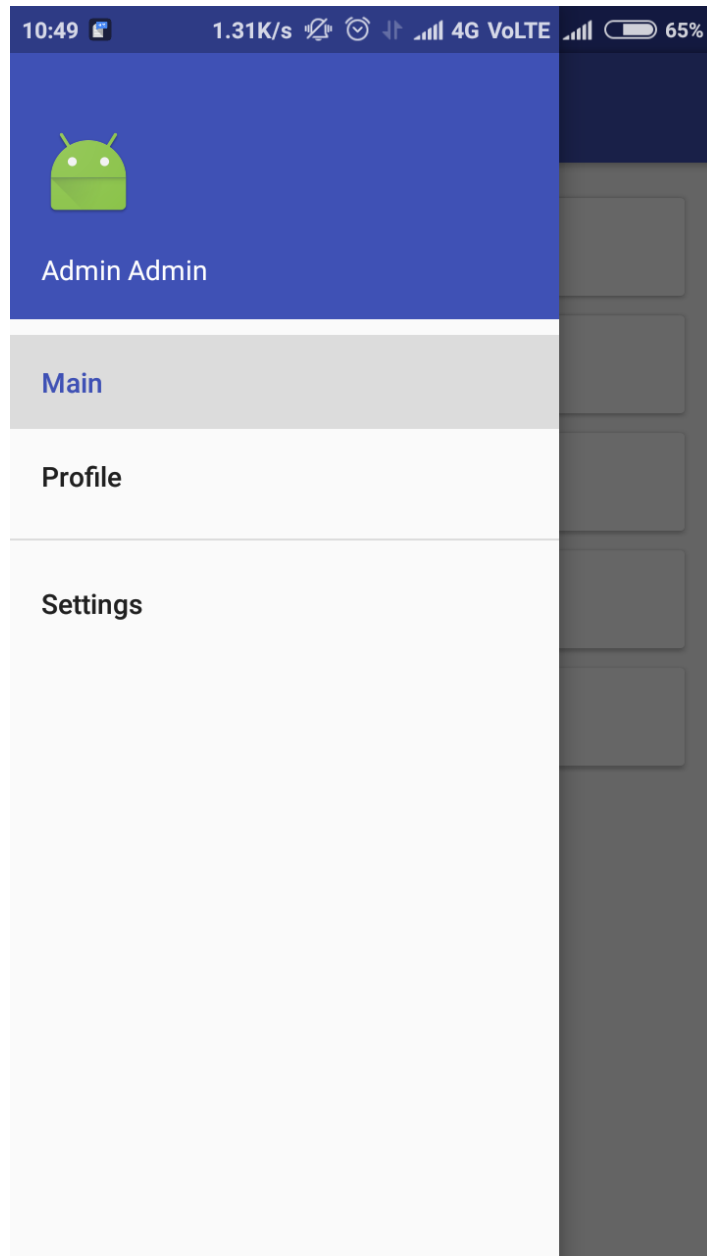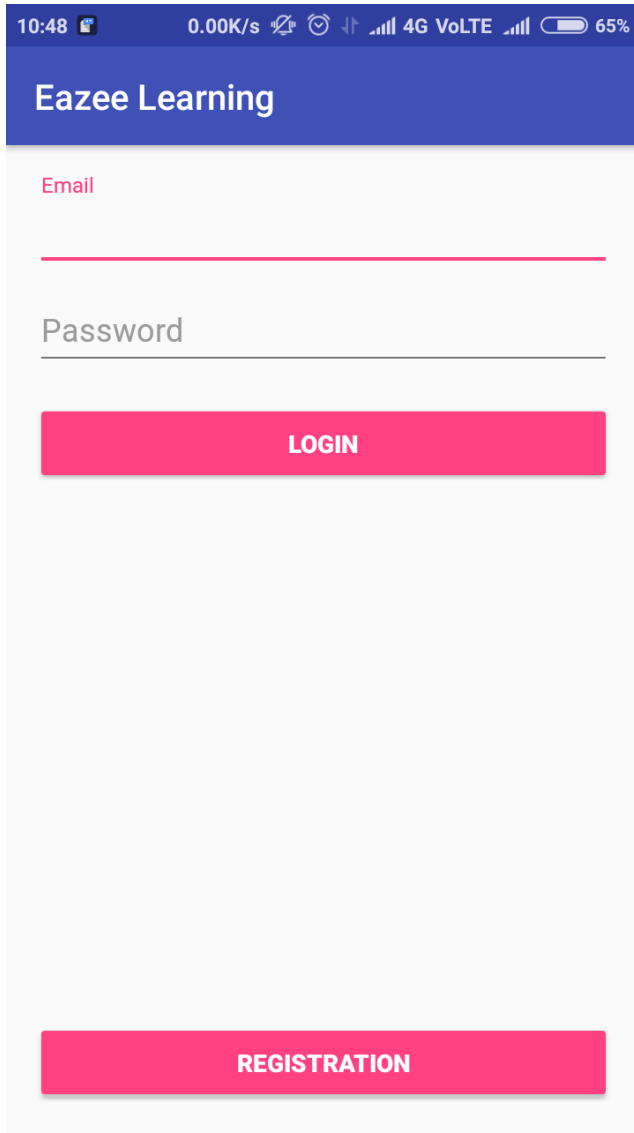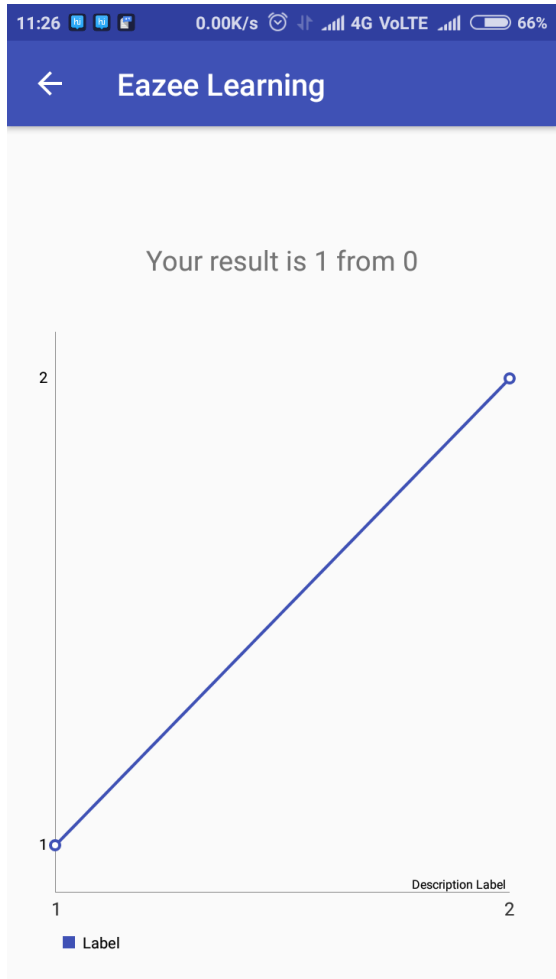
4
Android OS

Android is a mobile operating system developed by Google, based on the Linux kernel and designed primarily for touchscreen mobile devices such as smartphones and tablets. Android's user interface is mainly based on direct manipulation, using touch gestures that loosely correspond to real-world actions, such as swiping, tapping and pinching, to manipulate on-screen objects, along with a virtual keyboard for text input. In addition to touchscreen devices, Google has further developed Android TV for televisions, Android Auto for cars, and Android Wear for wrist watches, each with a specialized user interface. Variants of Android are also used on notebooks, game consoles, digital cameras, and other electronics

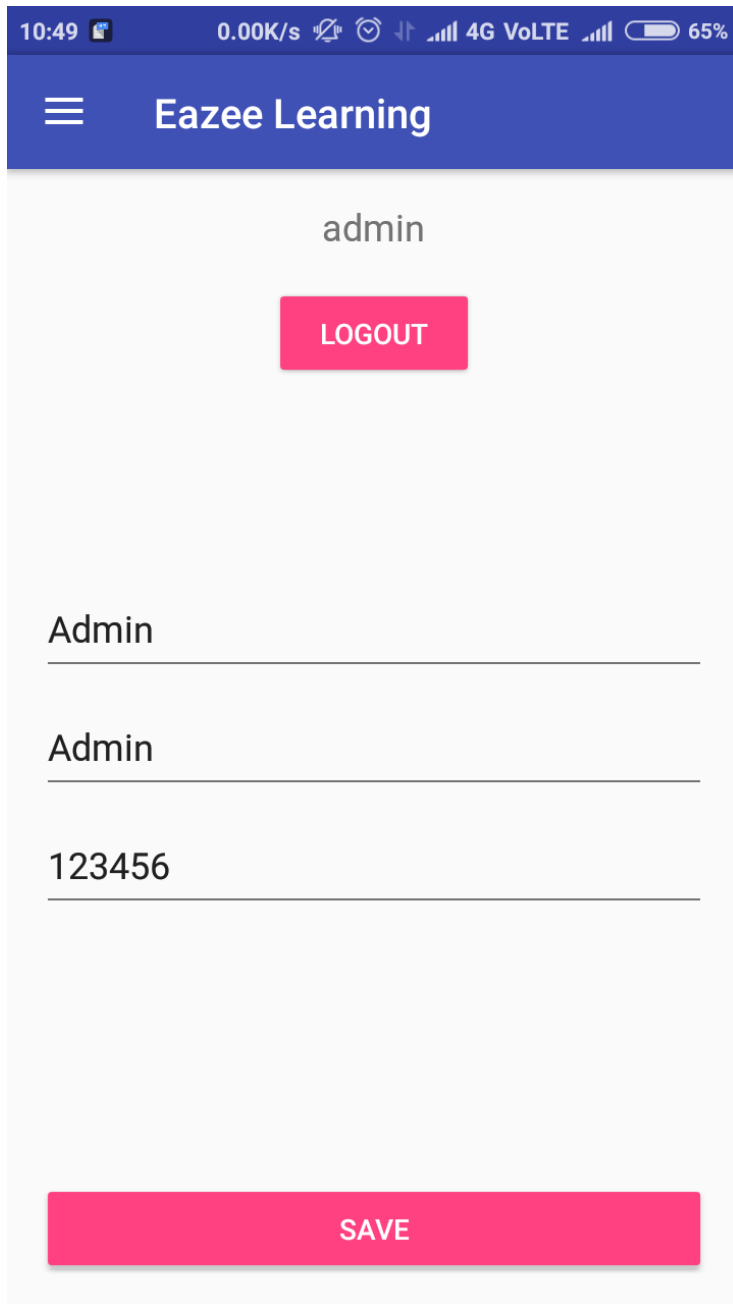**Fig: Chapter in the Application.**

Fig: UI of the Application.

Fig: Menu

Fig: Login page

Fig: Line graph

10:49 0.00K/s 4G VoLTE 65%

Eazee Learning

admin

LOGOUT

Admin

Admin

123456

SAVE

Fig: Admin Page

5.2 Coding

Subject,php

```php
<?php
   /* establish a connection with the database */
   $server = mysqli_connect("localhost", "id1449377_root",
      "12345", "id1449377_eazee_learning");
   if (!$server) die(mysqli_error());

   $query = "SELECT * FROM subject";

   /* query the database */
   $result = mysqli_query($server, $query);
?>

<html>
   <head>
      <link rel="stylesheet"
href="https://maxcdn.bootstrapcdn.com/bootstrap/3.3.7/css/bootstrap.min.css"
integrity="sha384-
BVYiiSIFeK1dGmJRAkycuHAHRg32OmUcww7on3RYdg4Va+PmSTsz/K68vbdEjh4u"
crossorigin="anonymous">

<!-- Optional theme -->
<link rel="stylesheet" href="https://maxcdn.bootstrapcdn.com/bootstrap/3.3.7/css/bootstrap-
theme.min.css" integrity="sha384-
rHyoN1iRsVXV4nD0JutlnGaslCJuC7uwjduW9SVrLvRYooPp2bWYgmgJQIXwl/Sp"
crossorigin="anonymous">

<!-- Latest compiled and minified JavaScript -->
<script src="https://maxcdn.bootstrapcdn.com/bootstrap/3.3.7/js/bootstrap.min.js"
integrity="sha384-
Tc5IQib027qvyjSMfHjOMaLkfuWVxZxUPnCJA7l2mCWNIpG9mGCD8wGNIcPD7Txa"
crossorigin="anonymous"></script>

      <style>

      </style>
   </head>
   <body>
      <ul class="list-group">
      <?php if(mysqli_num_rows($result) > 0) : ?>

      <?php while($row = mysqli_fetch_assoc($result)) {?>
         <li class="list-group-item">
         <a href="edit_subject.php?id=<?php echo $row["subject_id"];?>">
            <?php echo $row["subject_name"];?>
```

```php
        </a>
        <a class="btn btn-default glyphicon glyphicon-hand-up"
href="delete_subject.php?id=<?php echo $row["subject_id"];?>">Delete</a>
        </li>
      <?php } ?>
      <?php else : ?>
        echo "0 results";
      <?php endif; ?>
      <a class="btn btn-default glyphicon glyphicon-hand-up" href="add_subject.php">Add
Subject</a>
      <?php
        mysqli_close($server);
      ?>
      </ul>
  </body>
</html>
```

Questions.php

```php
<?php
  $url = $_SERVER['REQUEST_URI'];
  $parts = parse_url($url);
  parse_str($parts['query'], $query);
  $chapter_id = $query['chapter_id'];

  $link = mysqli_connect("localhost", "id1449377_root",
      "12345", "id1449377_eazee_learning");
if (!$link) die(mysqli_error());

 $sql = "select * from question where chapter_id='$chapter_id'";
  $result = mysqli_query($link, $sql);
  if(mysqli_num_rows($result) > 0){
    $json = array();
    while($row = mysqli_fetch_assoc($result)) {
      $question_id = $row["question_id"];
      $question_number = $row["question_number"];
      $question_text = $row["question_text"];

      $choice_sql = "select * from choice where question_id='$question_id'";
      $choices_result = mysqli_query($link, $choice_sql);


      $choices = array();

      while($choice_row = mysqli_fetch_assoc($choices_result)){
        $choice_id = $choice_row["choice_id"];
        $choice_number = $choice_row["choice_number"];
        $choice_text = $choice_row["choice_text"];
        $choice_right = $choice_row["choice_right"];

        array_push($choices, array("choice_id" => $choice_id, "choice_number" => $choice_number,
"choice_text" => $choice_text, "question_id" => $question_id, "choice_right" => $choice_right));
      }
```

```php
        array_push($json, array("question_id" => $question_id,
                        "question_number" => $question_number,
                        "question_text" => $question_text,
                        "chapter_id" => $chapter_id,
                        "choices" => $choices
                        ));

    }
  }
?>
<html>
   <head>

     <link rel="stylesheet" href="https://maxcdn.bootstrapcdn.com/bootstrap/3.3.7/css/bootstrap.min.css"
integrity="sha384-BVYiiSIFeK1dGmJRAkycuHAHRg32OmUcww7on3RYdg4Va+PmSTsz/K68vbdEjh4u"
crossorigin="anonymous">

<!-- Optional theme -->
<link rel="stylesheet" href="https://maxcdn.bootstrapcdn.com/bootstrap/3.3.7/css/bootstrap-theme.min.css"
integrity="sha384-rHyoN1iRsVXV4nD0JutlnGaslCJuC7uwjduW9SVrLvRYooPp2bWYgmgJQIXwl/Sp"
crossorigin="anonymous">

<!-- Latest compiled and minified JavaScript -->
<script src="https://maxcdn.bootstrapcdn.com/bootstrap/3.3.7/js/bootstrap.min.js" integrity="sha384-
Tc5IQib027qvyjSMfHjOMaLkfuWVxZxUPnCJA7l2mCWNIpG9mGCD8wGNIcPD7Txa"
crossorigin="anonymous"></script>
   </head>

   <body>
   <?php for($i=0; $i < count($json); $i++){?>
     <?php
        $q=$json[$i];
        $cs = $q["choices"];
     ?>
     <ul class="list-group">
       <li class="list-group-item"><?php echo $q["question_text"]?></li>
       <?php for($j=0; $j<count($cs); $j++){?>
          <?php
            $c=$cs[$j];
          ?>
          <?php if($c["choice_right"] == 1) :?>
           <li class="list-group-item active"><?php echo $c["choice_text"]?></li>
            <?php else : ?>
              <li class="list-group-item"><?php echo $c["choice_text"]?></li>
          <?php endif; ?>
        <?php } ?>
        <li class="list-group-item"><a href="edit_question.php?question_id=<?php echo $q["question_id"];?>"
class="btn btn-default">Edit</a><a href="action_delete_question.php?id=<?php echo $q["question_id"];?>"
class="btn btn-default">Delete</a></li>
     </ul>
     <?php }?>
   </body>
</html>
<a href="add_question.php?chapter_id=<?php echo $chapter_id ?>">Add Question</a>
```

BaseActivity.java

```java
package basant.schoolapp;

import android.support.v7.app.AppCompatActivity;
import android.util.Log;
import android.view.MenuItem;

/**
 * Created by basant on 4/28/17.
 */

public class BaseActivity extends AppCompatActivity {
    @Override
    public boolean onOptionsItemSelected(MenuItem item) {
        switch (item.getItemId()){
            case android.R.id.home:
                Log.d("admin", "admin");
                finish();
                break;
        }
        return super.onOptionsItemSelected(item);
    }
}
```

AndroidManifes.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="basant.schoolapp">

    <uses-permission android:name="android.permission.INTERNET" />

    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:supportsRtl="true"
        android:theme="@style/AppTheme">
        <activity
            android:name=".LoginActivity"
            android:label="@string/app_name"
            android:launchMode="singleTop"
            android:screenOrientation="portrait">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />

                <category android:name="android.intent.category.LAUNCHER" />
```

```xml
        </intent-filter>
    </activity>
    <activity
        android:name=".MainActivity"
        android:launchMode="singleTop"
        android:screenOrientation="portrait"
        android:theme="@style/AppTheme.NoActionBar" />
    <activity
        android:screenOrientation="portrait"
        android:name=".ChaptersActivity"
        android:launchMode="singleTop"
        android:parentActivityName=".MainActivity" />
    <activity
        android:launchMode="singleTop"
        android:screenOrientation="portrait"
        android:name=".ChapterDetailActivity"
        android:parentActivityName=".ChaptersActivity" />
    <activity
        android:launchMode="singleTop"
        android:screenOrientation="portrait"
        android:name=".TestActivity"
        android:parentActivityName=".ChapterDetailActivity" />
    <activity android:name=".RegistrationActivity"
        android:launchMode="singleTop"
        android:screenOrientation="portrait"></activity>
</application>

</manifest>
```

Conclusion

"Android is a truly open, free improvement stage in light of Linux and open source. Handset makers can use and alter the phase without paying a sway.

A fragment based plan motivated by Internet mixture. Parts of one application can be used as a piece of another in ways not at first envisioned by the originator can even supplant builtin fragments with have enhanced renditions. This will unleash another round of inventiveness in the adaptable space.

•Android is interested in all: industry, planners and customers

•Participating in a noteworthy number of the effective open source wanders

•Aims to be as easy to work for as the web.

•Google Android is venturing into the accompanying level of Mobile Internet"

The application will help parents to monitor their child's performance. With the help of line graph that is made from the tests that were taken by the toddler during the learning period which were saved in the database and later used in the line graph. What we have tried to achieve is that the child is the one who suffers the most so the UI is specifically designed for kids aging 8-12. Parents are required to register their phone number to get periodic notifications about their ward's performance through a text message that they will receive.

Future Scope

☐ Android Developers have built outstanding careers through the development activity. Demand for new apps and enhancing the existing apps is increasing**.**

☐ It has opened a new stream of technological advancements. And interestingly, there seems no end to experimenting and evolving new applications and mobile phones using this innovative and dynamic technology.

☐ The android Learning app gets updated with new modules every fixed period of time. The future of the interactive learning.

References

- Kamaruddin Mamat, Farok Azmat (InCULT 2012) "Mobile Learning Application for Basic Router and SwitchConfiguration on Android Platform" Procedia - Social and Behavioral Sciences 90 (2013) 235 – 244.

- Sharples, M. (2005). Disruptive devices: mobile technology for conversational learning. International Journal of Continuing Engineering Education and Life Long Learning, 12(5/6), 504-520.

- Jones V., Jo J. H., Cranitch G.: HyWeb: A Holistic Approach to Technology -based Tertiary Education, Proc. of 14th World Conference on Educational Multimedia, Hypermedia and Telecommunications , Denver, CO, USA , June 2012

- Chang C., Sheu J.(2007). Design and Implementation of Ad Hoc Classroom and eSchoolbag Systems for Ubiquitous Learning, Proc. of IEEE International Workshop on Wireless and Mobile Technologies in Education (WMTE 2002) , (p. 8-14).

- Botzer, G and Yershalmy, M. (2007) Mobile application for mobile learning. Paperpresented at IADIS International Conference on Cognition and Exploratory Learning in Digital Age (CELDA 2007).

- P. Pocatilu, F. Alecu and M. Vetrici (2010). Measuring the Efficiency of Cloud Computing for E-learning Systems, WSEAS TRANSACTIONS on COMPUTERS, Issue1, Volume 9, January 2010, pp. 42-51.

- Mahmoud, Q.H and Popowicz, P. (2010). A mobile application development approachto teaching introductory programming. Paper presented at Frontiers in Education Conference (FIE), 2010.

- Potts, J, Moore, N and Sukittanon, S. (2011). Developing Mobile Learning Applications for Electrical Engineering Courses. Paper presented at Southeaston, 2011 Proceedings of IEEE.

- Klopfer E., Squire K., Jenkins H.: Environmental Detectives: PDAs as a Window into a Virtual Simulated World, Proc. of IEEE International Workshop on Wireless and Mobile Technologies in Education , (p. 95-98), Växjö, Sweden, August 2011

- "Professional Android 4 Application Development" by Reto Meier

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- "Programming Android Java Programming for the New Generation of Mobile Devices" by Zigurd Mennieks , Laird Dornin , G. Blake Meike ,& Mausmi Nakamura
- "Hello, Android Introducing Google's Mobile Development Platform" by Ed Burnette
- "Learning Android Building Applications for the Android Market" by Marko Gargenta
- "Android Programming: The Big Nerd Ranch Guide " by Bill Phillips and Chris Stewart
- "Android Programming for Beginners " by John Horton
- "Android Programming In a Day!: The Power Guide for Beginners In Android App Programming " by Sam Key
- "Android Programming: Mastering Course for Beginners Quick Start to Develop Your Own App " by Mitchell Schuler
- "Android Cookbook" by Ian F Darwin
- http://php.net/
- www.mysql.com
- http://code.google.com/android/
- http://developer.android.com/