MOBILE BASED TUTORING SYSTEM IN DISTANCE LEARNING: THE CASE OF ST.MARY'S UNIVERSITY

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by

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DECLARATION

I, the undersigned, declare that this thesis work is my original work, has not been presented for a degree in this or any other universities, and all sources of materials used for the thesis work have been duly acknowledged.

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Abstract

Mobile technology has become the driving force behind most education and training. Its potential in supporting distance education is so significant in countries where there is poor ICT infrastructure and internet connectivity. Although mobile technology has such undeniable significance, limited studies have been conducted in the areas of applying mobile technology for distance learning in general and tutorial services in particular in the Ethiopian context. The purpose of this thesis is therefore, developing mobile based tutorial framework that can support distance learners in Ethiopia by considering St. Mary's University as a case. Both qualitative and quantitative case study research methods have been applied to understand the existing distance learning context and identify problems, issues and requirements for developing the system. Interview and questionnaire used as a tool for data collection. The problems and requirements identified through qualitative and quantitative case study are used as a basis for developing contextualized and easily accessible mobile based tutorial system that can address the existing problems of delivering tutorial services and meet system requirements identified by learners and educators. The findings of the empirical study key challenges that SMU distance learners faced like missing tutorial sessions, limited expertise and experience of tutors, Lack of practice of relating theory to practice and poor quality of tutorial packages.

The results confirm that to investigate the usability of the mobile based tutoring is easy to use, saves time and less cost in delivering tutorial services, improves or motivates distance learners to attend or follow up tutorials. This study has a practical contribution towards enhancing distance education by providing adequate tutorial services to distance learners.

Key words: Distance learning, Tutorial service, Mobile Tutoring, Mobile Tutoring Architecture

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List of Acronyms

SMU:	St. Mary's University
ODL:	Open and Distance Learning
DL:	Distance Learning
PDAs:	Personal Digital Assistants
PC:	Personal Computer
M-Learning:	Mobile Learning
M-Tutoring:	Mobile Tutoring
CEDU :	College of Education
SPSS:	Statistical Package for Social Sciences
PHP:	Hypertext Pre-processor
HTML:	Hyper Text Markup Language
MySQL:	My Structured Query Language
J2ME:	Java 2 Platform, Micro Edition
MUSO:	M-learning & University Student Organizer
OUHK:	Open University of Hong Kong
SMS:	Short Message Service

ICT:	Information and Communications Technology
FGD:	Focus Group Discussion
SDK:	Software Development Kit
IDE:	Integrated Development Environment
AVD:	Android Virtual Devices
N/A:	No Applicable
ADT:	Android Development Tools
API:	Application Program Interface
WAMP:	Windows, Apache, MySQL, and PHP
MVC:	Model View Controller
GSM:	Global System for Mobile communications
GPRS:	General Packet Radio Service

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CHAPTER ONE

INTRODUCTION

1.1. Background

Distance education is a kind of educational process in which all or most of the teaching is conducted by someone remote in space and/or time from the learner, with the effect that all or most of the communication between teachers and learners is through an artificial medium, either electronic or print. As an alternative to the traditional face-to-face education it has been seen as the teaching-learning process in which students are separated from the teachers by a physical distance, which is often bridged by modern communication. It comprises all patterns of student-centered learning process in which the teacher has limited role [1]. On the other hand, distance learning is a means of providing education to everyone who is keen to learn. It operates in a flexible manner, that is, one, which is less restrictive and less prohibitive as compared to conventional institutions [2]. Distance Education has become one of the most rapidly growing fields of education and training. According to [3], it is an accepted and indispensable part of the mainstream of educational systems in both developed and developing countries. The goals of distance education, as an alternative to conventional education, have been to offer degree granting programs, to battle illiteracy in developing countries, to provide training opportunities for economic growth, and to offer curriculum enrichment in non-traditional educational settings.

Distance Education in Ethiopian is not a new phenomenon. Currently, there are governmental and private institutions providing distance education. In addition to domestic providers, International Educational Institutions are also providing distance education programs. Hence, the focuses of this study is St. Mary's University.

St. Mary's University (SMU), established in 1998, is an Ethiopian institution of higher learning located in the capital Addis Ababa. After fifteen years of service as a college first and a university college since 2008, it earned university status from the Ethiopian Ministry of Education in September 2013.

The university has four campuses in Addis Ababa, 12 Distance Education Regional Centers, and 106 Coordination Offices throughout the country. It has 466 full-time academic staff and 826 employees. The total number of academic and support staff dedicated for distance education is 206 and 193 respectively. It caters to the needs of six thousand undergraduate students, twenty thousand students enrolled in distance education programs, and two thousand students in graduate programs.

Distance education program has been accepted by institutions in many parts of the world in both the developed and the developing economies largely because it has been seen as a means of extending educational opportunities to millions of people and thereby contributing to the human resource development of a nation [4] . According to [5] distance education is one of the fastest growing trends in higher education. Arguably it has become a saving grace to millions of people around the world who desire to pursue further studies. It is one of the successful modes of extending education in a context of reachability, acceptability, and productivity.

The provision of an opportunity to learn without being restricted by geographical or temporal is a major factor behind the growth of distance education programs. Distance education is highly essential to share the goals of conventional education, aims at providing access to historically under-served, and highly motivate people, provide students freedom and program flexibility, offer useful learning opportunity to recipients at a time and local environment convenient to

them and the delivery medium plays a crucial role in minimizing the gap between teaching and learning [3]. Distance education, according to [6], may offer different benefits to education providers: enabling access to students; alleviating capacity constraints; capitalizing on emerging market opportunities and serving as a catalyst in institutional transformation.

Distance education is based on less face to face contact during whole period of study. It is an educational process in which educators teach their students without face to face interaction. Distance learners face loneliness most of the time while working because the nature of learners' activities demands independent study by learners. They are assigned to perform different tasks but without direct guidance of teachers who are mostly termed as tutors. Therefore, learners face problems to perform ideally because of lack of direct supervision and guidance of teachers.

Distance learners live far away from their host institutions and obviously do not have the same opportunities as their counterparts in residence regarding the use of library resources and services though the basic needs are the same as those of conventional students. They have special needs and concerns that differ greatly from those on campus. It is therefore desirable to understand the information needs of this group of students since they are also entitled to library services regardless of their location.

Distance education institutions device rules and implement policies to reduce gap between learners and teachers. They arrange activities to develop face to face interaction among distance learners and tutors as well as distance learners with their classmates. Tutorials are one of the important components in this regard.

In [7] Tutorial is an activity during the educational process in which a tutor attempts to guide students and solve leaning problems of small groups of learners. In the other hand, Tutorials

guide learners in the form of lectures by resource persons, discussions between resource persons and participants and question answer sessions [7]. Tutor organizes a small group for teaching activity on a particular topic. He provides a formalized opportunity to learners for collaborative learning.

In [8] observed that face to face tutorials are organized to facilitate distance learners. But learners lack satisfaction regarding fulfilling their educational needs by tutorials. It seems that tutoring process bears some weaknesses and problems and requires further investigation.

In the attempt to find viable solutions to these problems, much hope has been placed in new information and communication technologies (ICTs). It is believed that ICTs can empower teachers and learners by facilitating communication and interaction, offering new modes of delivery, and generally transforming teaching and learning processes. Of the many different forms of ICTs, mobile phones are thought, for several reasons, to be a particularly suitable tool for advancing education in developing regions. First, mobile phones are the most prevalent ICT in the developing world, and the penetration rate is rising rapidly [9] It is also relevant due to the fact that mobile phone ownership is increasingly more common in the lower socio-economic segments of society [9]. Second, mobile phones are an especially good 'leapfrogged' since they use the radio spectrum. There is, therefore, less need for new physical infrastructure such as roads and phone wires, and base-stations can be powered via generators in places where there is no electrical grid. Finally, in addition to voice communication, mobile phones allow the transfer of data, which can be particularly useful for delivering educational content over long distances.

Mobile phone-facilitated learning contributes to improved educational outcomes in terms of improving access to education, and promoting new learning [9]. With mobile technology,

learning environment can go with the student to the field site, to the laboratory and beyond. There is an opportunity to leverage mobile technology to better support students not only in the classroom, but also enabled to navigate the context of their learning. Mobile technology opens the door for a new kind of learning and performance support in the field, providing anytime and anywhere access to information, processes, and communication. Mobile devices are increasingly being used for learning in the classroom [10].

The use of mobile phones to support distance education has specific reasons. Distance learners are in diverse geographical locations, and are learning in isolation. Therefore, affordable technology is an appropriate means to help them communicate with the institution and with other learners. The mobile phone can be used to provide academic and administrative support for such learners, and therefore to reduce what Moore refers to as transactional distance, one of the major constraints faced by distance education learners. Distance learners can conveniently carry their mobile device with them, meaning that they can learn wherever they are. Mobile phone penetration in Africa is high [11], and mobile devices such as phones and PDAs (Personal Digital Assistants, i.e., palmtop computers) are available at much lower prices than desktop computers and, therefore, offer a less expensive means of communication [11].

Mobile phones introduce interactivity and thus overcome the problems plaguing traditional distance education in Ethiopia, including lack of interaction between tutor and student, lack of feedback during presentations, no monitoring of student progress throughout the course, and no evaluation of teaching quality. Given that the cost of Internet bandwidth is high and that there is lack of infrastructure mobile phones present a promising alternative [12].

Mobile devices, nowadays, are widespread and providing great multimedia capabilities, which make the delivery of mobile learning a more realistic approach since it can provide just in time learning on the move. Currently, students in some universities can watch live lectures or tutorials on their university website after a registration process. Some students who face difficulties in attending their lectures or tutorials due to living in remote areas would like to watch missed lecture/tutorial by downloading lecture/tutorial videos for their mobiles [1].

Therefore, mobile learning can facilitate in improvement of the entire distance education by enhancing ways of communication among distance learners, tutors and supporting staff. The biggest advantage of this technology is that it can be used anywhere, anytime and its usage is easy accessable to a larger number of distance learners [13].

1.2. Statement of the problem

Open and Distance Learning as an educational method has been identified as the most powerful instrument for fighting the educational problems in developing countries like Ethiopia. Different individual perceive the advantages of Mobile phones differently and their perceptions have influenced attitudes towards the acceptance and use of Mobile phones in the system in our country and elsewhere.

In [7] confirmed that although face to face tutorials are organized to facilitate tutorial services for distance learners but learners lack satisfaction regarding fulfilling their educational needs by tutorials. And also pointed shortage of tutorial time and complexity of materials as major challenges. In [14] reported that there is a gap between students' expectations and tutorial practices. Students want tutor centered approaches and tutors practice various activities keeping in view their own learning experiences.

In [7] pointed out that learners were partially satisfied with tutorials. They observed less use of audiovisual aids and lack of proper monitoring by competent authorities during tutorials. In addition to reported that tutors appointed to conduct tutorials were expert in teaching but had no training to teach in distance education mode.

Considering the Ethiopian situation, because of the distance between the residential areas of learners and the tutorial centers as well as inconvenience in the schedule, the number of learners that participate in the tutorial programs is very limited. Different official commitments of learners in government offices including extended meetings caused low turnout rates in tutorial sessions. Tutorial programs are organized for very limited courses and once in a semester. Each tutor is assigned to deliver two or more courses at a time that compromised the quality of tutorial services. Because of delay in material distribution, learners attend tutorial sessions without getting and reading the modules. As a result of this problem learners mostly fail to benefit from the limited tutorial services provided. Learners are also obliged to do and submit assignments and project work without timely provision of modules, adequate tutorial services and proper guidance [3].

The above stated challenges from literature and local experiences demonstrated that tutoring process bears weaknesses and problems and requires further investigation [7] with the aim of exploring the potentials mobile phone in supporting and enhancing tutorial services. Despite evidence that cell phones can be used successfully as a cognitive delivery tool; the pedagogical affordances of cell phones have not yet been fully explored in most developing countries. To understand the pedagogy for mobile learning, it is important to look at distance education theories to determine the importance of interaction on the efficiency of distance learning [15]. The potential benefits of mobile tutoring have not been well understood from the contexts of the

underserved, disadvantaged, and marginalized in higher education. There is currently little research describing the relationship between use of mobile devices to access resources and the possibilities of adopting them in Ethiopia's distance learning system that constitute marginalized rural communities [16].

Though the information and communication technology (ICT) infrastructure is weak in rural communities and non-existent in some, almost all distance learners in these communities own a personal electronic mobile device, which in itself provides insights into the kinds of accessible ICT. Mobile technology offers a very hopeful way to reach the vast population of the developing countries as it does not require bandwidth connections. We have to develop distance learning using multimedia through mobile technology. This seems to be the most viable way to reach living in the rural areas of the developing countries. Hence considerable research efforts must be dedicated to this line. To design solutions for learners of mobile technology who wish to study also when on the move. Thus, when students are mobile and wishing to study, the mobile technologies they use will be in addition to the equipment used at anywhere. The solutions must be designed in ways to allow both learners and tutors of mobile technology to participate in the course. This means that we have looked for solutions that are optimal for distributing content and communication in courses, independent on whether the students and tutors apply mobile technology for teaching or learning. The study addressed the following research questions:

- What are the existing practices of tutorial service of distance education at SMU?
- What are the major challenges that distance education is facing in tutorial service?
- How can mobile technology addresses the existing challenges and support the provision of effective tutorial services?

1.3. Objectives

1.3.1. General Objective

The general objective of this thesis is to investigate develop mobiles based tutorial system that can support distance learners.

1.3.2. Specific Objectives

The specific objectives of this study are to:

- assess the existing practices in providing tutorial service for distance learners;
- identify major challenges and issues in providing tutorial services;
- identify requirements of learners for the introduction of mobile based tutorial system;
- design and develop a prototype mobile based tutorial system;
- validate the prototype

1.4. Scope of the Study

The scope of the study is limited to tutorial services of distance learning and the possibility of designing mobile based tutoring system that can support audio and video based content provision and SMS based interaction between the tutor and learners.

1.5. Significance of the Study

The study has a significant contribution to the Ethiopian distance education at large by providing a better service mechanism to reduce the current distance service challenges. It will also benefit distance education service providers in enhancing its services, In addition, the findings of this research is much important for the researchers to conduct further study in promoting and enhancing distance education through M – tutoring.

1.6. Limitation of the Study

As in most research face limitation in the first limitation in this study is sample size limitation which doesn't represent the entire population. The second is limitation is participant's limited experience in the area. And, the third is Every technology has some limitations and weaknesses, and mobile devices are no exception. The researcher have shown some usability problems. these problems as follows: physical attributes of mobile devices, such as small screen size, inadequate memory, and short battery life and connectivity could be a failure, mobile tutoring is supposed to happen anywhere and time during these times, there may be some connectivity problems while uploading and downloading the information because of poor or totally absent mobile network signals.

1.7. Organization of the Study

The research is organized in seven chapters. Chapter One, introduction, consists of background to the study, statement of the problem, objective of the study, research questions, significance and limitations of the study. Chapter two contains a review of related work to the study.Chapter three deals with the research methodology that comprises the research design, population, sample and sampling procedure, and procedures for data collection. The collected data from the subjects of the study were carefully analyzed and interpreted under chapter four. Chapter five presents proposed mobile tutoring framework. Chapter six presents implementation and evaluation. Finally the seventh chapter summarizes the research findings and forward conclusions and there is future more recommendation on the findings of the study.

CHAPTER TWO

LITERATURE REVIEW

2.1. Distance learning

The terms ‘open learning’ and ‘distance education’ according to in [17] represent approaches that focus on opening access to education and training provision, freeing learners from the constraints of time and place, and offering flexible learning opportunities to individuals and group of learners. Some of the more commonly used terms related to open and distance learning include the following: correspondence education, home study, independent study, external studies, continuing education, distance teaching, self-instruction, adult education, technology-based or mediated education, learner-centered education, open learning, open access, flexible learning, and distributed learning. Distance learning, on the other hand, deals with training or teaching people who are separated by time and space from their teachers utilizing certain mediating processes to transmit learning content.

Distance learning is defined as a way of providing learning opportunities that is characterized by the separation of teacher and learner in time or place, or both time and place [18],[19] ,[20]. It is a process of self-education based on stand-alone courses, which do not involve regular interaction with the teacher. In [20] also defined distance learning as a field of education that focuses on the pedagogy/andragogy, technology, and instructional system design that are effectively incorporated in delivering education to student where students may communicate asynchronously and synchronously. It is an alternative learning system to traditional face-to-face education and comprises all patterns of student-centered learning process in which the teacher

has limited role [18]. Distance learning involves student in making sense of course materials for themselves, to structured learning situations and shaping their own learning experiences.

Distance learning involves a variety of media including interactive communication, the possibility of occasional face-to-face meetings and a specialized division of labor in the production and delivery of courses [19].In [18] also argued that distance learning can be bridged by modern communication. Learning content can be delivered by postal communications, electronic media, face-to-face tutoring, mentoring, e-mail correspondence or via the telephone [21].

The advantages of distance learning include freedom of content, space, medium, time and freedom from constraint, flexibility in pursuing courses, job-related goals and improvement of social status [2] [19]. Students do not have to present physically with the instructor in space and, depending on the method used, they do not have to be together in time as well [22]. This is a great advantage for non-traditional students who cannot attend at regular times. It provides education to everyone who is keen to learn [2]. In addition, distance learning can meet the promise to deliver classes to a geographically broad and diverse population. Such advantages enhance student's motivation to learn.

2.2. Challenges of distance learning

One of the main barriers of learning in distance education is the absence of interaction in a learning environment. The distance education character of individual form of learning and the absence of interaction is a challenge for both students who need help and tutors who want to assist students in cognitive development [15].

In [22] Identifies several challenges that affect the implementation of Open and Distance learning (ODL) programs. The researcher observes that “much of the instruction depends on the attitude of the administrators and instructors”. In this case, some ODL stakeholders especially administrators regard distance education as low quality as compared to face-to-face lessons. In other word, this problem includes the quality of instruction, hidden costs, misuse of technology, and the attitudes of instructors, students, and administrators. Each one of these has an effect on the overall quality of distance learning as a product.

According to [23] the major challenges confronting distance learning includes the non-easy access to tutors and other educational resources by students. The students rely only on handouts. The result of such dependence may bring to poor study-skills and examination malpractices. Also, very little or no guidance and counseling benefits are available to learners.

The learners expect their tutors to cover everything in tutorial sessions with them in a single tutorial class. Lack of information on the tutorial time/ schedule, too far residence from the tutorial center, lack of time to study the material in advance of tutorial sessions and absenteeism from the tutorial sessions for unknown reasons are also other critical challenges of distance learning [3]. In addition, the most frequently known barriers in Distance Learning (DL) includes; lack of technical support, lack of adequate library and its equipment, lack of administrative support, poor preparation time required to create assignments, and student resistance.

2.3. Tutorial service – different definitions

Tutorial is an activity during the educational process in which a tutor attempts to guide students and solve leaning problems of small groups of learners. On the other hand tutors guide learners

in the form of lectures by resource persons, discussions between resource persons and participants and question answer sessions [7].

In [2][24] indicted that a tutorial is referred as to a small group-learning context that supports and extends learning offered through distance learning modules. As such, tutorials differ from lectures in that they provide opportunities for students to construct and refine their own knowledge by means of feedback from peers and more knowledgeable tutors. Thus, a tutorial has a potential to involve students in the active process of constructing their own understanding, as opposed to repeating notes dictated in a lecture.

According to [25] tutorials should be participatory events, not straight lectures. The stated approach reflects the educational philosophy that deep learning requires students to be active in the process of learning, not passive recipients of transmission teaching and that such method are a vital ingredient in promoting more independent learning.

In [26] Learners come to the tutorial center to solve their course related problems, get necessary information and acquiring knowledge.

2.4. The role of tutorial services in distance learning

In [25] indicate that local students highly value academic support from tutors which enhances their understanding of the course materials and provides general guidance on their assignments. Therefore, effective tutorials are concerned primarily with covering course content and assignments to facilitate the understanding of distance learners.

The importance of tutorials in distance Learning (DL) has been further confirmed by a study [24]. They revealed that tutorials in the Zimbabwe Open University were very useful in assisting

distance education students to interact with their peers and their course tutors. The study revealed that tutorials are indispensable. Content of tutorials helps to guide isolated students. This further reinforces the view that the tutorials must be of high quality if they are to serve this purpose.

A tutoring service, in concept, would only enhance student learning, support, and satisfaction while mitigating demands on faculty time, particularly when it comes to providing more meaningful student-to-instructor/tutor interaction. This intervention should also help student's better master course content and complete course assignments. A tutoring service may also provide a scalable and cost-effective solution for courses with already high and growing enrollment numbers by leveraging scarce faculty time. Tutoring services could also minimize student complaints as distance education programs anticipate—rather than react to—student support needs [27].

Tutorial services play an important role for the quality of education depending on what goes on in the tutorial centers and class room, therefore, face to face interaction is significant. Conditions and infrastructure of the tutorial center, tutor's qualification, experience and training in distance learning, teaching style and strategies are of importance in the process of acquiring education through distance mode of delivery [26] .

Tutoring is widely used for learning support especially for quality higher education because of its pedagogic benefits [28]. Numerous studies have reported effectiveness of tutoring; In [29] indicated that tutoring is typically more effective than classroom instruction, especially in competency-based learning, adequate feedback regarding complex learning is vital for helping students redirect their learning process [30].In [31] claimed that significant, ongoing tutoring is a

key to a good education and to retain students; therefore, institutions should encourage good tutoring.

In [24] also argue that tutorials appear useful and indispensable to students. Tutorials facilitate the exchange of ideas and promote interpersonal relationships. These tutorials therefore must be guided by the need to satisfy and motivate students so that they learn for more and better quality education that makes them worthwhile stakeholders and collaborative partners in both public and private sectors of the economy.

2.5. Method of tutoring in open and distance learning

According to [25] the approaches to be used in tutorials , include: tutors using questions to lead whole-group discussion; tutors giving individual guidance to students; tutors organizing small-group discussion; students participating in role play/simulation games; and students making presentations to the class. The author indicated that this tutor-centered approach was most preferred by students.

There are different technology based solutions for providing effective tutorial services. One is an intelligent tutoring system. According to [32] an intelligent tutoring system is developed for supporting students to probe and acquire knowledge based on their learning status and personal factors, such as learning progress, knowledge levels, learning styles, cognitive styles, the characteristics of the learning contents and learning environments as well as preferences. To help students comprehend and organize knowledge, solve problems and make inferences based on what they have learned, it is important to provide the right mind tools for them to deal with different learning tasks or solve different types of problems at the right time and in the right context. Therefore, mind tools also play an important role in helping students learn in smart

ways. In [32] have indicated that web-based systems, which present information as hypermedia, have the potential to provide personalized learning support or guidance to students based on their personal characteristics or learning performance. In [7] also pointed that online tutorials can be the best way to reduce problems of distance learners regarding effective tutoring in learning process.

2.6. Challenges in providing tutorial service

In [25] Indicated that most of the problems associated with distance learning is associated with lack of tutors' training and expertise in distance teaching approach. Tutors lack expertise and experience to work in distance education and have less command on skill to manage tutorials. They could be experts in teaching but not in distance teaching [7]. Less use of audiovisual aids, ignoring slow learners, giving more attention to male students, favoritism, less attention to motivating students and lack of proper monitoring by authorities during tutorial programs were also identified as major problems [33] [7]. Research in evaluation of attitude of learners indicated that distance learners do not attend tutorials because it has no weight in the result of students and rules do not force them to attend tutorials compulsorily [33]. A tutorial has a potential to involve students in the active process of constructing their own understanding, as opposed to repeating notes dictated in a lecture. But in most cases students are not convinced that this is the case and this could be the reason why the attendance rate is very low. Non-attendance of any kind, that is, either by lecturers or by students is an indicator of dissatisfaction, hence something should be done. One way to motivate lecturers to attend and deliver quality tutorials through the provision of better incentives with the hope those students would also be attracted to attend tutorial sessions [2][24]. Learners travel a long distance to come to the regional campus for tutorials and the majority of the students encounter travel challenges. This indicates that

quality of tutorial services is a central issue since students will expect value for their money after travelling all the way to attend tutorials [24].

In [3] Identified some of the major challenges in the tutorial services of Ethiopian distance learning system. Very limited attendance of learners during tutorial sessions, delay in module distribution and conducting tutorial sessions without modules received by students, focusing only on one or two courses, limited coverage of the module and difficulty of assignments were identified as major challenges. It is also identified that the commitment of stakeholders who are involved in the distance learning is limited specifically in the areas of timely delivery of modules, assigning tutors with required expertise and skills as well as monitoring and ensuring effective delivery of tutorial services.

The stated challenges explain that learners lack satisfaction regarding fulfilling their educational needs by tutorials. It seems that tutoring process bears some weaknesses and problems and requires further investigation. It is recommended that, it is good to make the system more flexible and use different information and communication technologies to support distance education.

2.7. The role of Mobile phone in enhancing distance learning in general

The use of mobile phones to support distance education has three clear rationales. First, distance learners are in diverse geographical locations, and may be learning in isolation, so affordable technology is an appropriate means to help them communicate with the institution and with other learners. Mobile phone can be used to provide academic and administrative support for such learners, and therefore, to reduce to as transactional distance, one of the major constraints faced by distance education learners. Second, learners can conveniently carry their mobile device with

them, meaning that they can learn wherever they are. Third, mobile phone penetration in Africa is high, and mobile devices such as phones and PDAs (personal digital assistants, i.e., palmtop computers) are available at much lower prices than desktop computers and therefore offer a less expensive means of communication [11].

Mobile technologies, such as cell phones, hold a lot of promise for distance education as a cognitive delivery tool to enhance interactive collaborative learning while addressing the challenge of student isolation which is often associated with the correspondence nature of distance education. Mobile technology can be appropriated for teaching and learning at a distance, we should start by looking at how different is mobile learning from other technologies that are used in teaching and learning. The strength of using mobile technologies is that they offer learning that is intimate, spontaneous, pervasive and versatile. Mobile learning "provides an enhanced cognitive environment in which distance learners can interact with their instructors, their course materials, their physical and the virtual environment" [15].

According to [34] Mobile learning (ML) is a new form of distance learning, characterized by the separation of the lecturer from students temporally and spatially, providing wireless and mobile networking technologies for those who have been deprived of instruction due to various reasons, and spread throughout the world and serving tens of millions of students so as to do important role in reaching out to learners. Moreover, M-Learning provides a new way to delivery instruction without installing complex communications infrastructures. Mobile devices have become all-in-one devices that can be carried and used almost anywhere; consequently, they give learners the opportunity to carry their institution in their own hands. So there are many higher education organizations which are implementing M- Learning to provide flexibility in learning.

According to [35] mobile phones are not simply limited to increased access to educational services but it can also facilitate changes of learning modalities that in turn impact educational outcomes. Moreover, m-Learning facilitates is the alternative learning processes and instructional methods that leads to effective learning. Mobile phones theoretically make learner-centered learning possible by enabling learners to gain educational information in order to build on their skills and knowledge and to meet their own educational goals.

2.8. The role of Mobile phone in supporting tutorial services

According to [11] The mobile phone project is particularly concerned with exploring the use of mobile phones for distance learning tutorials, and seeks to go beyond merely communicating information and creating access to learning resources, aiming at supporting and engaging distance education students.

To address the problem of student isolation, distance education institutions, especially in developing countries have used numerous intervention programs such as tutorial support, counseling services and peer-group support to enhance interaction. Where it is not possible to offer face-to-face tutoring, tutoring via telephones, videos and computers have been used to support a two-way communication between the teacher and the learner [15].

Distance learning, unlike classroom based learning, has always been challenged by the problem of lack of communication in the education transaction. That is why distance education theorists have always looked at how to address this problem through mediated technologies and face-to-face intervention. Since cell phones can be used as a tool to facilitate interaction through synchronous and asynchronous learning, it is suggested that different cell phones applications are harnessed for teaching and learning [15].

2.9. Related studies

In [7] Conducted a study on analysis of face to face tutorials of distance learners for prospective teachers in Pakistan. The objectives of the study were to analyze different aspects of face to face tutorials and explore problems regarding different aspects of the process of face to face tutorials. Data of this study was based on a survey research, collecting data from 2549 distance learners of teacher education course with the help of questionnaire.

The findings revealed that distance learners give importance to tutorials. Regarding the first aspect "planning and organization of tutorials" students have showed their satisfaction regarding the institution's planning about dissemination of information to students, suitability of timings for tutorials, allocation of tutoring Centre, recording of attendance of students, duration of tutorials and allocation of duties to tutors regarding their responsibilities in tutorial process. Problems identified in include students' dissatisfaction about the detailed discussion of tutorials activities with learners and appointment of tutors having lack of expertise and experience to work in distance education. This indicates some problem in relation to planning process of institution to appoint tutors on the basis of their qualification and training in distance teaching.

Regarding the second aspect of tutorials examined in this study, "attitude of distance learners towards tutorials," an admiring feature of students have diagnosed that they like to get benefit from tutorials. They want planned teaching learning activities by tutors. But, they have identified a problem of working students who have "low attendance in tutorials" and think that online tutorials can be the solution for their problem to enjoy benefits of tutorials for effective learning of distance learners. This result shows positive motivation of distance learners to learn under the

guidance of teachers (tutors). They want online tutoring and lectures related to topics of courses by tutors during tutorials.

Regarding the third aspect of tutorials, "skill and expertise of tutors in managing tutorials," distance learners have indicated their displeasure about the appropriate skill of tutors to manage tutorials tactfully. This has pointed out selection of tutors by ignoring the aspect of appointment of tutors having expertise in distance teaching. This is because of the reason that appointment criteria described in eligibility criteria for appointment of tutors explains no requirement for tutors' qualification or training in distance education.

Regarding the last aspect investigated in this study, "attitude of tutors towards tutorials," distance learners have pointed out some problems. The study has pointed out that tutors give favor to those students who use some personal reference and try to get unjustified favor from tutors. They give no value to motivate students to attend tutorials and do not try to search out; why students ignore tutorials? They discourage distance learning in their talks with distance leaners. This again indicates tutors' less command on skill to manage tutorials in distance education and appointment of tutors who are not expert in distance education and are not in favor to educate through distance education mode. They are expert in teaching but not in distance teaching.

In [25] Conducted a study on Face-to-Face Tutorials in a Distance Learning System in university of Hong Kong's distance education system. The study focused on face-to-face tutorials in the Open University of Hong Kong' s distance education system, including students' expectations of the benefits they will gain; their reasons for attending; the approaches they prefer; and their overall satisfaction with what tutors actually provide. Overall, the study attempted to compare

students' tutorial preferences and actual practice in the Open University of Hong Kong (OUHK), and to explore factors which appeared to contribute to successful tutorials.

The researchers used questionnaire surveys. The questionnaire consists of two phases, the first phase questionnaire aimed to explore what the students initially expected to gain from face-to-face tutorials and their preferred tutorial approaches. In the second phase the questionnaire examined four main areas, namely: attendance rates at tutorials; overall ratings of the quality of tutorials, and the related reasons; how frequently each tutoring approach had been employed; and reasons for attending and not attending tutorials.

The key finding from phase 1, student's expectations to gain from tutorials and their preferences for approaches that would help them to understand the course better. Around 17% anticipated that they would gain more knowledge, beyond what was required in the course. In addition, there was a considerable expectation that tutorials should lead to improvement in their performance, particularly in continuous assessment. However, less than 10% of responses referred to improvement of study skills, and gaining support and encouragement from tutors and other students, indicating that the respondents felt little need for enhanced skills for studying or psychological support from their tutors and peers. Regarding to the approaches to be used in tutorials `lecturing by the tutor' was clearly most preferred by students from all schools, followed in order by: tutors using questions to lead whole-group discussion; tutors giving individual guidance to students; tutors organising small-group discussion; students participating in role play/simulation games; and students making presentations to the class. These results indicated that, in general, students preferred more tutor-centered approaches to those which involved their active participation and interaction.

The key finding from phase 2 Students' attendance rates at tutorials, most students had a high attendance rate, with over 70% of them attending over 75% of the tutorials, including 30% who attended all. Fewer than 10% attended less than 25% of the tutorials, with only around 3% never attending any. Also, the vast majority of students (over 75%) rated the tutorials positively- almost 45% reporting that they were either `excellent' or `good' , and another 30% viewing them as `satisfactory' . The high attendance rate and the positive ratings suggest that students felt a strong need for tutorials to support their study and found that, in most cases, they met their needs.

The most important reason students gave for attending tutorials was to listen to the tutor explaining the course material, followed by receiving guidance on assignments. This is in line with the results of the first questionnaire in which a very large percentage of students expected to gain better understanding of the course and enhanced achievement through tutorials.

The main reason or challenges for about half the students from all schools not attending tutorials was because of work duties, family commitments and tiredness after work, inconvenient location of tutorial center, Illness, social and leisure activities, inconvenient timing of the tutorials and the students did not need any tutorial support.

In [36] Conducted a study on experiences of tutorial sessions as learning support for distance education students. This study focused on learner support during distance education tutorial sessions. Students involved in the study experienced tutorial sessions as a useful learning support structure.

This is done by using a qualitative approach to capture nuances of how the students and tutors experience and conceptualise learning support in a tutorial session and whether they think that it

is worthwhile attending the sessions. The data were collected through interviewing students and their tutors. The interviews were based on the following questions: What can you say about tutorial sessions, What is your role in and expectations of a tutorial session, What kind of support do you receive in a tutorial session and What are the challenges?

The key findings are four major themes emerged from the interviews. The first pertained to general perceptions of a tutorial session, clarification of the subject content and motivation to study after attending the sessions. There was also a strong awareness of the importance of collaborative learning through peer support. The second theme concerned the different ways in which the role of the tutor was comprehended by both tutors and students. The third theme related to the nature and importance of the support that students get from tutorial sessions, while the fourth involved administrative problems experienced by the students.

The main challenge regarding tutorial sessions evident in the data was students' dissatisfaction with administrative support from the university. The students' experiences of administrative problems suggest disengagement from communication with the university. They insisted on a tutorial venue at a convenient place and on being informed of such venues in time for them to attend.

Future studies in learning support for distance education students should explore the impact of student administration support on the success of tutorial sessions, student motivation and performance. Further research should also investigate a more effective communication system for distance education students in remote areas where cellphone network coverage is poor.

In [24] Conducted a research on Quality tutorials in open and distance learning: Exploring experiences of Zimbabwe Open University Students. The main objective of the study was to

explore students' experiences with quality tutorials in Zimbabwe Open University's an open and distance education institution.

The researchers used the descriptive survey design to investigate the present status of the phenomenon and generated both quantitative and qualitative data using a questionnaire with both open-ended and closed items. The instruments for data collection were the questionnaire and the interview. The questionnaire was preferred because it is cheaper to construct and administer, while the processing and analysis of data is less complex than in the case of observations. The interview was also used because it promoted a two-way communication. It also allowed the researchers freedom and flexibility to probe deeper into students' experiences with tutorials.

The study found out that in terms of the distance travelled, the majority of the students travel well in excess of 100 km 83 (44%) to come to the regional campus for tutorials. In terms of the distances travelled by students to attend tutorials, the study found out that the majority of the students encountered travel challenges considering the fact that they travelled distances well in excess of a hundred kilometers. This means the quality issue becomes an important agenda in the Zimbabwe Open University considering that students will expect value for their money after travelling all the way to attend tutorials.

The major challenges are students' expressed dissatisfaction with the ability of their tutors to promote active adult students' participation, inconsistence in lecturer attendance, poor quality tutorial package, waning commitment, economic hardships and the failure to use modern technologies in tutorials.

The study recommended the need to take urgent, bold and decisive steps to train tutors on adult and distance education methodologies and the use of modern technology in teaching. Further

research need to be done on the quality of a tutorial package for distance learners and motivating adult learners.

In [26] Conducted a study on Analysis of Tutorial Services for Distance Learners: A Case of Bangladesh Open University. The objective of the study was attempted to the tutorial services of or to tutorial classes, use of educational technologies for delivering lectures.

A questionnaire was developed by the researchers. Structured questionnaire was constructed separately for the learners and tutors. This questionnaire was two separate parts in accordance with the objective and significance of the study.

The main Challenges in distance education system such as face-to-face interaction is almost absent because the University provides face to face interaction providing some tutorial classes. Infrastructure, class room and laboratory facilities, availability of qualified teachers are the main criteria for the selection of a tutorial center and actually tutorial centers are institutions located outside of University main campus. In addition, More than 90% of the tutors have at least completed post-graduation. But they have no experience in distance learning. On the other hand many tutors have not clear concept about distance teaching methods.

The key finding of the study revealed that in general the learners reported that they liked to go to tutorial center and they recommended for increasing contact hours. Assignment or homework is a determining factor in learning achievement and it is found from the result of this study that the learners are given assignment regularly. They liked to involve in laboratory and other activity seriously. Tutor and tutorial center factors are the main factor causing significant variation in the performance of the learners. Those tutors possesses negative attitude towards the distance education and open learning are not serious in teaching. Therefore, ensuring proper tutorial

services, attention of tutors in teaching, sensitive to feeling of learners, active interaction between tutors and learners may impact on acquiring solid knowledge and good performance of learners.

In this regard, the researchers also recommended further study on, in addition to tutorial classes, use of educational technologies for delivering lectures.

In [37] Conducted a study on The Impact of Face-To-Face Tutorials on College of Education Students: A Case of Unisa's Ekurhuleni Regional Service Centre. The aim of the study was to evaluate tutorial attendance patterns of 1st semester 2011 College of Education (CEDU) students and to evaluate how attendance of tutorials contributed to the performance of 1st semester 2011 CEDU students.

A case study involving quantitative document analysis was conducted. They researchers predicted that students who registered for face-to-face tutorials and attended sessions regularly would pass their final examinations.

Findings indicated that the most important reason students gave for attending tutorials was to listen to the tutor explaining the course material, followed by receiving guidance on assignments. Another noticeable pattern is that students tended to attend the first few sessions in greater numbers, with attendance declining towards the end. On the one hand, this may be a worrying factor to tutors and regional staff.

The researchers recommend that the marketing of tutorial programmes should be intensified. They further recommend constant communication between lecturers, tutors and coordinators. The final recommendation is that ongoing joint or parallel research projects, especially between

regional staff, tutors and lecturers be carried out to investigate the impact of all learner support services.

In [23] Conducted a study on Access, use and perceptions of teachers and students towards mobile phones as a tool for teaching and learning in Tanzania. This study explored the access, use and perceptions of teachers and students towards mobile phones as a tool for facilitating teaching and learning beyond the classroom walls.

Studies employed both quantitative and qualitative research approaches. Data were collected by Questionnaires and interviews. From both studies the researcher was able to draw data related to the access, use and perceptions of teachers and students towards the use of mobile phones as a tool for teaching and learning.

Findings showed that all in-service teachers, college instructors and pre-service teachers had mobile phones. Also 60 % of school students owned mobile phones, or had access to mobile phones. Students, pre-service teachers and college instructors were in favor of the use of mobile phones for learning, but the majority of in-service teachers were against it.

The findings of this study indicated that, mobile phones are the most accessible technological tools in schools and colleges in Tanzania, mobile phones are available in both rural and urban areas. At least every student can access his/her own mobile phone, a friend's mobile phone or a parent's mobile phone. All teachers were found to have access to their own mobile phones their use in teaching and learning is among the lowest, both in the colleges and schools. Teachers and instructors indicated in their responses that, they do not know how to use mobile phones to facilitate teaching and learning. Similar findings were identified by other study on technology use in science and mathematics teaching in Tanzania, where majority of teachers were found to

have limited technological knowledge. The limited knowledge of the use of various technological tools including the mobile phones to support teaching has been hindering the use of technology in schools in Tanzania.

Mobile phones appear to be a more convenient tool for learning than any other technological tools in terms of portability (it is handy), accessibility (in both rural and urban areas), affordability (by both poor and rich people), operability (easy to operate – it does not requires specific training on its uses), and applicability (can serve as a computer, radio, camera, audio or video recorder, calculator, GPS etc.).

The researchers recommended a professional development programme for in-service teachers to help them develop a positive attitude towards mobile phones use in teaching and learning.

In [38] Conducted a study on utilization of mobile phone in enhancing learner support services for distance education programmes: a case of Mount Kenya University, Kenya. The objective of this study is to establish the utilization of text messages ; examine utilization of email; determine the utilization of voice call ; and establish the utilization of social media in enhancing learner support in distance education.

The study adopted descriptive survey research design that supported quantitative and qualitative approaches. This facilitated the use of questionnaires to collect data from sample comprising of lecturers, students and administrators. Collected data was analysed quantitatively and qualitatively. Quantitative data was analysed descriptively by use of Statistical Package for Social Sciences (SPSS) while qualitative data was analysed thematically. The analysed quantitative data was presented using frequency distribution tables while analysed qualitative data was presented in themes based on the opinion given.

Findings showed that the lecturers, students and administrators had phones that were used depending on their needs. However, utilization was ineffective due to attitude and perceptions. In addition, although the information was related to learning, it had insignificant contribution to the entire learning process as a learner support tool. On the other hand, the findings reported by the researcher indicated that mobile phone is a learner support tool that is not fully used in distance education learning. This is due to attitudes and perceptions of students, lecturers and administrators despite their possession of the phones that support SMS, Email, voice calls and social media. The study recommended that mobile phones should be fully integrated in the entire distance education learning system.

In [1] Conducted a study on MUSO: An M-learning & University Student Organizer Platform. The main objective or focus of the study is on developing an M-learning and University Student Organizer (MUSO) application for university students. This application helps students to manage their time according to the university assessments.

The system is designed as client server architecture. The developed system uses J2ME, PHP, MySQL, and HTML. These technologies help to build an application reliable for most currently available mobile phones.

The outcome of this research, MUSO, facilitated on-demand learning, m-learning and sharing of learning materials by enabling students from different years to download their lectures or tutorial videos via a mobile phone. These videos are hosted on the university server which offers absent students an opportunity to download missed lectures.

In [11] Conducted a study on Learners' Acceptance of the Use of Mobile Phones to Deliver Tutorials in a Distance Learning Context: A Case Study at the University of Ibadan. The

objectives of the study were to determine the level of acceptance of students for mobile delivery modes; Create opportunities for users to contribute to the final product, while studying the influence of the following variables: external factors, perceived usefulness, perceived ease of use, intention to use, attitude to using and action; determine which cultural and environmental factors are predominant in influencing acceptability of the courseware; determine preferences for a particular delivery format and reasons for this choice; Ascertain the type of support that students need to make effective use of mobile delivery modes; and Based on challenges faced during use, make appropriate recommendations for adoption.

A Mixed method (both quantitative and qualitative) was used as the methodology.Challenges were encountered with respect to students using the mobile platform: Login problem: Student difficulties included login names not written correctly, Network problem: Some students complained about unreliable Internet connectivity. Special needs: Blind students were not catered for in the project as they were not able to interact with content, which was wholly text-based. Students requested that their physical challenge should be factored into the design and implementation of the mobile learning project. Inadequate ICT skills: During quizzes, some students complained about not being able to initiate the quiz . Some students also complained about answering the quiz questions but then not being able to submit their response because of low IT skills. User interface: Students commented that the mobile platform was not simple to navigate through, and most of them expressed difficulty in attempting to use the platform. This could be due to the design of the interface and poor or low internet skills at the beginning of the project.

The findings showed that the mobile tutorials enhanced teaching and learning. However, it also highlights several preconditions for successful implementation, including providing technical

support to students, using a well-designed interface, improving student information and communications technology (ICT) literacy, controlling the messaging and data costs faced by students, and improving the capacity of course developers and technical staff.

In [3] Conducted a study on the Dynamics and Challenges of Distance Education at Private Higher Institutions in t Ethiopia. The main objective is to explore the dynamics and challenges of distance education at private higher universities facing in the delivery of distance education program. The study at hand has paramount importance in exploring the achievements and challenges that may debilitate the system, enables us to consider the views of tutors and coordinators and students/learners towards the program and its practical implications for extending and strengthening the system.

Mixed (Both qualitative and quantitative) was used as the methodology. A descriptive survey approach was then employed as the method of the study, and representative sample of tutors‟ and academic program leaders was selected using a probability sampling technique. To triangulate the research results in the researcher used observation, Focus Group Discussion (FGD) and document analysis. The researcher decided that 40 tutors and 10 program coordinators and 6 FGD distance learners became the sources of information.

The following major challenges of distance learners were identified by the study. Students are interested to attend tutorial sessions given by their tutors, but the majority of distance education learners‟ lack motivation for learning. Distance learners come to the tutorial sessions without prior reading their learning modules.Lack of skills for active participation, and being registered solely for the sake of improving their career prospects. The learners expect their tutors to cover everything in tutorial sessions with them in a single tutorial class. The center coordinators are not

properly trained to pay attention to problems such as, lack of information on the tutorial time/ schedule, too far residence from the tutorial center, lack of time to study the material in advance of tutorial sessions and absenteeism from the tutorial sessions for unknown reasons were also other critical challenges of distance learning. To sum up, most students were not motivated to learn, but they come because they were forced to do so. Many of them need further assistance and help which may not be possible during tutorial sessions alone.

The findings also revealed that, the number of learners in a class during tutorial programs is not to the standard. The tutors‟ are responsible for one to two courses at a time. Assignments were too difficult for the ability of the students on the courses. Some learners do not receive modules before tutorial sessions and, consequently, some were forced to share modules, modules were not given long enough in advance of the actual tutorial sessions less commitment of stakeholders to realize the Distance Learning program.

It is recommended that, intensification of distance education units at the institution and ensuring that students have a suitable educational background when they join to the specific program would make distance education efficient. In addition to this, it is good to try to make the system more flexible and use different information and communication technologies to support distance education.

In [49], present the demand for education in Africa has been on the increase. Thus, there is the need to identify more affordable ways of improving access to learning. For many decades, Open and Distance Education facilitated by ICTs has been used to improve access to education. But in developing countries ICTS have been full of challenges of cost, and lack of appropriate infrastructure creating the notion of “digital divide”. At the same time, researchers are now

witnessing an unprecedented explosion in the number of mobile telephones globally.This technology, which is arguably the shared means of communication, could play a pivotal role in extending the possibilities for teaching, learning, and research in distance educational institutions. Several studies have shown success stories of mobile learning in the developed world. This makes a case for implementing mobile learning in developing countries by showing a number of successful Mobile Learning initiatives. The study also identified challenges that need to be addressed in order to sustain and succeed in the implementation of mobile learning in developing countries.

In [50], present the evolution of wireless technologies and the development of applications for mobile devices in higher education have been impressive. For many educators, mobile technology in the field of teaching and learning has recently become one of the most important areas of research. Today, mobile learning is a strategic topic for many organizations concerned with education. In the future, more research should be conducted to transform education using mobile learning. The introduction of new types of devices is disruptive to education, no matter what educators and education institutions do. Therefore, a detailed analysis, from a pedagogical and technological perspective, is key to ensuring appropriate usage and implementation of mobile learning. A general overview of successful mobile learning experiences in higher education. Its aim is to share best practices and create new opportunities in universities. These mobile applications will add another layer to the learning and teaching processes.

In [51], present Mobile learning is often described as ubiquitous, pervasive, accessible, and transparent. It has been seen as providing opportunities for those who could not previously cross existing digital divides—though it of course may create new ones. Yet, some work in the field lacks sufficient and appropriate grounding in theory to effectively address such needs. Theory

determines what researchers observe, how researchers observe it, and what researchers deem valuable. Theory has power; it can affect how people live and how they view the world. In the case of mobile learning, it can affect how people access and interact with the world. In order to ensure adequate access to knowledge and resources, researchers must fight against uncritical, old theory and against unstated theory, and consider the exploration of theoretical perspectives outside the dominant modernist Western-European perspectives and perhaps outside those of late-global capitalism. Research and practice needs to be grounded in well considered theoretical perspectives that take into account the local and the global; the overly represented and the excluded; the global South and the global North. Researchers argue for an ongoing and increasingly sensitive role for researchers and theoreticians as well as a reexamination of extant theories in mobile learning.

Table 2.1: Summary of Related works

Author, Year & Title	Objective/ Purpose	Approaches/ Methodologies	Key Findings	Recommendation & Future Work
[7]	•To Analyze different aspects of face to face tutorials and Explore problems regarding different aspects of the process of face to face tutorials.	•Descriptive survey questionnaire	• tutors having lack of expertise and experience to work in distance education, •Weak attendance in tutorials, Attitude of tutors towards tutorials	
[25]	• To explore what the students initially expected to gain from face-to-face tutorials and •Their preferred tutorial approaches	•A questionnaire surveys	•Students' attendance at tutorials was very high; •high preference for face-to-face meetings; •Lack of tutors' training and expertise in distance teaching approach of education	
[36]	•To exploring the experiences of students and tutors in a tutorial session.	•A qualitative approach	•Students' dissatisfaction with administrative support from the university.	•To redefine the role of the tutors and to review the academic and •Administrative support structure of the students so as to improve the quality of the tutorial sessions.
[24]	•To explore students experiences with quality tutorials in open and distance education institution..	•Both quantitative and qualitative	• inconsistence in lecturer attendance, poor quality tutorial package, weakening commitment,	

Author, Year & Title	Objective/ Purpose	Approaches/ Methodologies	Key Findings	Recommendation & Future Work
[26]	•The study focused on the tutorial services of or tutorial classes, use of educational technologies for delivering lectures.	•A case study with questioner	•Face to face interaction is almost absent, •Infrastructure, qualified teachers are the main criteria for the selection of a tutorial center and • tutorial centers are institutions located outside of University main campus.	•Ensure proper tutorial services, attention of tutors in teaching, sensitive to feeling of learners, active interaction between tutors and learners may impact on acquiring solid knowledge and good performance of learners.
[37]	•To evaluate tutorial attendance patterns of students and • To evaluate how attendance of tutorials contributed to the performance of students.	•Quantitative approach	. •Challenge students are able and allowed to attend tutorial classes at different centers but they don't attend tutorial classes.	
[23]	•To explore the access, use and perception of teachers and • Students towards the use of mobile phones as a tool for teaching and learning	•Both quantitative and qualitative research approaches	•Mobile phones appear to be a more convenient tool for learning than any other technological tools in terms of portability, accessibility, affordability,& applicability. • Lack of skilled teachers on ICT use.	
[38]	•Examining the utilization of mobile phones in enhancing learner support services in distance education programmes at Mount Kenya University, in Kenya	•Both quantitative and qualitative approaches	. •Challenge Mobile phone network coverage has not been used as strength to roll out comprehensive learner support in distance education through the mobile phones.	

Author, Year & Title	Objective/ Purpose	Approaches/ Methodologies	Key Findings	Recommendation & Future Work
[1]	•To develop an M-learning and University Student Organizer application for university students.	•Client- server architecture	•To facilitates m-learning and sharing materials by enabling download missed their lectures or tutorial videos via a mobile phone..	
[11]	•The study focused on students' Acceptance of mobile delivery modes.	•Both quantitative and qualitative	•The mobile tutorials enhanced teaching and learning. • Network failure and the poor supply of electricity were reported.	
[3]	•To explore the dynamics and challenges of distance education at private higher universities.	•Both quantitative and qualitative	• The number of learners in a class during tutorial programs is not to the standard •The tutors" are responsible for one to two courses at a time •Lack of skills, motivation for ,learning, information on the tutorial time/ schedule.	

2.10. Android

This section presents the mobile software which our application will run on. An analysis of the Android system and its features is given, followed by the versions of Android and the needed development tools to create an Android application.

2.10.1 What is android

Android is a software stack for mobile devices that includes an operating system, middleware and key applications. The Android Software Development Kit (SDK) provides the tools and APIs necessary to begin developing applications on the Android platform using the Java programming language [39][40].

ANDROID is a java based operating system which runs on the Linux 2.6 kernel. It's lightweight and full featured. ANDROID applications are developed using Java and can be ported to new platform easily thereby fostering huge number of useful mobile applications [41].

Android is the first mass-produced consumer-market open source mobile platform that allows developers to easily create applications and users to readily install them [42].

Android is an open source software assemble of an operating system, middleware and key applications for mobile devices introduced by Google capable of running multiple application programs. It is a complete operating environment based upon the Linux V2.6 kernel [43].

Android includes an operating system which is based on the free Linux kernel, the necessary middle-ware, libraries and key mobile applications.The diagram in Figure 2.1 shows the major components of Android, which is divided into four different layers that include five different groups.

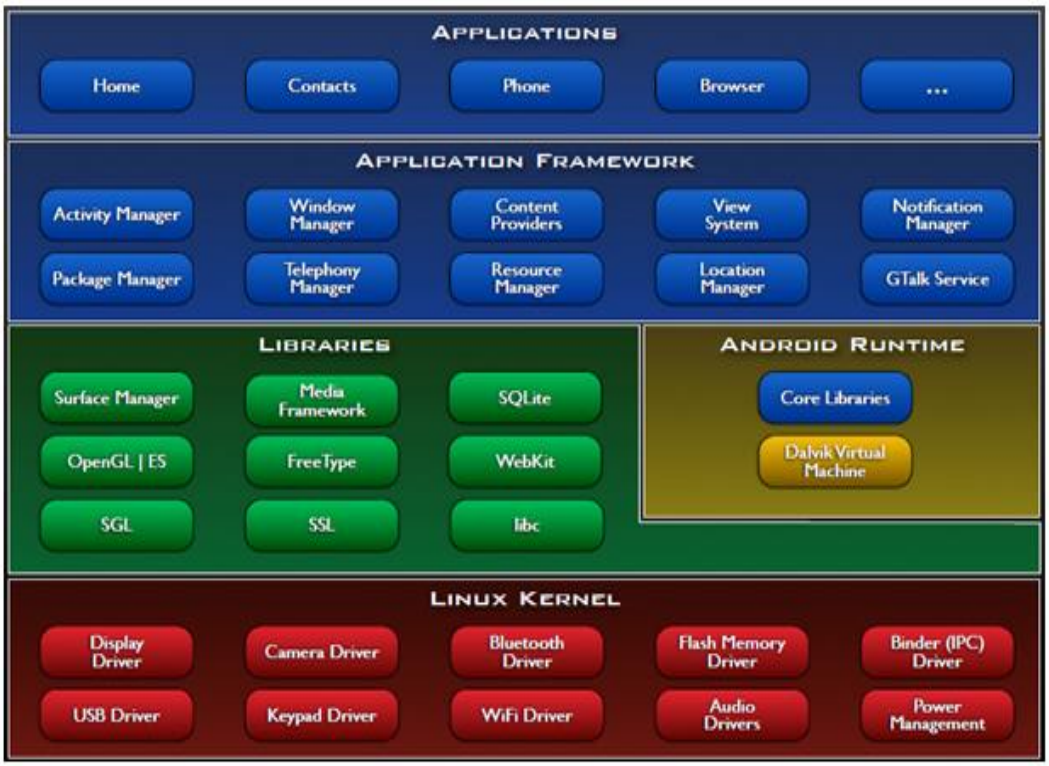


Figure 2.1: Android Architecture

A description of the most important of Android's components is given below:

- Linux kernel
  - Core services, including the hardware drivers, process and memory management, security network and power management are handled by a Linux 2.6 kernel. The kernel also provides an abstraction layer between the hardware and the remainder of the Android architecture stack.
- Libraries
  - Running on top of the kernel. The available libraries are all written in C/C++. The core libraries are the following:

- Surface manager – provides display management
- Media Framework – A media library for playback of audio and video media
- SQLite – provides database support
- OpenGL | ES – graphics libraries for 2D and 3D graphics
- FreeType – provides font-related operations support
- WebKit – integrated web browser and Internet security
- SGL – graphics libraries
- SSL – provides Internet and web browser security
- libc – support for Android-specific services such as system properties and logging.

- Android Runtime
  - The runtime is what makes Android something more than a mobile Linux implementation. Android runtime is the engine that powers the applications and, along with the libraries, forms the basis for the application framework. It also includes:
    - Core Libraries – provide most of the functionality available in the core Java libraries, as well as the Android-specific libraries.
    - Dalvik VM – is a register-based Virtual machine that has been optimized to ensure that a device can run multiple instances efficiently. It relies on the Linux kernel for threading and low level memory management.

- Application Framework
    - Provides the classes used to create Android applications. It also provides a generic abstraction for hardware access and manages the user interface and application resources.
- Applications
    - All applications, both native and third-party, are built on the application layer by means of the same API libraries. The application layer runs within the Android runtime, using classes and services made available by the application framework.

2.10.2. Android SDK

The Android Software Development Kit (SDK) contains the necessary tools to create, compile and package Android application. Most of these tools are command line based. The Android SDK also provides an Android device emulator, so that Android applications can be tested without a real Android phone. You can create Android virtual devices (AVD) via the Android SDK, which run in this emulator [44].

Google's Android Software Development Kit (SDK) and the use of the Java programming language are necessary to the development of an Android application [45].

The Android SDK includes everything needed to develop, test and debug an Android application. A description of the included components is listed below in [46]:

- Android APIs – They consist of the core of SDK and they provide access to the Android stack.

- Development Tools – SDK includes tools that let a programmer compile, run, and debug applications.
- Android Emulator – It is a full interactive Android device emulator. Running the applications on the emulator is the same as running them on a real Android device. It also provides different interfaces and options to run the application on a specific device emulator or with custom hardware features (RAM, CPU, and Resolution).
- Full Documentation – It includes extensive code-level reference information detailing exactly what things are included in each package and class and how to use them. It explains how to get started and gives detailed explanations of the fundamentals behind Android development.
- Sample Code – SDK includes a selection of sample applications to help understand some fundamental Android APIs and coding practices. Each version of the Android platform available by the SDK Manager offers its own set of sample apps.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

This chapter presents research design and methodology. It contains data sources, sampling techniques, data gathering tools, procedures of data collection, methods of data analysis as well as design and development tools.

3.1. Research Design

Mixed methods research design was used because it helps the researchers to investigate the issue from diverse angles. Both quantitative and qualitative methods were used as methods because they would compensate the weaknesses of each other [47].

3.2. Sources of Data

To get valid and reliable data, the use of appropriate data sources is very important. Therefore, the sources of data for this study included both primary and secondary sources. Accordingly, the primary data were collected from distance students who attend the tutorial program and tutors. These were considered as the main sources of data because of either direct involvement in the implementation of the program or their responsibilities in guiding and supporting the tutorial program. The secondary sources of data were documents (institutions records, guidelines, etc.) related to the tutorial program that was available in the sample institution and the literatures reviewed.

The data extracted from these sources through both quantitative and qualitative methods were used as an input for designing mobile tutoring system. The existing tutorial practices, the major challenges faced by learners and tutors as well as their requirements were captured through the survey and interview methods.

3.3. Sample Size and Sampling Techniques

The sample size has been limited as compares to the large number of distance learners. It is assumed that because of similar background and experience of the learners with respect to tutorial sessions, small sample would represent the large number of distance learners.

In [48] Provides a simplified formula to calculate sample sizes. This formula was used to calculate the sample size as shown below.

$n = N / [1 + N (e)^2]$

Where n is the sample size, N is the population size, and e is the level of precision. When this formula is applied to the above sample, it results in or gives.

$n = N / [1 + N (e)^2]$

$n = 10,000/[1+10,000 (0.05)^2]$

$n= 10,000/26 = 384$

The sampling technique is purposive since the questionnaires were distributed to learners who came to the head office for different services. This is done because traveling to different centers is both time consuming and costly.

The major criteria used to select the SMU were active involvement and extensive experience in distance education. This strategy helped the researcher to collect a more representative view of a population of interest, thus supporting the ability to apply findings to the population at large.

3.4. Instruments for Data Collection

To collect data for the study, different data were employed. These were questionnaire, interview and it document analysis a data gathering tool.

3.4.1. Questionnaires

Since, questionnaire is useful instrument to collect primary data from those respondents who can read, understand and give responses and can reach a large number of subjects, the researcher made use of the questionnaire that has to secure data from distance students and tutors.

In order to gather the appropriate data about current practice of tutorial services, questions was set for distance students, in light of the literature reviewed and survey instrument used by related studies. All of the questions in the questionnaire were translated into Amharic, as the researcher believes of that respondents could better understand the questions. A direct translation of the questionnaires in English has been attached at the end of the paper (See Appendix A).

3.4.2. Interview

The research interviews and suggested potential solutions to improve the existing practices and challenges in providing tutorial service for distance learners This tool was selected since it is helpful to obtain the opinion, beliefs, feelings and views in detail about the situation from participants themselves. In order to facilitate qualitative data collection an interview guide was developed by the researchers (See Appendix B).

3.4.3. Document Review

Document review is a way of collecting data by reviewing existing documents. Documents may be hard copy and may include reports, performance ratings, meeting minutes, tutorial program formats, and other tutorial related documents were used

3.5. Procedures of Data Collection

Before the final questionnaire was distributed to the respondents the questionnaires and interview questions were pre-tested for their validity, clarity and practicality. The discussion and pre-test of the drafts were made with advisor and the tutors of St. Mary's university (SMU) who were excluded during the main data collection. By taking the inputs obtained from the group into consideration, the questions and interview guide were restructured. That means, items found to be ambiguous and unclear were revised, improved and reset. Finally, the restructured questions were distributed to the selected respondents to collect the necessary data for the study.

3.6. Method of Data Analysis

After collection, the data was coded and the responses from the questionnaires and interview schedules were arranged and grouped according to individual research questions. The data from the questioners was analysed using frequencies and percentages with the aid of tools of the Statistical Package for Social Sciences (SPSS: version 20.0).

Qualitative method of data analysis was applied for the data obtained from questions and interviews. On the whole, the results of the study were presented, analyzed and summarized accordingly.

This study aimed at designing and developing a prototype on mobile-based tutoring system for distance learning which offers solutions to the existing problems. Mobile-based tutoring system developed using database the researcher use MySQL database and also need webserver the researcher also going to use apache server and that run as local host and also need have server side scripting language here the researcher also going to use PHP uses as server side scripting langue for establish connection to database and insert information in to database and for testing

purpose the researcher need WampServer, this wamp server is defines a windows web development environment. It allows to create web application with Apache2, PHP and a MySQL database alongside, PhpMyAdmin allows to manage easily database. Finally the researcher needs to create this android application that communicate MySQL database.

3.7. Validation

Validation on the final output of the research made though designing questionnaire at SMU who have a better experience and experts to provide us valuable comments.

As it is indicated in the research questions and specific objective, the final output of this study is proposing a Mobile based tutoring system for tutorial service in distance education environment and finally the system was validated.

3.8. Method of Evaluation

The study gathered responses to the questionnaire addressing the existing practices and challenges of tutorial service evaluation. The researcher used personal approach and performed interviews with the respondents. This provided closer feedback and allowed to ask additional specific questions when the answers were vague.

The participants were selected from SMU distance education staffs and learners, in order to confirm the system acceptable or not. The study uses five respondents who are working distance education facilitators.

The results confirm that to investigate the usability of the mobile based tutoring framework is easy to use, saves time and less cost in delivering tutorial services, improves or motivates distance learners to attend or follow up tutorials.

Finally this evaluation fulfills to solve the findings of the empirical study key challenges that SMU distance learners faced like missing tutorial sessions, limited expertise and experience of tutors, Lack of practice of relating theory to practice and poor quality of tutorial packages.

CHAPTER FOUR

PRESENTATION, ANALYSIS AND INTERPRETATION OF DATA

As it has been stated in the preceding chapters, the general objective of this study was to design and develop mobile-based tutoring system that addresses the existing challenges in tutorial services faced by distance learners. Different tools were used to gather data as described in the previous chapter.

The analysis was done as follows: the quantitative data collected through questionnaires were tabulated and frequency counts and percentage were used for analysis a thematic analysis was applied to analyze the qualitative data collected using interview. Three hundred eighty four questionnaires were distributed to the selected distance learners of St. Mary's University. Of these, 314 questionnaires (79%) were properly filled and returned; 70 questionnaires (21%) were not returned.

4.1. Demographics of the Respondents

In order to provide a clear image about the respondents involved in the study some major characteristics of them were presented.

Table 4.1: Responses on Demographic Data

Variables	Representations	Frequency	Percent
Sex	Male	238	75.8%
	Female	76	24.2%
	Total	314	100%
Age	Less than 25	22	7.0%
	26–35	152	48.43%
	36-45	138	43.9%
	46 and above	2	0.6%
	Total	314	100%
Department	Accounting	94	19.9%
	EDPM	52	16.6%
	Management	90	28.7%
	Business	2	0.6%
	Economics	54	17.2%
	Rural Development	4	1.3%
	Agri-Economics	12	3.8%
	Cooperative Business management	6	1.9%
	Total	314	100%
Admission Year	2009	4	1.3%
	2008	8	2.5%
	2007	82	26.1%
	2006	186	59.2%
	2005	22	7.0%
	2004	10	3.2%
	2001	2	0.6%
	Total	314	100%
Current Year	1st year	0	0.0%
	2nd year	8	2.5%
	3rd year	98	31.2%
	4th year	208	66.2%
	Total	314	100

As it is indicated in table 4.1 the dominant proportion of respondents were male (76%) and within the age group of 26 – 45. The largest proportion of respondents were from Management department (28.7%) followed by Accounting (20%), Economics (17%) and EDPM (16.6%). More than 66% of the respondents were 4th year students (66.2%) followed by 3rd year students (31.2%). This implies that most of our respondents have sufficient experience to respond to our questions.

4.2. Difficulty in Distance Learning Coursework

Respondents were asked to identify parts of distance-learning coursework which are most difficult to complete. As it was presented in Figure 4.1 below the majority of respondents (66.9%) confirmed that final exams are most difficult to successfully complete which is followed by understanding the module content. This conclusion is supported by the data from the interview. One of the respondents said that:

> *"The majority of students are not good academically, they miss tutorial program, and they come to tutorial session without studying their material which results in failure in final exams."*

One of the tutors also said that:

> "*Of course, many distance learners complained about the incomplete course materials every day. That is true, there are problems related to course material distribution such as distribution of course materials without assignment, lost course materials, distribution of course materials arbitrarily. Due to these problems students do not succeed in final exam."*

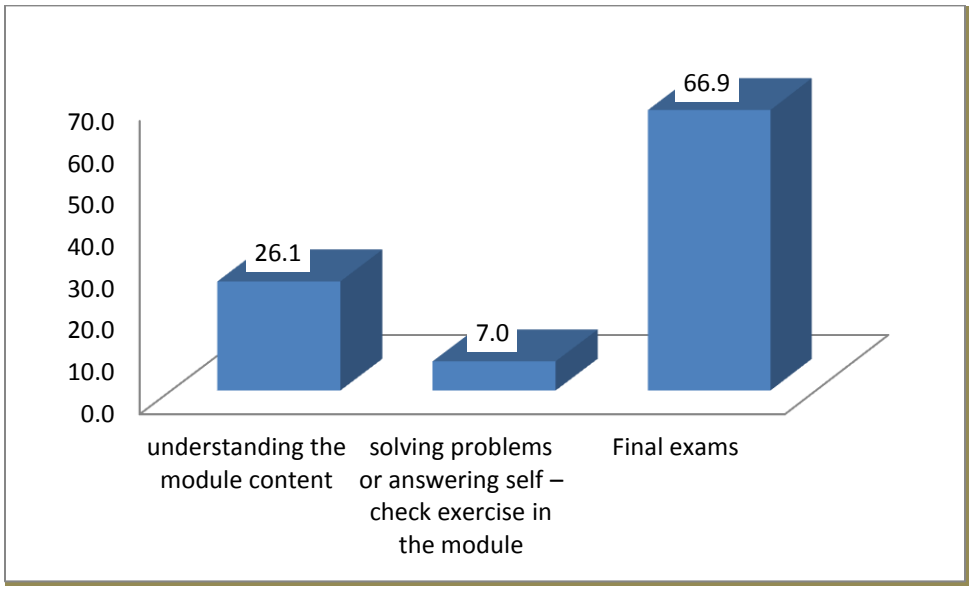


Fig 4.1: Distance learning coursework which is most difficult to complete

4.3. Type of Tutorial Services

Respondents were asked to indicate the type of tutorial service they commonly use. As it is indicated in Figure 4.2 below the majority of respondents (46%) identified lecture by focusing on the full content of the course followed by a mixture of lecture and discussion (33.8%). The existence of services like tutoring in specific assignments and academic counseling were supported by limited number of respondents.

The researcher also interviewed students regarding to tutoring services. One of the respondent replied:

> "*Most of the time our tutorial service focuses on Lecture by focusing on the full content of the course in the given time*."

One of the respondents from tutors also replied that:

> "*Mostly I give a chance to students to ask as many question because our tutorial service focus on a mixture of lecture and discussion. I also asked the students as many question as possible and then discuss their question, if they do not ask I deliver the tutorial program in the form of question-answering session. I also discuss with students.* "

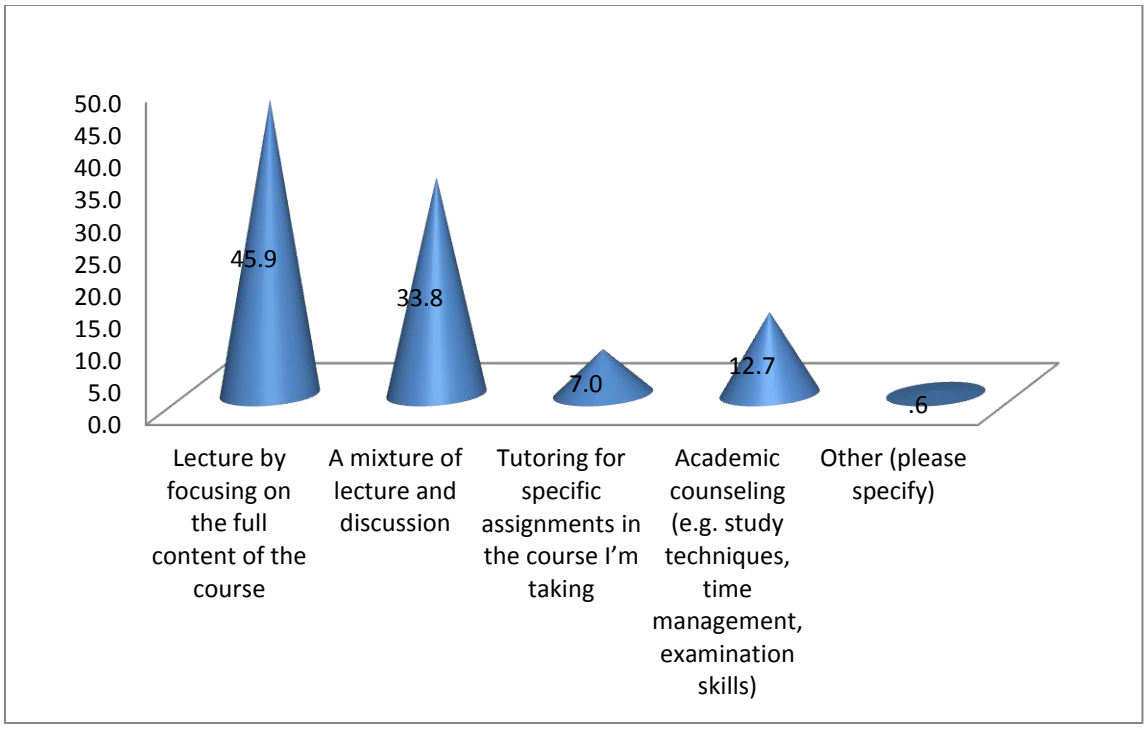


Figure 4.2: Type of tutoring services

4.4. Reason for Attending Tutorials

Respondents were asked to indicate their reason for attending tutorial session. As it is indicated in Table 4.4 and Figure 4.3 the dominant number of respondents (75.8%) confirmed that the most important reason for attending tutorial session is to listen to the tutor explaining the course material, followed by receiving guidance from tutors on study skills (11.5%) and exchange

viewpoints with tutor and other students (8.9%). This is in line with the results of the questionnaire in which a very large percentage of distance students expected to gain better understanding of the course and enhanced achievement through tutorials. The result also indicated that learners do not give much attention to receiving guidance from tutors on examinations, discussing course content with other students and getting some psychological support from tutors and other students.

This is an indication that students probably experienced `the loneliness of distance learning' as they progressed through their courses and increasingly recognized the value of emotional support from peers and tutors.

Table 4.2: Reason for attending tutorials

Variable	Frequency	Percent
Listen to the tutor explaining the course material	238	75.8
Receive guidance from tutors on study skills	36	11.5
Receive guidance from tutors on examinations	2	0.6
Exchange viewpoints with tutor and other students	28	8.9
Discuss course content with other students	2	0.6
Get some psychological support from tutors and students	8	2.5
Total	314	100.0

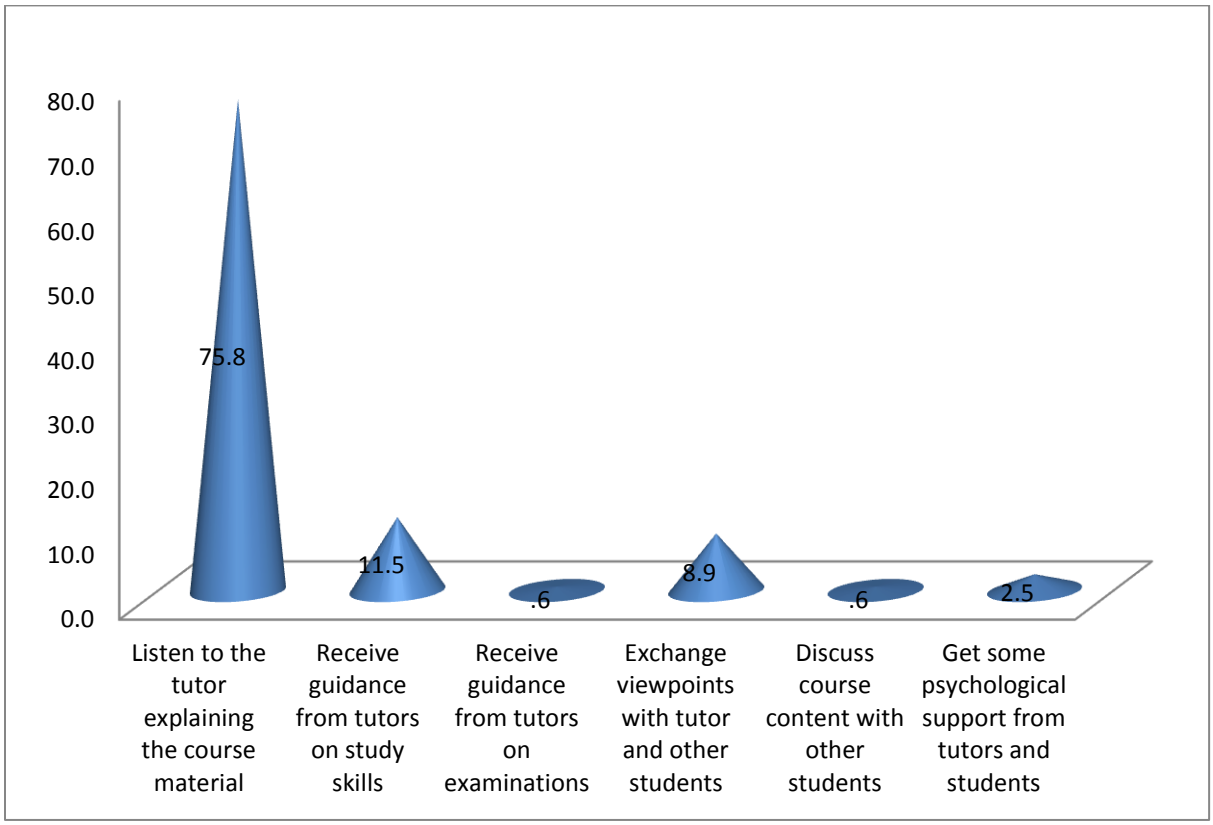


Figure 4.3: Reason for Attending Tutorial

One of the respondents from SMU distance learners also replied that:

> "*The most important reason for attending tutorial sessions was to listen to the tutor explaining the course material, followed by receiving guidance on assignments. This is in line with the results of the students expected to gain better understanding of the course and enhanced achievement through tutorials."*

4.5. Expected Gain from Tutorial Session

Respondents were asked to rate their level of agreement on the gain they expect from tutorial session. As it is indicated in Table 4.3 below the highest number of respondents (90.4%) agreed or strongly agreed that improved ability to cope with examination is the most expected gain from tutorial which is followed by more knowledge and better understanding of the course (89.8%),

improved ability to work on assignments (89.2%), and greater insight into what had been studied (82.8%). On the other hand the dominant proportion of respondents (78.3%) disagreed or strongly disagreed in considering additional information outside the course content as the expected gain from tutorial session which is followed by ability to relate theory to practice (77.7%) and building relationships with other students and forming study groups (53.5%).

Table 4.3: Expected gain from tutorial session

variables	Strongly Disagree		Disagree		No Idea		Agree		Strongly Agree			
	F	%	F	%	F	%	F	%	F	%	Mean	Std. Deviation
More knowledge and better understanding of the course	18	5.7	10	3.2	4	1.3	180	57.3	102	32.5	4.08	0.991
Greater insight into what had been studied	44	14.0	4	1.3	6	1.9	178	56.7	82	26.1	3.80	1.249
Additional information outside the course content	46	14.6	200	63.7	10	3.2	40	12.7	18	5.7	2.31	1.055
Ability to relate theory to practice	92	29.3	152	48.4	10	3.2	38	12.1	22	7.0	2.19	1.188
Improved ability to work on assignments	18	5.7	10	3.2	6	1.9	232	73.9	48	15.3	3.90	0.900
Improved ability to cope with the examination	12	3.8	12	3.8	6	1.9	228	72.6	56	17.8	3.97	0.835
Improvement in study skills	8	2.5	94	29.9	6	1.9	160	51.0	46	14.6	3.45	1.140
Building up relationships with other students and forming study groups	22	7.0	146	46.5	12	3.8	108	34.4	26	8.3	2.90	1.192

Regarding this issue, one student said:

> "*What I expect from tutorial session is that tutorials should lead to improvement in my performance, to improvement of study skills, and gaining support and encouragement from tutors and other students."*

4.6. Preferred Mode of Tutorial Service

Respondents were asked to rate their level of preference on each mode of tutorial services. As it is indicated in Table 4.4 below, from the most preferred modes 'tutorial services to be supported by video and/or audio recorded information' accounted for the highest proportion of respondents (88.5%) followed by 'comments from tutors on assignments' (54.8%) and tutors provide academic counseling (e.g. study techniques, time management, examination skills) (40.8%). From the preferred modes 'tutors lead whole-group discussion using a 'question and answer' approach' accounted for highest proportion of respondents (43.9%).

On the other hand, 'tutors give individual guidance to students' and 'tutors organize small-group discussion' were considered as not applicable by higher proportion of respondents, 40.1% and 29.9% respectively. In addition, 'tutors lecture to the whole group' was considered as the less preferred mode that accounted for 43.3%.

Table 4.4: Preferred mode of tutorial service

	N/A		Less preferred		Preferred		Most preferred			
	F	%	F	%	F	%	F	%	Mean	Std. Deviation
Tutors lead whole-group discussion using a 'question and answer' approach	24	7.6	66	21.0	138	43.9	86	27.4	2.91	0.887
Tutors lecture to the whole group	24	7.6	136	43.3	68	21.7	86	27.4	2.69	0.960
Tutors organize small-group discussion	94	29.9	74	23.6	54	17.2	90	28.7	2.45	1.198
Tutors give individual guidance to students	126	40.1	32	10.2	70	22.3	86	27.4	2.37	1.262
Tutors provide academic counseling (e.g. study techniques, time management, examination skills)	116	36.9	30	9.6	40	12.7	128	40.8	2.57	1.345
Tutorial services to be supported by video and/or audio recorded information	4	1.3	8	2.5	24	7.6	278	88.5	3.83	0.517
Comments from Tutors on Assignments	86	27.4	6	1.9	50	15.9	172	54.8	2.98	1.293

The researchers interviewed learners regarding the preferred mode for tutorials service. One of the learners replied,

> *"Frankly speaking, I didn't totally attend tutorial session. due to different reasons. One of the major reasons for not attending tutorials were related to family commitments and tiredness after work but I need to recommend to the institution to give or provide tutorial services to be supported or provide by video and/or audio recorded information and to be uploaded on the institution's website so that students can download the content without problem using computer or mobile phones."*

On the other hand, one of the tutors replied:

> *"I prefer tutors to lead whole-group discussion using a 'question and answer' approach because the majority of the students are not good academically. But to solve this problem I prefer lecturing through questions and answering. "*

4.7. Extent of Use of Different Tutoring Mode

As can be seen from the Table 4.5, 38.9% of the respondents strongly disagreed that tutorial services were supported by video and/or audio recorded information used in tutorials during the year or tutorial sessions, 59.2% and 40.1% were agreed tutors lead whole-group discussion using a 'question and answer' approach and tutors organize small-group discussion respectively.

Table 4.5: The extent to which each tutoring mode had been used during the year

	Strongly Disagree		Disagree		No Idea		Agree		Strongly Agree	
	F	%	F	%	F	%	F	%	F	%
Tutors lead whole-group discussion using a 'question and answer' approach	20	6.4	32	10.2	14	4.5	186	59.2	62	19.7
Tutors lecture to the whole group	16	5.1	48	15.3	8	2.5	110	35.0	132	42.0
Tutors organize small-group discussion	30	9.6	66	21.0	8	2.5	126	40.1	82	26.1
Tutors give individual guidance to students	82	26.1	172	54.8	22	7.0	32	10.2	6	1.9
Tutors provide academic counseling (e.g. study techniques, time management, examination skills)	110	35.0	116	36.9	20	6.4	30	9.6	38	12.1
Tutorial services to be supported by video and/or audio recorded information	122	38.9	150	47.8	22	7.0	16	5.1	4	1.3
Comments from Tutors on Tutor Marked Assignments	116	36.9	114	36.3	8	2.5	36	11.5	40	12.7

4.8. Frequency of Attending on Tutorial Session

Respondents were asked to rate their frequency in attending tutorial sessions. As it is indicated in Table 4.6 and Figure 4.4 the largest proportion of respondents (73.2%) attend tutorial sessions very rarely followed by never attended (17.2%).

Table 4.6: Frequency of Attending on Tutorial Session

Variables	Frequency	Percent
Never attended	54	17.2
Very seldom	230	73.2
Seldom	18	5.7
Neither often or seldom	12	3.8
Total	314	100.0

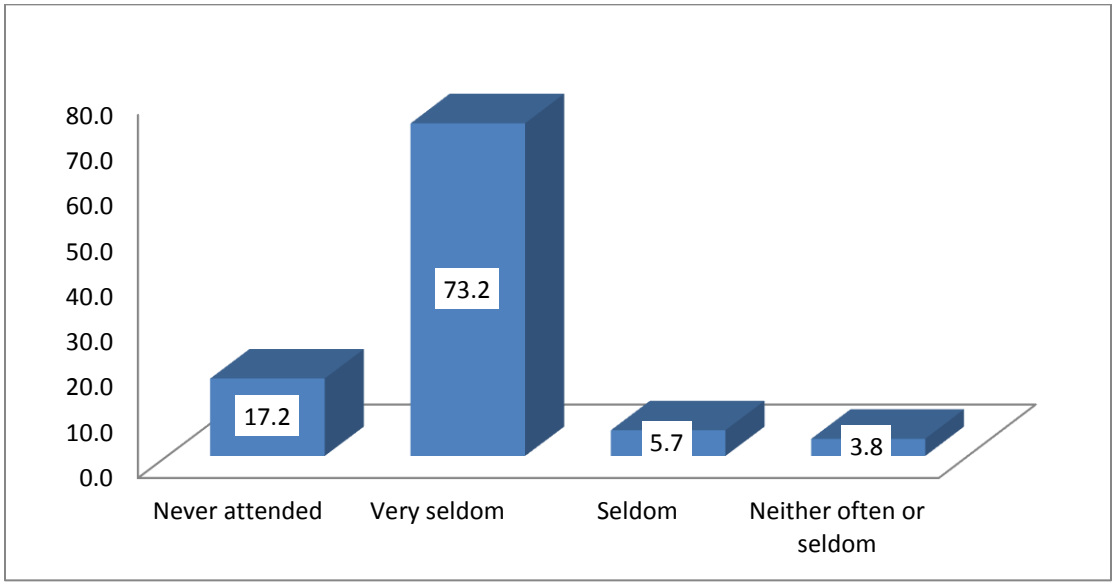


Figure 4.4: Frequency of Attending on Tutorial Sessions

One of the interviewee also said that:

> *"The institutions provide the tutorial service once a semester but due to different commitment I didn't attend most tutorial sessions."*

4.9. Reasons for not Succeeding in Distance-Learning Courses

Respondents were asked to identify reasons for not succeeding in distance-learning course. As it is presented in Table 4.7 and Figure 4.5 the majority of respondents (38.2%) confirmed that one of the major reasons for not succeeding in distance-learning course is that the course assignments are too difficult, which is followed by the fact that tutors are not teaching well (36.3%) and lack of enough tutors (21%).

Table 4.7: Reasons for not succeeding in a distance-learning course

Variable	Frequency	Percent
No enough tutors	66	21.0
Tutors are not teaching well	114	36.3
I don't understand anything the tutor delivers	4	1.3
Course assignments too difficult	120	38.2
I couldn't get help when I needed it	2	0.6
Too much course work or too difficult	2	0.6
Tutors are not serious	4	1.3
Tutors are absent	2	0.6
Total	314	100.0

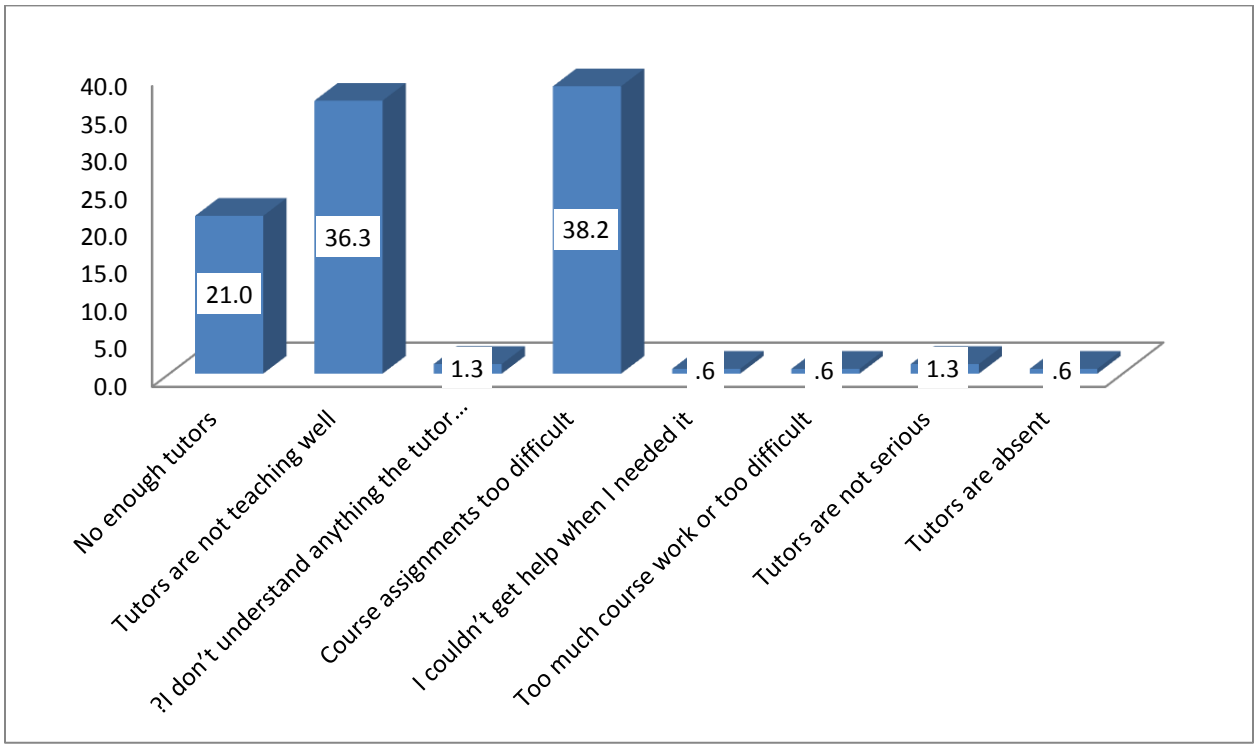


Figure 4.5: Reasons for not succeeding in distance-learning courses

4.10. Quality of Tutorial Services

In response to the question on rating the quality of tutorial services which is presented in Table 4.8 the majority of respondents strongly disagreed on the availability of SMU tutors when they are needed (58%). Significant proportion of respondents also disagreed in terms of feeling free to seek help from tutors (69.4%), in the suitability of communication style with tutors (59.9%) and informativeness of interaction with tutors (59.2%).

Table 4.8: Quality of tutorial services

	Strongly Disagree		Disagree		No Idea		Agree		Strongly Agree			
	F	%	F	%	F	%	F	%	F	%	Mean	Std. Deviation
SMU tutors are readily available when I needed them	182	58.0	86	27.4	12	3.8	32	10.2	2	0.6	1.68	0.994
Communication style with tutors is suitable for me	54	17.2	188	59.9	12	3.8	52	16.6	8	2.5	2.27	1.017
My interaction with tutors is informative	14	4.5	186	59.2	16	5.1	82	26.1	16	5.1	2.68	1.068
I always feel free to seek help from tutors	36	11.5	218	69.4	14	4.5	40	12.7	6	1.9	2.24	0.887

The implication is that most of these students could not access or gain quality tutorial services at St. Mary's University. This conclusion is supported by the data from the interview. One of the respondents said that:

> "*Honestly speaking, the lists of your variable questioners like tutors are readily available when I need them and feel free to seek help from tutors not yet practice because this is distance education. Distance education by nature has less face to face contact during the whole period of study. On the other hand, tutors of the institution lack the required expertise and experience to work in distance education. This resulted in poor quality of tutorial package and no one expect quality tutorial services."*

4.11. Effectiveness of Tutorial Services

Students were asked to rate the effectiveness of tutorial services they experienced. As it is presented in Table 4.9 and Figure 4.6 the dominant proportion of respondents (57.3%) rated the effectiveness of tutorial services as satisfactory, which is followed by good (28.7%). This implies

that the majority of respondents were less satisfied with the effectiveness of the tutorial services provided by the institution.

Table 4.9: Effectiveness of Tutorial Services

Variable	Frequency	Percent
Excellent	14	4.5
Good	90	28.7
Satisfactory	180	57.3
Fair	10	3.2
Poor	20	6.4
Total	314	100.0

Figure 4.6: Effectiveness of Tutorial Service

4.12. Type of Mobile Phones

Regarding the kind of mobile phones that learners own, the data presented in Table 4.10 and Figure 4.7 below confirm that the dominant proportion of respondents (66.2%) owned smartphones while the remaining 26.8% and 7% owned standard cellular phone and others

respectively. This implies that learners have mobile phones with advanced features and can use them for accessing and exchanging any multimedia content.

Table 4.10: Kinds of mobile phone owned by learners

Variable	Frequency	Percent
Standard Cellular phone	84	26.8
Smartphone	208	66.2
Other	22	7.0
Total	314	100

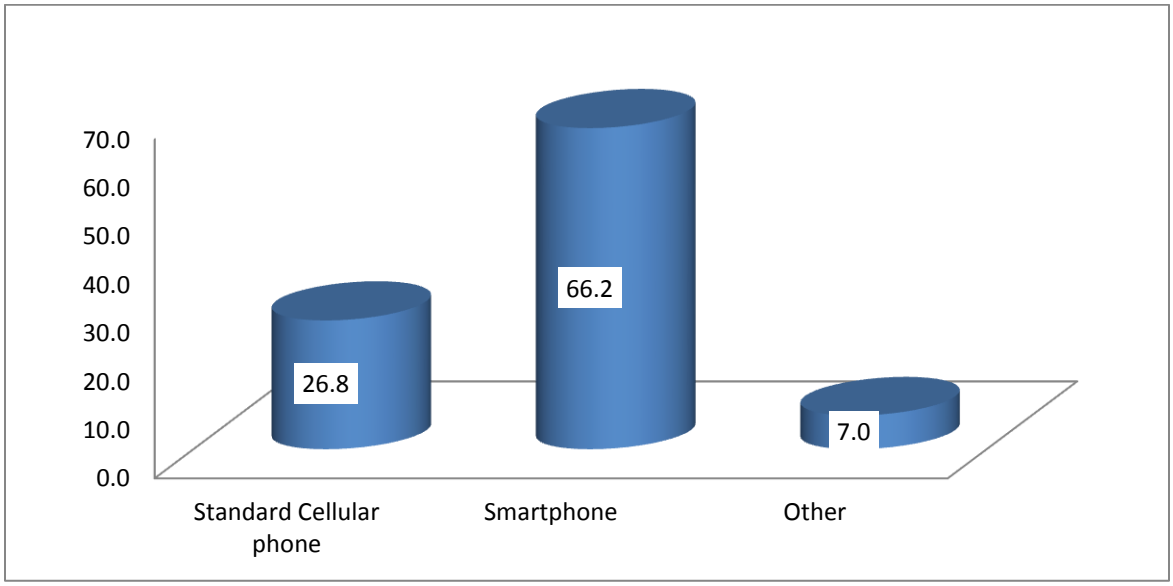


Figure 4.7: Kinds of mobile phone owned by learners

4.13. Functions Available on Mobile Phones

Respondents were asked to indicate the functions available on their mobile phones. As it is indicated in Table 4.11 below more than 81% of them confirmed that their mobile phone has features of voice calling, playing music/audio, texting, internet browsing, photography/camera and video camera.

Table 4.11: Functions Available on Mobile Phone

Variable	Frequency	Percent
Voice calling only	32	10.2
Photography/camera	2	0.6
Voice calling, texting, internet browsing, photography/camera and video camera	2	0.6
Voice calling and video camera	2	0.6
Voice calling, playing Music/audio and video camera	2	0.6
Voice calling, texting and Internet browsing	8	2.5
Voice calling, Internet browsing and video camera	4	1.3
Voice calling, photography/camera and video camera	2	0.6
Voice calling, texting, internet browsing and photography/camera	2	0.6
Voice calling, texting, internet browsing, photography/camera and video camera	2	0.6
Voice calling, playing Music/audio, texting, internet browsing, photography/camera and video camera	256	81.5
Total	314	100.0

4.14. Frequency of Use of Mobile Phone

In responding to a question about the frequency of use of mobile phone which is summarized in Table 4.12 below, 98.7% of the respondents confirmed that voice based contact with others is done several times a day. Regarding text based interaction with others 45.2% of them indicated that they use it once a week which is followed by several times a day (33.8%). Taking, storing or viewing of pictures is done several times a week by 47.8% of the respondents which is followed by once a week (33.8%). Taking, storing or viewing of video is done once a week by 60% of respondents which is followed by few times a month (25%). Recording, storing or playing audio is done several times a day by 44% of respondents which is followed by few times a month (37%). Browsing internet is done several times a day by 60% of the respondents followed by once a day (33%).

Table 4.12: Frequency in which you use your mobile phone

	Several times a day		Once a day		less than daily,several times a week		Once a Week		Few Times a Month		Once a Month or less		Never	
	F	%	F	%	F	%	F	%	F	%	F	%	F	%
Contact others (voice)	310	98.7	4	1.3	0	0	0	0	0	0	0	0	0	0
Contact others (texting)	106	33.8	26	8.3	6	1.9	142	45.2	34	10.8	0	0	0	0
Take/store/view/pictures	40	12.7	6	1.9	150	47.8	106	33.8	12	3.8	0	0	0	0
Take/store/view video	4	1.3	34	10.8	4	1.3	188	59.9	78	24.8	2	0.6	4	1.3
Record/store/play audio	138	43.9	36	11.5	0	0	22	7	116	36.9	0	0	2	0.6
Browse internet	188	59.9	104	33.1	2	0.6	18	5.7	0	0	0	0	2	0.6

4.15. Intention to Use Mobile Based Tutoring Service

Respondents were asked to indicate whether they intend to use mobile based tutoring service if it is introduced by SMU.As it is indicated in Table 4.13 and Figure 4.9. 96% of the respondents are willing to use the mobile based tutoring service when it is introduced.

Table 4.13: Intention to Use Mobile Based Tutoring Service

variable	Frequency	Percent
Yes	302	96.2
No	6	1.9
Maybe	6	1.9
Total	314	100.0

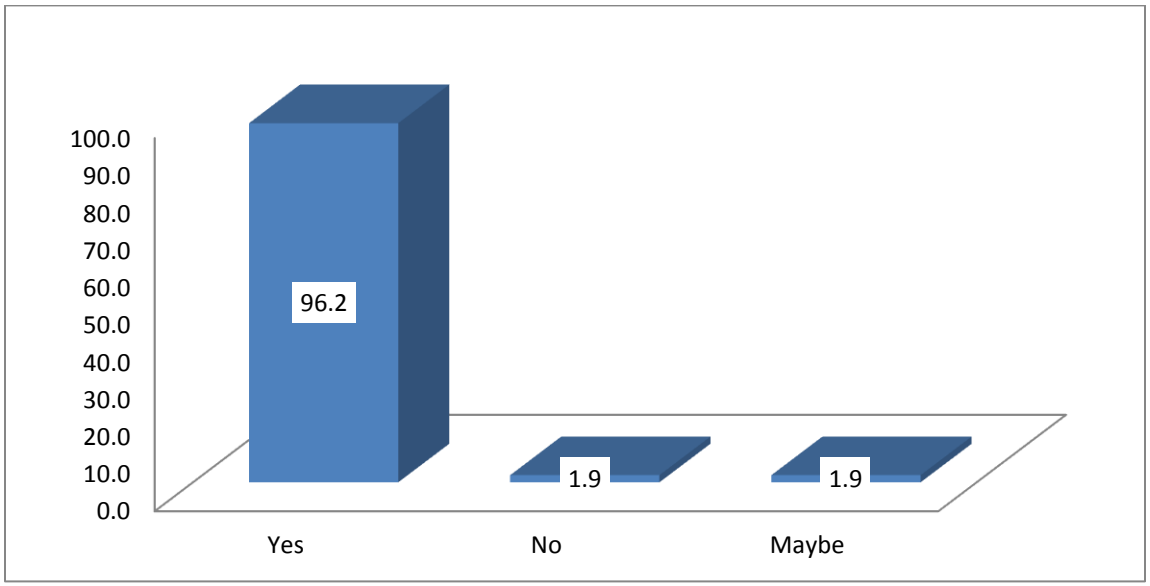


Figure 4.8: Intention to Use Mobile Based Tutoring Service

The researcher interviewed the student regarding to SMU introduces tutoring service using mobile phone. One of the institution student replied:

> "*The most serious problem that I face is that I have never attended tutorial sessions due to lack of expertise and experience of tutors, poor quality tutorial package and remote tutorial centers. But if the institution begins to introduce tutoring service using mobile phone I will definitely attend or follow each tutorial session without any problem.*"

Summary of Results from Interview

As it is stated in the methodology, interview method was employed to collect qualitative data. Selected distance learners and tutors were involved from distance education. Interview was developed in such a way that the questions can address the major research objectives. The results of the interview were summarized using the following table.

Table 4.14: Summary of Qualitative Data

No	Themes	Explanations
1.	Best practices	Some of the best practices mentioned by respondents include: ▪ Give chance to students to ask as many question as possible and discuss their question. ▪ Make question-answering methods. ▪ The method and use in tutorial is lecture method and discussion.
2.	Challenges	The major challenges identified by respondents include: ▪ lack of expertise of the tutors ▪ lack of experience to work in distance education ▪ poor quality tutorial package tutors do not prepare themselves to give tutorial
3.	Proposed Solutions	Participants of the interview proposed the following solutions in order to cope up with challenges: ▪ Mobile learning ▪ Online teaching ▪ Use video conference ▪ The materials should also be supplied via electronic way. ▪ Frequent tutorial with proper follow-up, mandatory attendance on tutorial, giving test /quizzes during tutorial, giving tutorial for all courses, giving tutorial question to students before the program.

CHAPTER FIVE

PROPOSED MOBILE TUTORING FRAMEWORK

5.1. Inputs for Designing Mobile Based Tutorial System

5.1.1. Support from Empirical Study

- An empirical study was conducted to investigate the current practices and challenges of tutorial service as well as to identify the needs of distance learners towards mobile based tutorial services. The findings of the empirical study provided inputs and the required conceptual support to the design and development of the mobile based tutoring system. The findings also served to prioritize areas of intervention based on the existing critical gap and learners' requirements. The following key findings were summarized from chapter four that can be used as a basis for the design and development of mobile based tutorial system for SMU distance learners.
- The largest proportion of distance learners attend tutorial session to listen to the tutor explaining course material. They expect to gain better understanding of the course and enhanced achievement through tutorials.
- Lecturing the full content of the module is the major mode of delivery which is combined with few discussions.
- Tutorial supported by video and/or audio recorded information is the most preferred mode followed by comments from tutors on assignments and providing academic counseling (e.g. study techniques, time management, examination skills). Tutors-lead whole-group discussion using a 'question and answer' approach is also another preferred mode of delivery. On the other hand, tutors lecturing to the whole group was considered as the less preferred mode.

- Tutoring in specific assignments and academic counseling are rarely practiced.
- Respondents claimed that the major reasons for not succeeding in distance-learning course is that the course assignments are too difficult, tutors are not teaching well and there is lack of enough tutors, i.e., limited tutorial sessions.
- Improved ability to cope with examination is the most expected gain from tutorials which is followed by more knowledge and better understanding of the course, improved ability to work on assignments, and greater insight into what had been studied. Learners also expect more frequent tutorial sessions, provision of as many tests/quizzes as possible, providing tutorial services for all courses and giving tutorial questions to students before the tutorial program.
- Some of the key challenges that SMU distance learners faced include:
    - Poor understanding of the module content and unable to completing exams successfully.
    - Missing tutorial sessions - the largest proportion of respondents (73.2%) attend tutorial session very rarely followed by never attended (17.2%).
    - Coming to tutorial sessions without reading the module by learners.
    - Tutors are not accessible when learners need them.
    - Limited expertise and experience of tutors.
    - Communication style with tutors is not suitable and the interaction with tutors is not informative.
    - Lack of practice of relating theory to practice.
    - Difficulty in building relationships with other students and forming study groups.

- ☞ Learners do not give much attention to receiving guidance from tutors on examinations, discussing course content with other students and getting some psychological support from tutors and students.
- ☞ The overall effectiveness of tutorial service is less satisfactory.

- In relation to mobile phone utilization:
  - ☞ The largest proportion of respondents have smartphone which implies that learners have mobile phones with advanced features and can use them for accessing and exchanging any multimedia content.
  - ☞ The mobile phone of the largest proportion of respondents has features of voice calling, playing music/audio, texting, internet browsing, photography/camera and video camera.
  - ☞ Users' have extensive experience in handling voice and text based interaction; taking, storing or viewing pictures; taking, storing or viewing video; recording, storing or playing audio as well as browsing internet
  - ☞ More than 96% of respondents are willing to use mobile based tutoring service when it is introduced and they expect the materials electronically.

Therefore, mobile based tutorial service (M-Tutoring) is proposed in order to address the above stated challenges, gaps and expectations which are mainly identified by distance learners during the empirical study.

5.1.2. Support from Literature

Support to in designing and developing a mobile based tutoring system from related work was well in order to investigate its practices and challenges. The findings of the literature review provided inputs in the form of existing practices and challenges that served as the basis for designing and developing a mobile based tutoring system. These findings also provided the required conceptual support to the design and development of the system.

The following key findings were summarized from related work that can be used as a basis for the design and development of mobile based tutorial system for distance learners.

- Mobile phones appear to be a more convenient tool for learning than any other technological tools in terms of portability, accessibility, affordability, operability, flexibility and applicability.
- M-learning and sharing of learning materials enables students from different years to download their lectures or tutorial videos via a mobile phone.
- Some of the key challenges that tutorial services face include
    - lack of expertise and experience to work in distance education and weak attendance in tutorials
    - Inconsistence in tutor's attendance, poor quality tutorial package and weakening commitment.

5.2. System Requirements

The following information is intended to list minimal system requirements to support the mobile based tutoring. Determining the necessary system requirements depends on many factors including, but not limited to, the complexity of android environment, the deployment strategy of

mobile based tutoring. Features, user requirements, expected peak usage requirements, and response time expectations.

5.2.1. Hardware Requirements

The mobile tutoring for distance learning is a mobile application designed to work on mobile devices, most especially, the android cell phone. This choice was made because these devices are readily available and affordable. The Android Studio emulator is terrible, even with decent hardware it's sluggish. Same for any emulator for development Obviously better hardware will make it run smoother the researcher recommended the following hardware requirements is needed for testing purpose.

- 3 GB RAM minimum, 8 GB RAM recommended; plus 1 GB for the Android Emulator and processor with 2.5GHz.
- 2 GB of available disk space minimum, 4 GB Recommended (500 MB for IDE + 1.5 GB for Android SDK and emulator system image)
- Internet Connection Broadband (high-speed).

5.2.2. Software Requirements

In this section, the researchers will specify detailed requirements for the mobile based tutoring .the researchers will design and build the mobile based tutoring on the following requirements

- ADT (Android Development Tools) is a plugin for the Eclipse IDE(Integrated Development Environment) is designed to Provide a powerful, integrated environment with Android applications built.
- SDK provide the API (Application Program Interface) libraries and developer tools space necessary to build, test, and debug apps for Android.

- The Android Virtual Device (AVDs) is software that emulates the real device sharing the hardware resources of the hosting device.
- WAMP stands for (Windows, Apache, MySQL, and PHP) are a variation of LAMP for Windows systems and are often installed as a software bundle (Apache, MySQL, and PHP). It is often used for web development and internal testing; WAMP also includes MySQL and PHP, which are two of the most common technologies used for creating dynamic websites. MySQL is a high-speed database, while PHP is a scripting language that can be used to access data from the database.
- Notepad++ is a text editor and source code editor for use with Microsoft Windows. It supports editing, which allows working with multiple open files in a single window.

5.3. System Design

The application is designed to be flexible, userfriendly, and portable. The installed application on the mobile device provides some features which are: student profile, SMS messages and lecture and tutorial videos. These features are retrieve the information from the server which has the database and PHP scripts that produce the requested data. However, the requested data from the mobile device application is obtained by initiating an HTTP request through internet connection.

This means that the user application sends the required data through the HTTP request like the student username and password so that the system on the server side collects the required data for each feature from the database. After the system in the server side locates the data required by the student application, then it starts arranging the data to send it to the user application. Still, the data can be the student profile and video list for lectures and tutorials. This process is where the server answers the student application requests.

SMS messages are also initiated in the local server using the PHP scripts by establishing a connection session with the SMS gateway for every database update. This session includes the student profiles and the SMS message text. Then, the SMS gateway sends the required SMS to the student mobile.

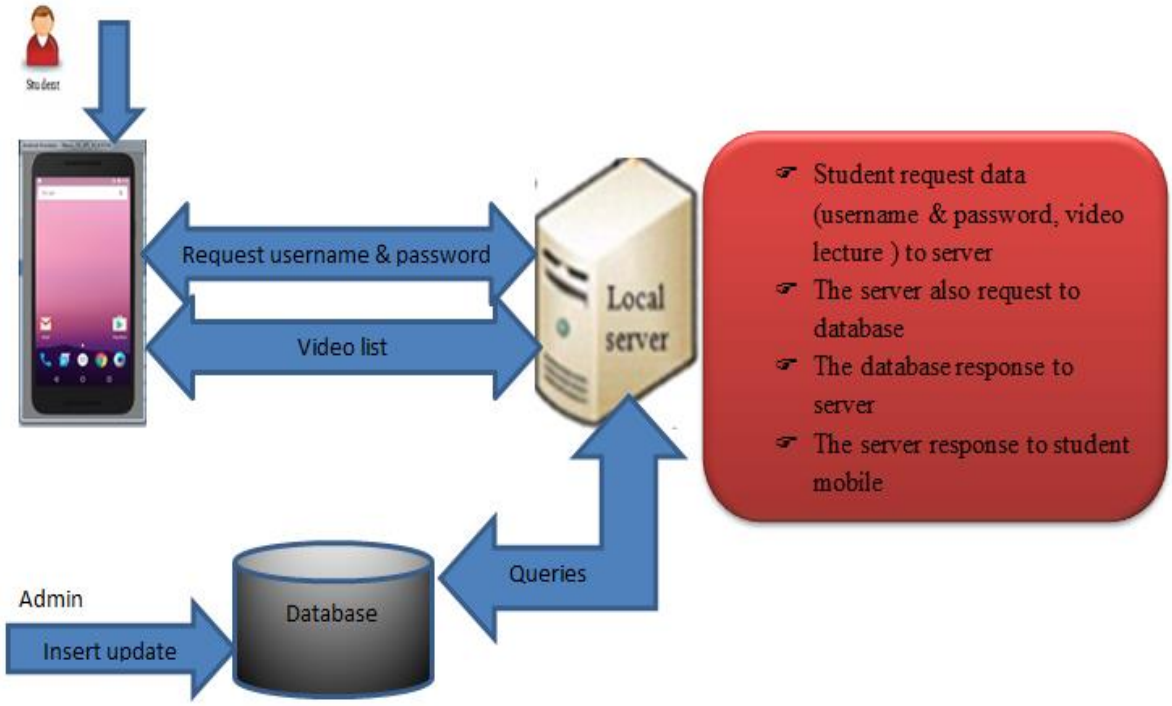


Figure 5.1(a): data gathering

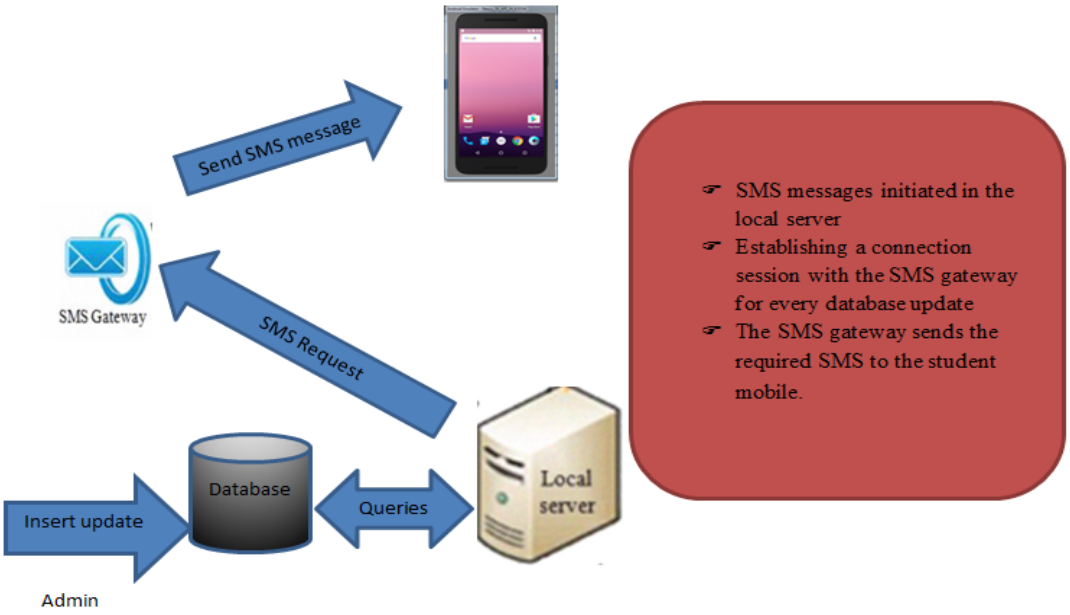


Figure 5.1(b): SMS Message

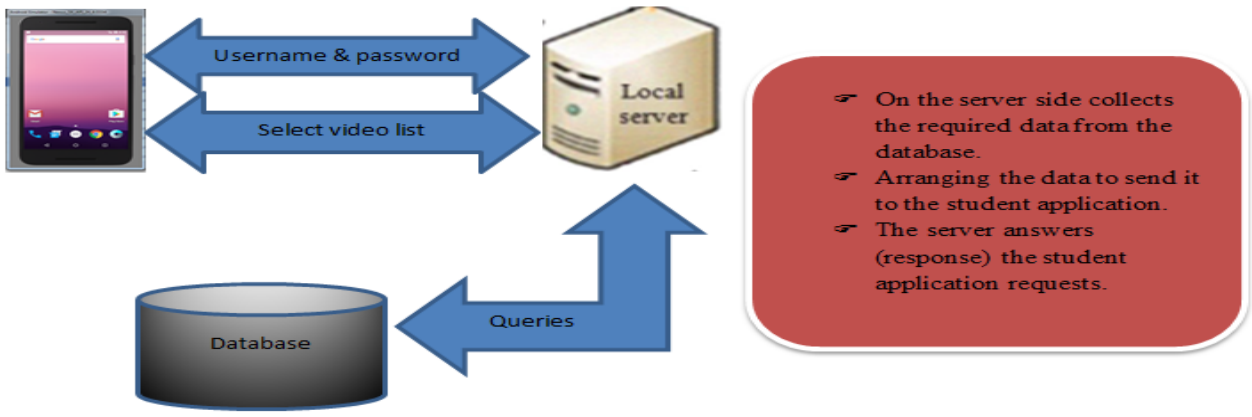


Figure 5.1(c): Server reaction

5.4. System Architecture

The architecture of the system is illustrated under Figure 5.2.The system uses a client server architecture which consists of mobile device, network connection, the server and the application installed in the student mobile device. This application communicates through the internet connection. The communication network is used to send or retrieve data from or to the server. The server contains the database and PHP scripts.

A key benefit of this architecture is that it allows the interactions and communications between students and tutors on mobile device. Messages posted on database can be instantly accessed on mobile device and students or tutors with mobile devices can exchange messages with students using mobile device. This is good for the m-tutoring environment as the critical network effect of mobile device. Another benefit of this integration is that students can receive video and audio when upload and updated are entered on the database. The overall goal of this architecture was to value-add to the anytime/anyplace flexibility of mobile tutoring.

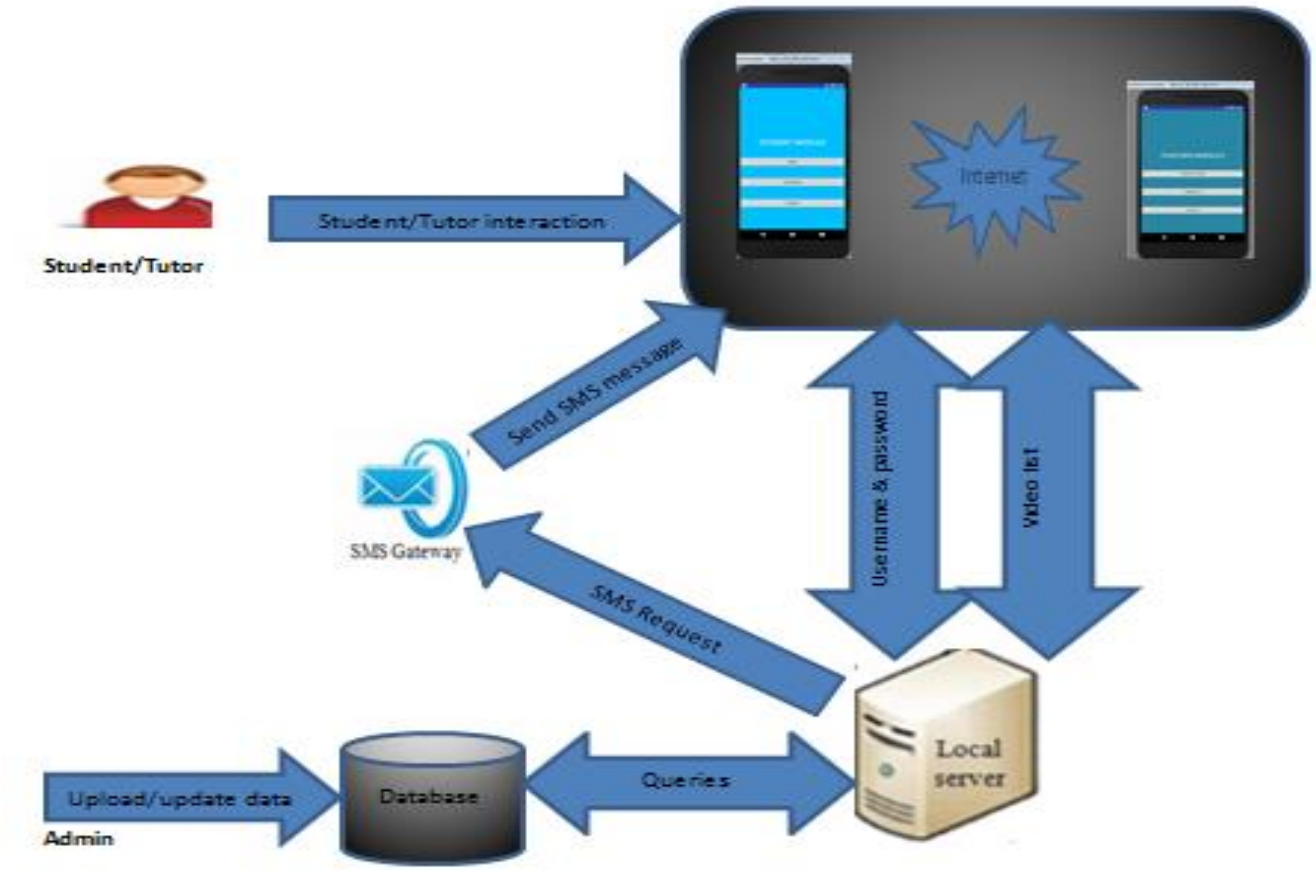


Figure 5.2: system architecture

System components are represented as follows.

- ***Database***: consists of student module and teacher module as combined form.
- ***Student module:*** handles a lecture archives (videos) and configurations, such as questions and answers with SMS text.
- ***Teacher Module:*** contains the video lectures, collect student's comment and replay SMS text, and the discussion made among tutors and learner. Finally it provides feedback.

- ***Local server:*** that "serves" the resources (files, storage, application programs and other devices) for a number of attached workstations or it allows development and testing on a local machine without the concerns of losing Internet connection, or constantly uploading files.
- ***SMS Gateway:*** to send or receive Short Message Service (SMS) transmissions to or from a telecommunications network.
- ***Admin:*** has full control over the system in accessing, managing and providing privileges for the other users and the rights to update the database of the system.

5.5. The Structure of mobile tutoring flow

This sequence activity flow mainly focus on addressing the existing challenges that distance learning tutorial face in tutorial service and possible remedial solutions derived from empirical research and literature. Therefore, based on the existing situation of distance education in SMU proposed Mobile based tutoring.

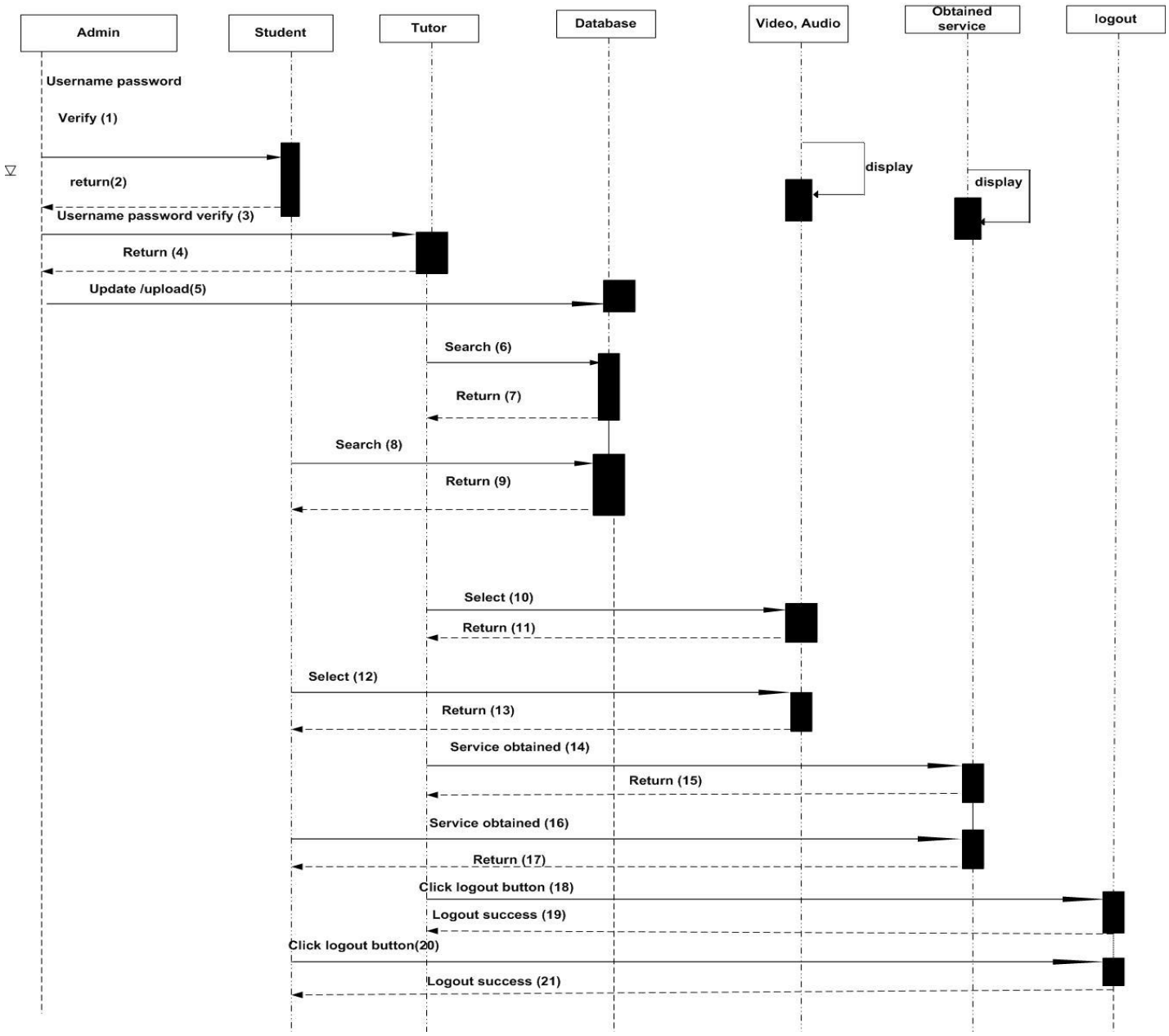


Figure 5.3: Sequence Activity flow for Mobile Based Tutoring

Description of the sequence activity flow

- Authentication & Verification
  - When tutor or students login to a mobile application a username and password are checked by Administrator. The Administrator verifies whether the tutor or student has right access to resource permission or not.
  - Administrator checks or verifies that the application allows the student to register.
  - Administrator also verifies whether the system allows to login.
  - Administrator checks or verifies that the application allows student to change his /her username and password after he /her is logged in.
  - All in all at this stage authorization will be done.
- Service seeker (Tutors & students)
  - The tutors search to upload or update tutorial materials and the student also search the tutorial service uploaded or inserted updated by admin.
  - The application should request a username and password from each user, the tutors or students to get service like video, audio lecture or SMS.
- Stored M-Tutoring Resource
  - Those resources that are stored or uploaded on the database.
- Selected M-Tutoring Resource (Video, SMS text)
  - It is a kind of resources that the service seeker wants to get .it can be a video, audio or text the user can select as he or she may need.
- Service obtained
  - Service seeker can select tutorial materials which ultimately support them in understanding the subject matter they learn.

- Logout
  - ☞ Finally the students and tutors once complete the operation they get out the application using the logout option.

CHAPTER SIX

IMPLEMENTATION

This chapter is concerned with the implementation of m-tutoring application. This system is tested based on functionality and performance in the environment of distance learning tutorial services at St. Mary's University.

6.1. Application of Mobile-Based Tutoring System

This research is aimed at designing and developing mobile based tutoring system. The functional requirements of the proposed system were aligned to the specifications derived from the empirical study and review of literature. The literature provided input and conceptual support to the design and development of the mobile-based tutoring system. Therefore, the detailed specification and description of each component is discussed below.

6.1.1. Actors/Users

The users that interact with the system application, specifically the tutoring content are categorized as follows based on their relevant roles.

Admin: has full control over the system in accessing, managing and providing privileges for the other users and the rights to update the database of the system.

Instructors/Tutors: have the privilege to access, add or upload video lectures and send answer or comment using text message on specific and authorized contents.

Distance learners: have the privilege to access selected files / document or contents and send question or comment using text message.

6.1.2. Mobile App

This application was developed for Android platform using Android studio version 2.2.3 development environment. Such apps are internet enabled, read, send, receive SMS and hence capable of launching content. Regarding the context of this study the app it is possible to access any distance learning lectures or tutorial contents like video lecture and SMS text message through mobile device. The general working structure of the app is illustrated in figure 6.1 below.

Figure 6.1: diagram of mobile based tutoring data access design

6.1.3. Design of Basic Functional Requirements

Since the proposed mobile app is for android platform, in the android studio project app file has the following contents.

- Activity classes

This represents the user interface components of the app on screen of a mobile terminal. It can hold several subcomponents as themes, views etc.

- Views

It is a single element on a screen of activities and can be considered as a building block of the activities. Example Button, ImageView, TextView, VideoView.

- Services

This is used to handle functionalities that run at the background.

- Intent

This is the part that handles the mechanisms of navigating between activities through intent messages relaying.

- database server

Backend persistent data storage, a database server should be in place. For the prototype implementation of the research work, the PhpMyAdmin MySQL WAMP server was used. For serve side scripting PHP was implemented while Notepad++ was used for the front HTML scripting.

6.2. Implementation

A screenshot shows new project screen that appears, set the name of app, package name, and the location of our project.

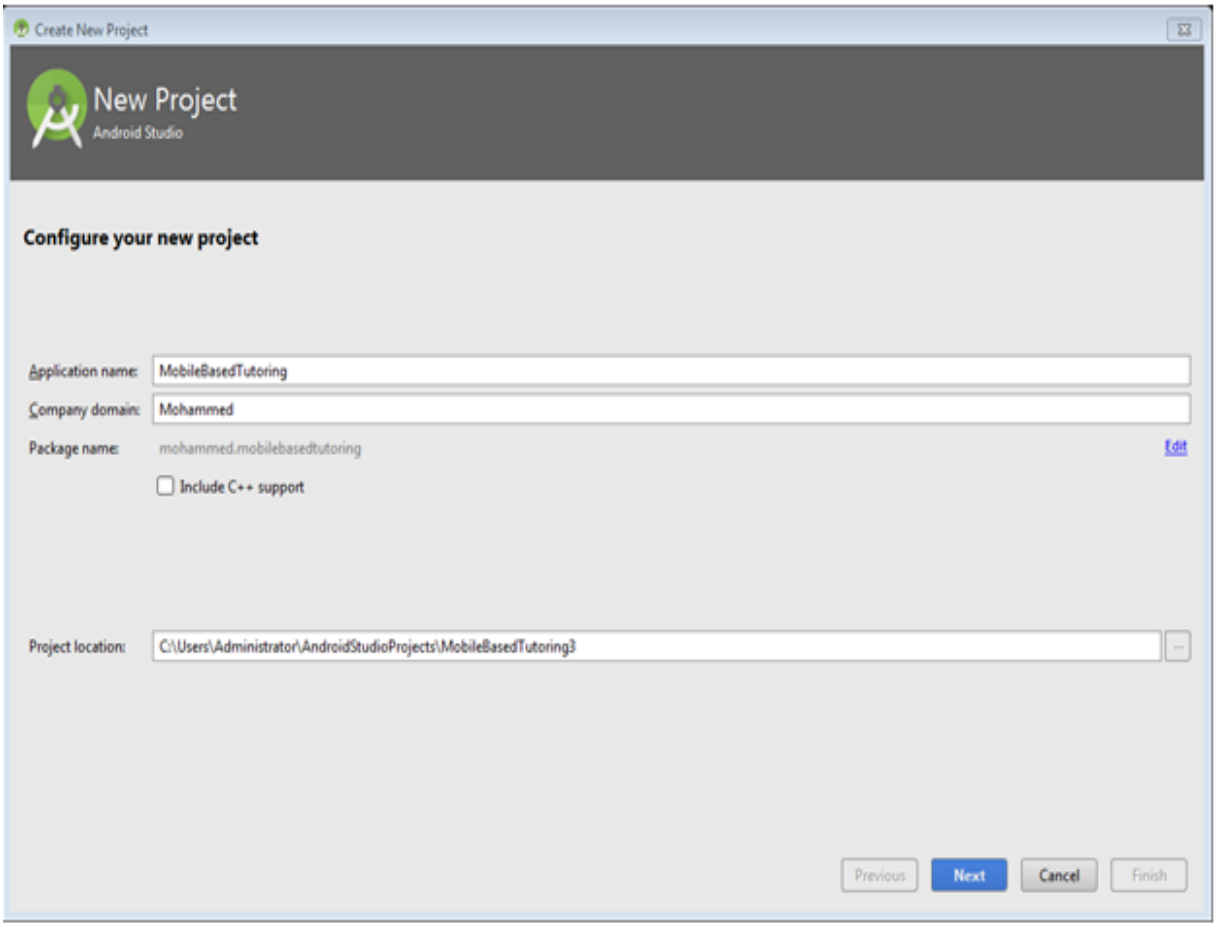


Figure 6.2: The Configuration of the project screen

The next window lets to select the device form want to build for, and the minimum version to support for each. For each device select, the wizard adds a corresponding module to our project.

Each module contains all the code and resources that built into an Android app package (APK) for the corresponding device. If later decide to add support for a new device, it can add a module at that time. And it can share code and resources between modules using an Android library.

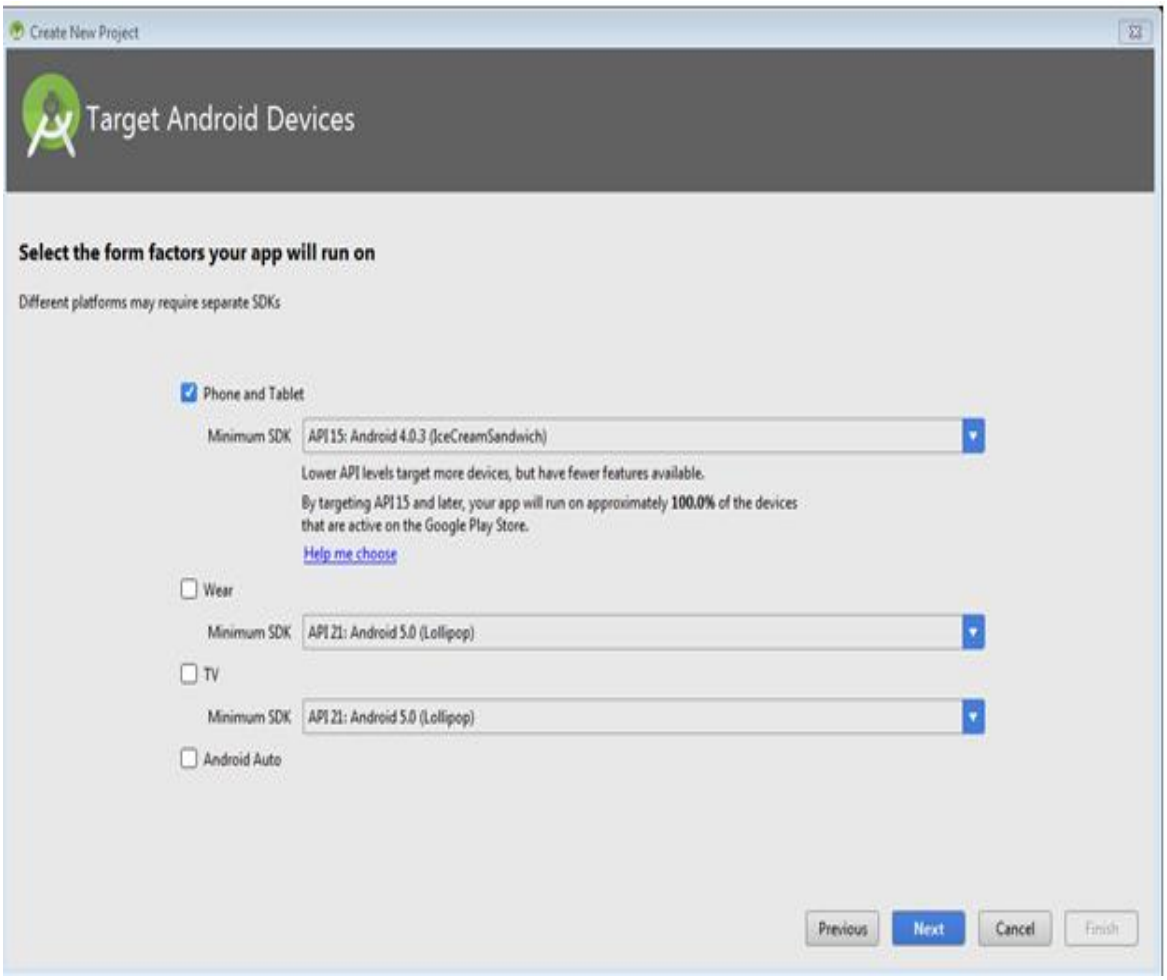


Figure 6.3: The Target Android Devices screen.

The next screen lets to select an activity type to add to the app, as shown in figure 6.4. This screen displays different set of activities for each of the form factors selected earlier.

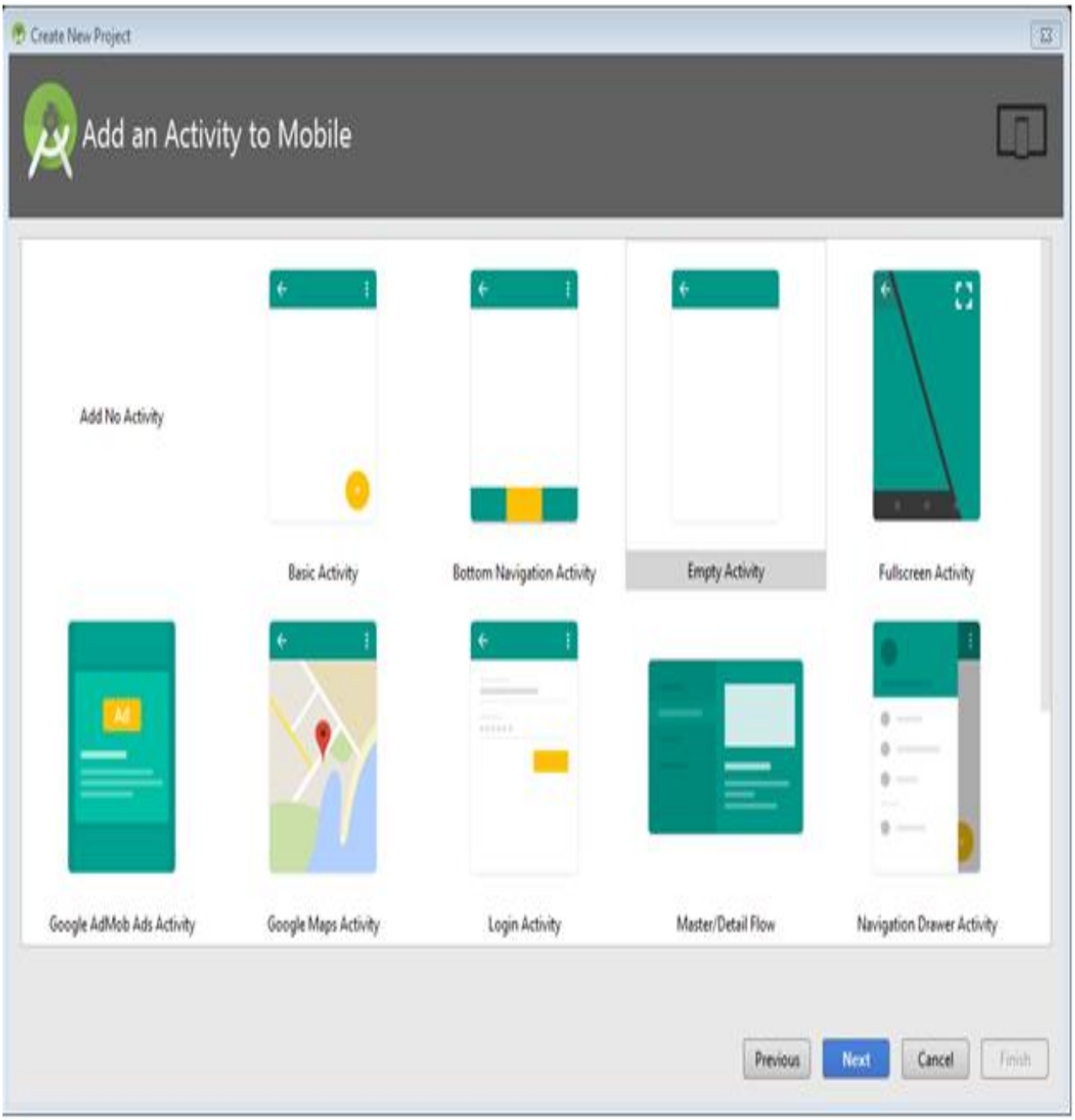


Figure 6.4: The Add an Activity screen for a mobile form factor.

The next screen lets to configure the activity to add app, as shown in figure 6.5. Enter the activity name, the layout name, and the activity title. Then click Finish. Android Studio now sets up the project and opens the IDE. Now ready to develop app.

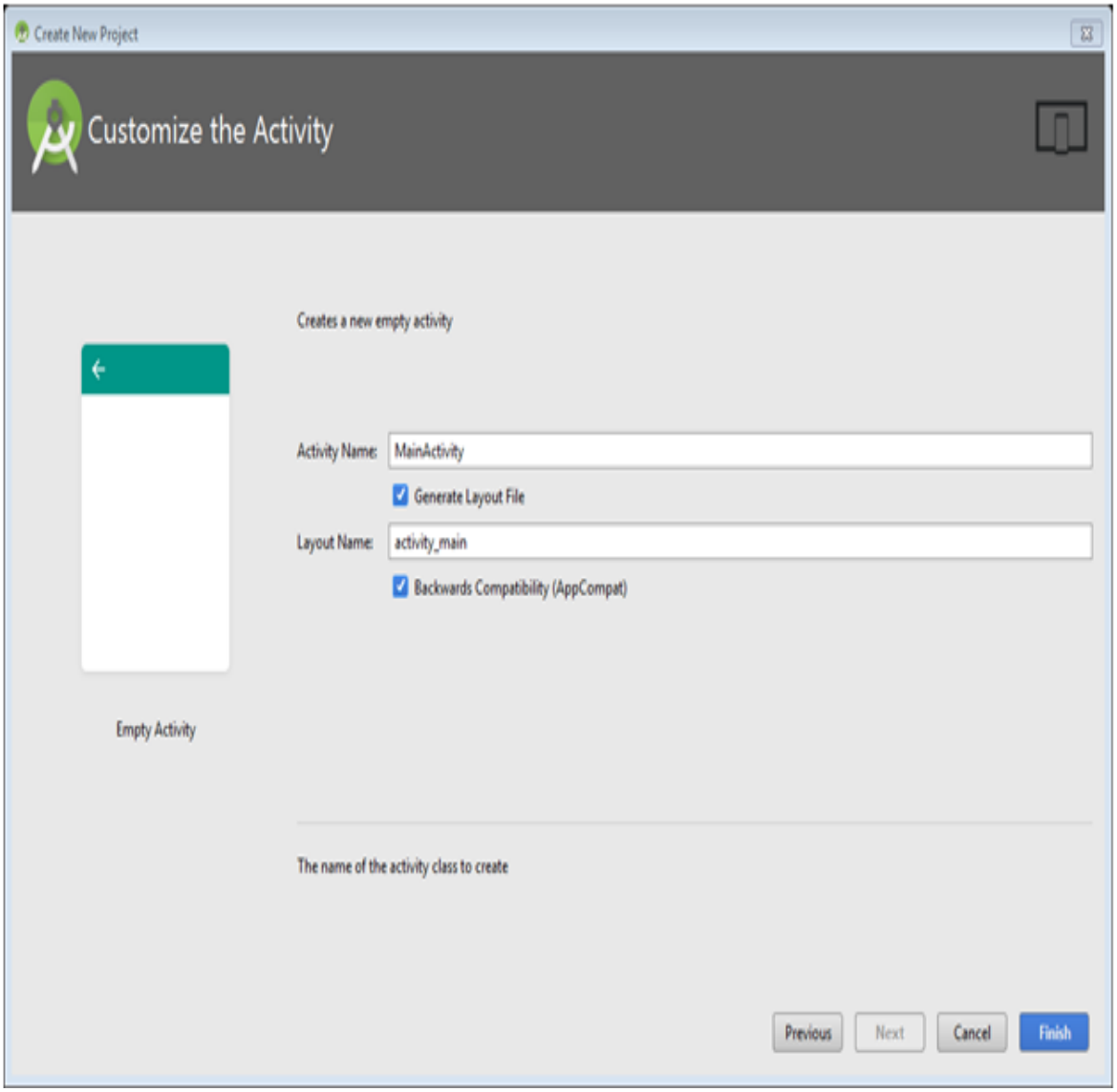


Figure 6.5: The Customize the Activity screen.

6.2.1. Implementation of the Mobile App Interfaces

In order to realize the basic requirement functionalities in the design specification of the earlier section, within the mobile app project package, several android files were included. Basically, in android application development on android studio, app development project structure always takes the MVC (Model View Controller) form. Generally, the prototype of the app was implemented on the android studio by the project package name "mohammed.mobilebasedtutoring "to have all the required interface functionalities. For the implementation of this app, one sample indication is as in figure 6.6. As it can be seen from the figure, in the project view of "mobilebasedtutoring", there are major source files. Some of these file directories are:

- **App**

This is the core directory which holds all the source code files for the MVC within the src→subdirectory. The internal library and build.gradle is also in this directory.

- External Library

This part of the project file is responsible for issues regarding the platform and the Software Development Kit (SDK). It also contains the detail of associated file and the emulator properties.

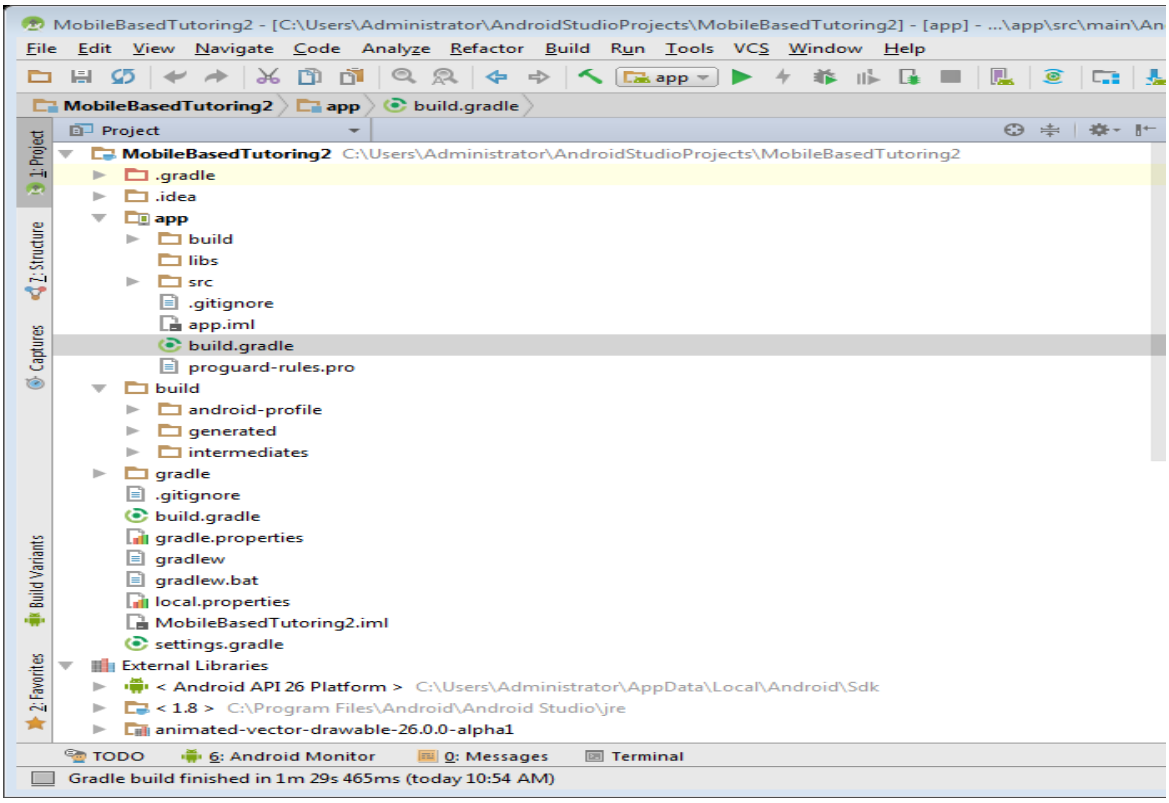


Figure 6.6: sample of android mobile app implementation

6.2.2. Model–view–controller (MVC) Structure

In android studio, Model–view–controller (MVC) is the inherent structure for every app project file. This way of organizing the files has several advantages like managing separation of concerns. In doing so, it is possible to modify one aspect of the project without affecting the other. The advantage is not only increasing the testability of the code but it also makes it easier to extend, allowing a fairly easy implementation of new features. In addition to reduce the code complexity, code reusing, increased flexibility and decoupled code (fewer dependencies) are major benefits.

For example, the view part of the file can be updated or changed separately of the model and control part.

The prototype design of the mobile app in this study followed the MVC project file structure. The sample screenshot of the model, view and control files of the app are presented below.

- Model

The model sub-file was used to specify the attribute and structure of the widget in the screen elements of an activity. The attributes of the widget is scripted as .xml format in name value pair. The preview layout of the whole element is viewed in design view. For the mobile app in this study, there is a couple of model layout. The sample model of the activity that launches the tutoring content is showed in figure 6.7(a) in design view and the text view is in figure 6.7(b).

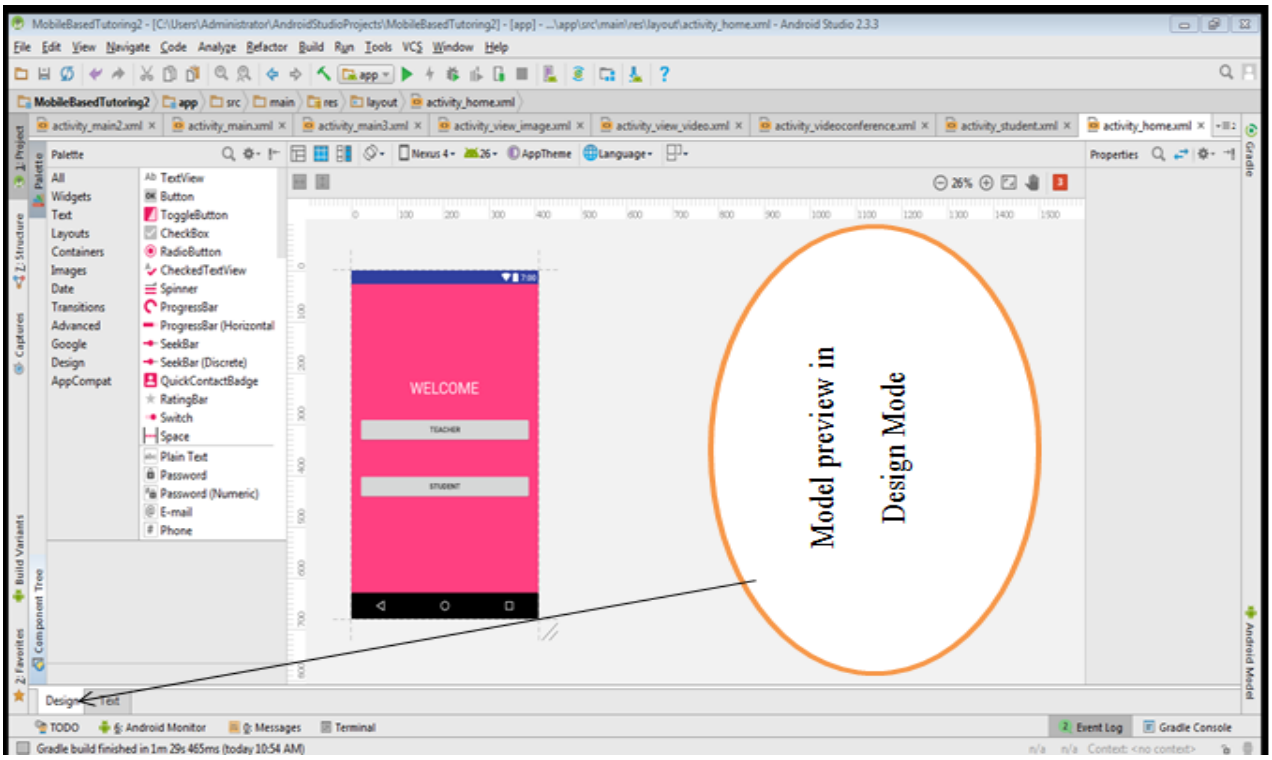


Figure 6.7 (a): Sample for model design view

```xml
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:id="@+id/activity_main"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:paddingBottom="16dp"
    android:paddingLeft="16dp"
    android:paddingRight="16dp"
    android:paddingTop="16dp"
    android:orientation="vertical"
    tools:context="mohammed.mobilebasedtutoring.HomeActivity"
    android:background="@color/colorAccent">

    <TextView
        android:id="@+id/tvWelcome"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_gravity="center_horizontal"
        android:padding="20dp"
        android:text="WELCOME"
        android:textColor="@color/white"
        android:textSize="30sp"
        android:layout_above="@+id/btnteacher"
        android:layout_centerHorizontal="true"
        android:layout_marginBottom="15dp" />
    <Button
        android:id="@+id/btnteacher"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="teacher"
        android:onClick="teacher"
        android:layout_above="@+id/btnstudent"
        android:layout_alignParentLeft="true"
        android:layout_alignParentStart="true"
        android:layout_marginBottom="56dp" />
    <Button
        android:id="@+id/btnstudent"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="student"
        android:onClick="student"
        android:layout_alignParentBottom="true"
        android:layout_alignParentLeft="true"
        android:layout_alignParentStart="true"
        android:layout_marginBottom="155dp" />
</RelativeLayout>
```

Figure 6.7 (b): Sample code for model text view

- View

It is java class file that is used to define the actions and events we can apply on the widget elements of an activity. In the prototype of this design, a number of view files were included. As it is illustrated in the figure 6.8 below, a sample screenshot of the view file of the 'Home 'activity was taken. The activity is mainly responsible for accessing contents from distance learning tutoring web app. The view is the basic building block for user interface components.

Figure 6.8: Sample code for view part of MVC

```
package mohammed.mobilebasedtutoring;
import android.content.Intent;
import android.os.Bundle;
import android.support.v7.app.AppCompatActivity;
import android.view.View;
import android.widget.Button;
import android.widget.TextView;

public class HomeActivity extends AppCompatActivity {

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_home);

        TextView Welcome=(TextView)findViewById(R.id.tvWelcome);
        Button btnteacher=(Button) findViewById(R.id.btnteacher);
        Button  btnstudent=(Button)findViewById(R.id.btnstudent);
        btnteacher.setOnClickListener(new View.OnClickListener()
        {
            @Override
            public void onClick(View view) {
                Intent intent=new
Intent(HomeActivity.this,teacherActivity.class);
                startActivity(intent);
            }
        });
        btnstudent.setOnClickListener(new View.OnClickListener()
        {
            @Override
            public void onClick(View view) {
                Intent intent=new
Intent(HomeActivity.this,studentActivity.class);
                startActivity(intent);
            }
        });
    }}
```

- Controller

This file is also .xml file and it is used to control the sequence of execution of the activities. The main xml file of the prototype that launches the application on emulators screen is shown on below.

Figure 6.9: Sample for controller Tutoring content

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

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

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

                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>
        <activity android:name=".HomeActivity" />
        <activity android:name=".studentActivity" />
        <activity android:name=".teacherActivity" />
        <activity android:name=".videoconferenceActivity" />
        <activity android:name=".questionActivity" />
        <activity android:name=".logoutActivity" />
        <activity android:name=".videolectureActivity" />
        <activity android:name=".studentquestionActivity" />
        <activity android:name=".MainActivity" />
        <activity android:name=".SendSmsActivity" />
        <activity android:name=".ViewImage" />
        <activity android:name=".Main2Activity" />

        <receiver android:name=".ReciveMessage">
            <intent-filter>
                <action android:name="android.provider.Telophony.SMS_RECIEVED" />
            </intent-filter>
        </receiver>

        <activity android:name=".Main3Activity"></activity>
    </application>
```

6.2.3. Web Server Design

This section presents the design of the web server and how it will be implemented. It starts with the structure of the web server; it consists of four PHP files (index, DB_Functions, DB_Connect, uploadFile). A description of each web server component is given below:

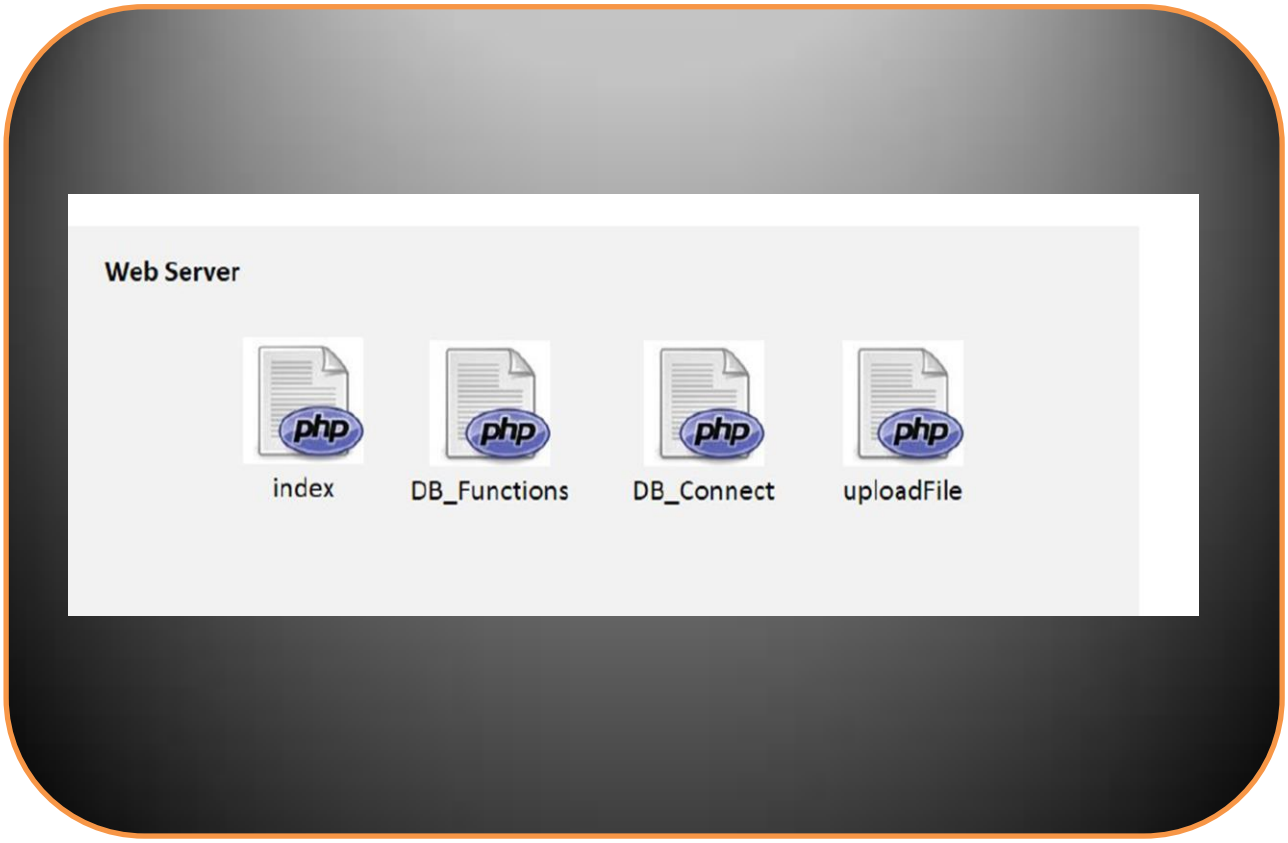


Figure 6.10: Web Server Structure

Index: the index file is responsible for handling all requests. It accepts Hypertext Transfer Protocol (HTTP) GET/POST methods to support the client-server communication. That means HTTP works as a request-response protocol between a client and server, GET Requests data from a specified resource and POST also Submits data to be processed to a specified resource.

DB_Connect: A class which contains methods to connect or disconnect from the database.

```php
<?php
$db_name ="webappdb";
$mysql_user="root";
$mysql_pass="";
$server_name="localhost";

$con=mysqli_connect($server_name,$mysql_user,$mysql_pass,$db_name);

//check the connection is successful or not
if (!$con)
{
        echo "Connection Error...".mysqli_connect_error();
}
else
{
        echo "<h3>Database connection Success...</h3>";
}

?>
```

Figure 6.11: Sample code for checking database connection

DB_Functions: A class which contains methods to insert/read/update operations on the database. It requires the DB_Connect file to establish the connection to the database.

```php
<?php
require "index.php";
$name = $_POST["user"];
$user_name =$_POST["user_name"];
$user_pass =$_POST["user_pass"];
$sql_query="insert into user_info values('$name','$user_name','$user_pass');";
if (mysqli_query($con,$sql_query))
{       echo "<h3> Data Insertion Success...</h3>";
}
else
{       echo "Data Insertion error...".mysqli_error($con);
}
?>
```

Figure 6.12: Sample code for inserting operation on database connection

UploadFile: It is responsible for accepting files from the application and moving them to a specific directory.

```php
<?php
require "index.php";
if($_SERVER['REQUEST_METHOD']=='POST'){
$file_name = $_FILES['myFile']['name'];
$file_size = $_FILES['myFile']['size'];
$file_type = $_FILES['myFile']['type'];
$temp_name = $_FILES['myFile']['tmp_name'];

$location = "uploads/";

move_uploaded_file($temp_name, $location.$file_name);
echo "http://127.0.0.1/webappdb/uploads/".$file_name;
}else{
echo "Error";
}
?>
```

Figure 6.13: Sample code for database connection for uploading file

6.2.4. Database Structure

The table user_info is used to store the user's information. The table video is used to store all the video that have been created by the administrator.

In all tables, there is a primary key, which means that it should have a unique value. The table's users_ info and video have two primary keys, which means that they do not accept a row with the same primary keys. The lines that connect the tables represent a foreign key relation, which means that the foreign key of one table points to a primary key in another table. Foreign keys are used in our database design to prevent invalid data from being inserted and also to accelerate the deletion operations in the database. Thus, when a primary key is deleted, all the rows that has a foreign key which points to it are deleted too, without the need of an extra database command. All the attributes of table's user_info and video are explained in Table 6.1.

user_info		
Attribute	Type	description
Uid	INT	The unique id of the user.
Name	VARCHAR	The name of the user
Username	VARCHAR	The unique Username of the user.
User pass	VARCHAR	The password of the user
Video		
Attribute	Type	Description
Vid	INT	The unique id of the video.
Name	VARCHAR	The name of the video
url	VARCHAR	The address the video data

Table 6.1: Database Tables' Attributes

6.3. Evaluation of the System

6.3.1. Sample Evaluation Scenario distance learners

Scenario 1: Performing video tutorial Using Mobile device

- Tester A , a distance learner of St. Mary's university, performs the following operation
  - Log on to the system

☞ Insert the username and password login system
☞ The system displays welcome message
☞ Click on the student button
☞ The system displays student module menu
☞ Click video button to view video lectures

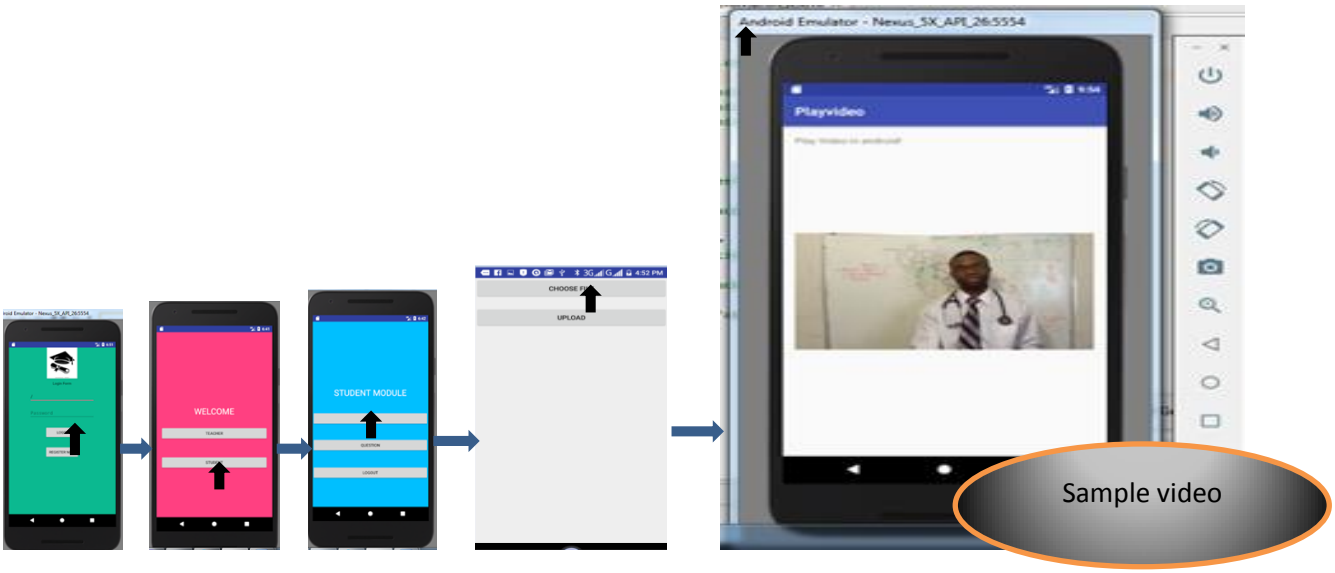


Figure 6.14: Video tutorial Using Mobile device

Scenario 2: Performing question-answering session using SMS text tutorial Using Mobile device

- Tester B , a distance learner of St. Mary's university, performs the following operation
  - Log on to the system
    - insert the username and password login system
    - the system displays welcome message
    - click on the student button
    - the system displays the student module menu
    - click question button
    - send question or comment using text message

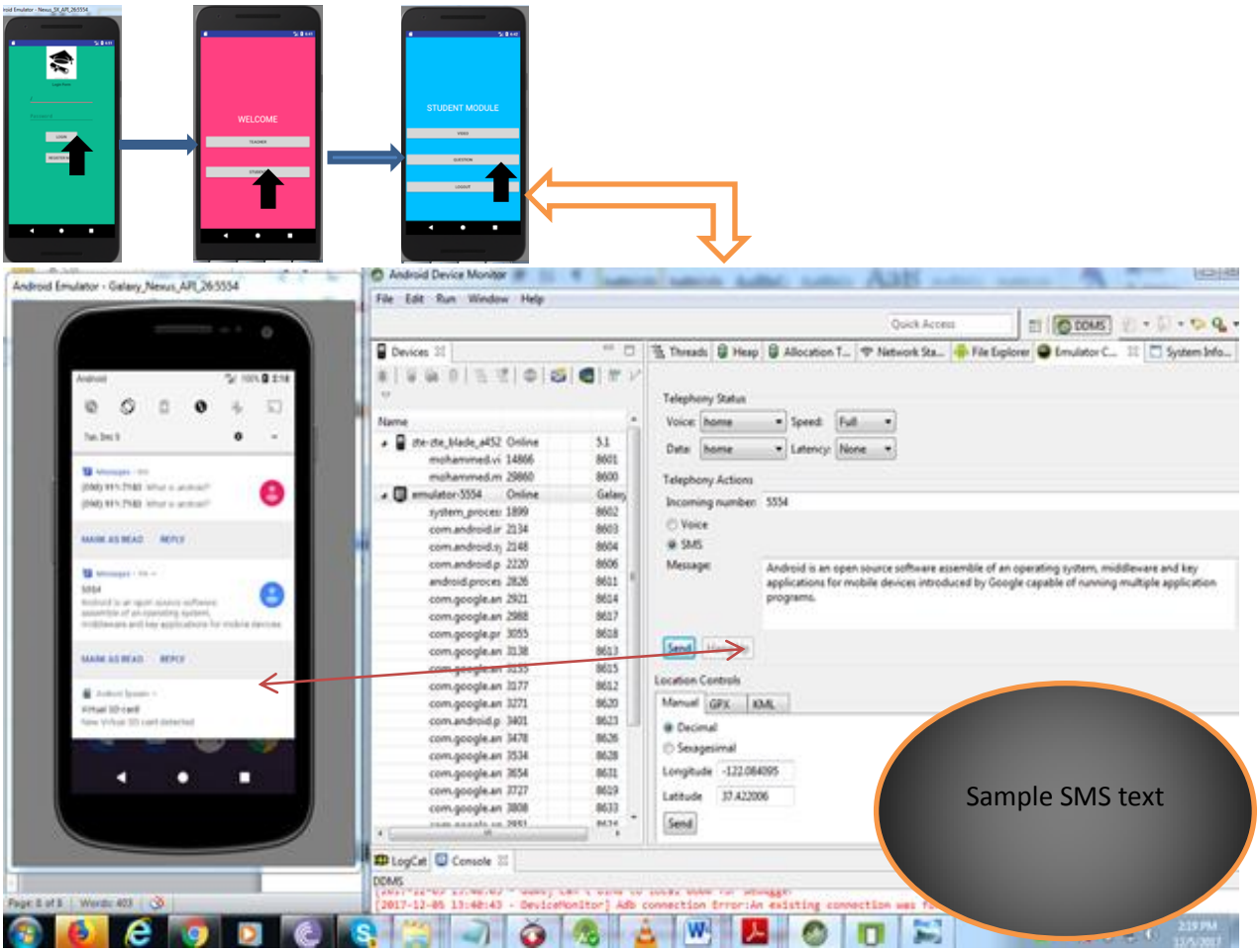


Figure 6.15: SMS text tutorial using Mobile device

6.3.2. Sample Evaluation Scenario tutors

Scenario 3: Performing upload video lecture into database

- A tutors of St. Mary's university, performs the following operation
  - Log on to the system

☞ insert the username and password login system
☞ the system displays welcome message
☞ click on the teacher button
☞ the system displays the teacher module menu
☞ Click video button to upload video lectures

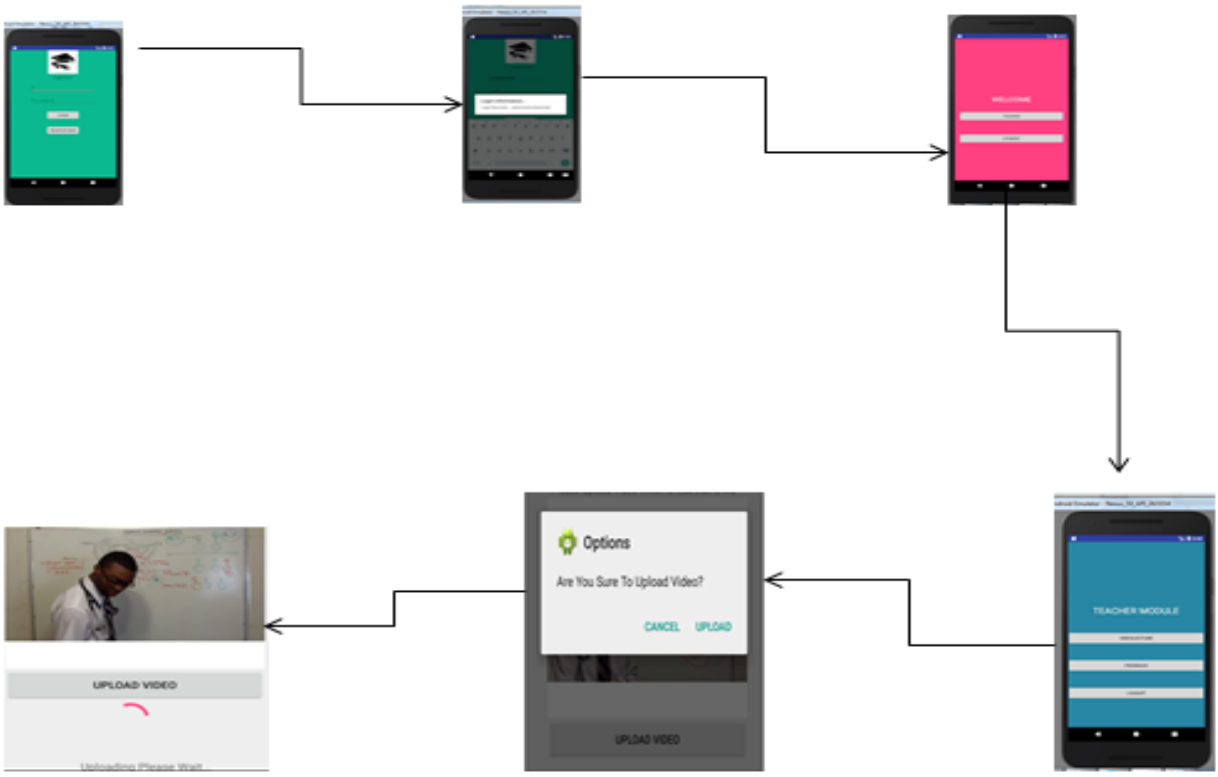


Figure 6.16: Uploading video lecture

Scenario 4: Performing collect student's comment from database and replay or provides feedback SMS messaging.

- A tutors of St. Mary's university, performs the following operation
  - Log on to the system

  - insert the username and password login system
  - the system displays welcome message
  - click on the teacher button
  - the system displays the teacher module menu
  - click question button
  - send answer or comment using text message

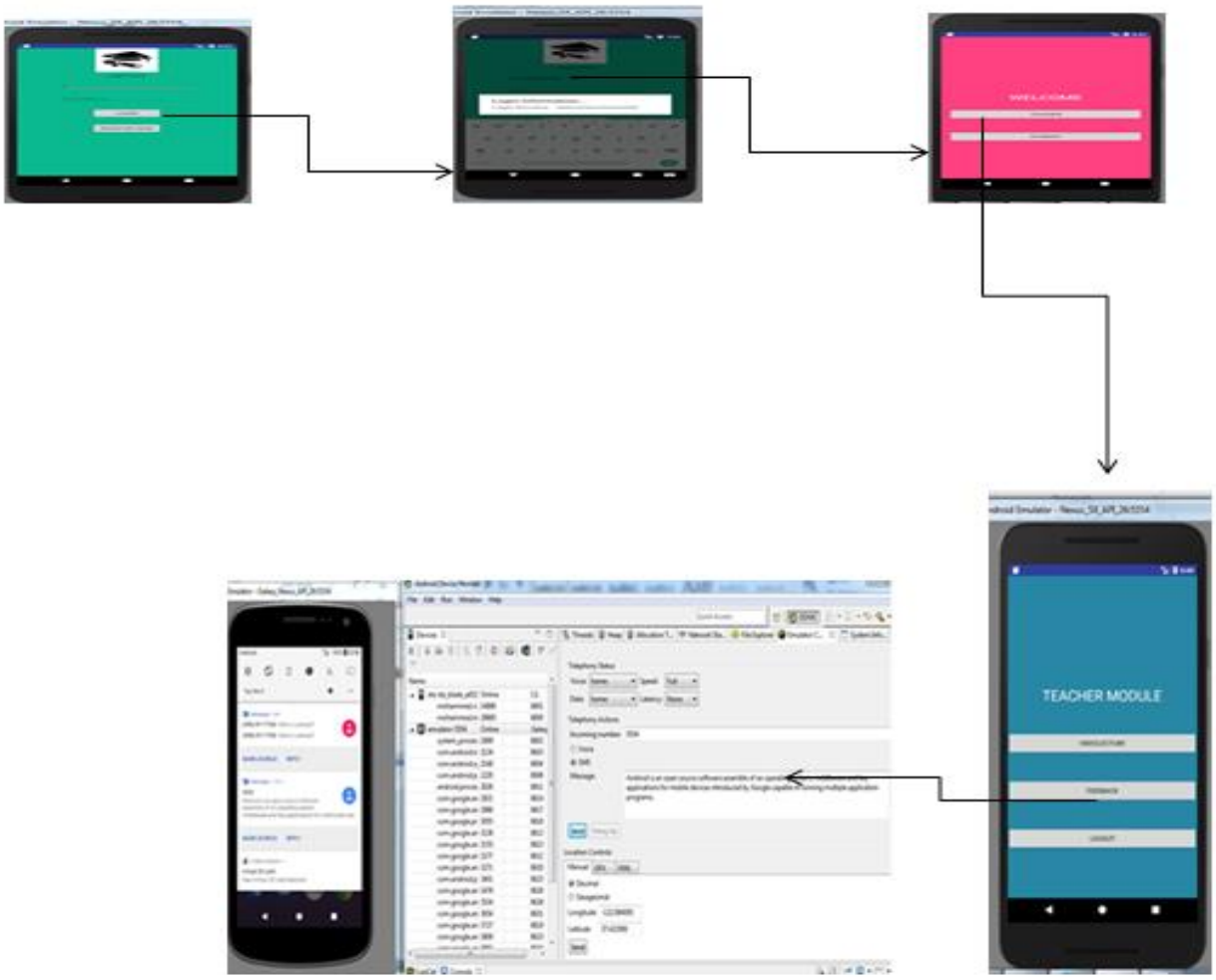


Figure 6.17: Sample Feedback for SMS message

A general description in the use of the application was given to along with the tasks in Table 6.2 on mobile based tutoring system.

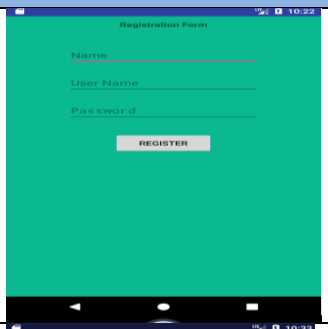
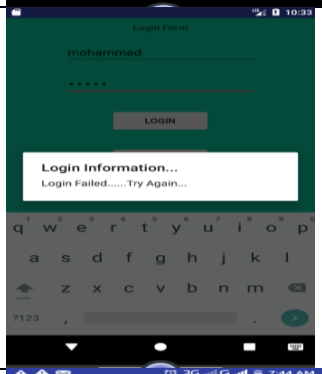
Task	Steps followed	Screenshot
Register	✓ Click on register form ✓ get register form ✓ Fill in the form ✓ Click on the register button	
Login	✓ Click on login form ✓ login form appear ✓ Fill in login form ✓ Click on the login button	
Upload	✓ Selected tutorial material from chosen files ✓ Click on chosen file button ✓ Click upload	
Download uploaded files	✓ Selected tutorial from chosen list ✓ Click on chosen files ✓ Click on lecture materials ✓ Get display	

Table 6.2: Steps followed to do the implementation task

DISCUSSION

The use of technology for tutorial service distance educational purposes has always been focused by distance learning approach. Technology-supported teaching and learning has helped in covering the physical distances between teachers and students, to enable the flexible delivery of tutorial distance education at a distance, anywhere and anytime. Nowadays, the use of mobile devices to enhance distance learning systems is being utilized. The developing technologies, such as Mobile technology can be an effective tool for tutoring or learning enhancing the teaching-learning process. Mobile based tutoring is more interactive, involves more contact, communication and collaboration with people. The increasing and ubiquitous use of mobile phones provides a viable avenue for initiating contact and implementing interventions proactively. For instance, Short Message Service (SMS) is highly cost-effective and very reliable method of communication. It is less expensive to send a SMS. Additional; no costly machines (personal computer) are required.

Besides video and audio, distance learner can use mobile phones to listen to their mobile technologies are now challenging the traditional concept of Distance Education. Majority of respondents in this study confirmed the importance of mobile devices for its flexible availability, improving the communication between students and tutor, gaining feedback of any courses. The order of their preferences regarding use of mobile devices in distance learning on the bases of mean for, information regarding assignments submission, schedule of tutorial meetings and feedback. In present study majority of the respondents preferred the effective use of mobile technology in distance education tutorial purpose of distance learning.

Tutorial sessions for effective use of mobile devices in distance learning should be organized at both levels of students and tutors of distance education.

The results confirm that to investigate the usability of the mobile based tutoring is easy to use, saves time and less cost in delivering tutorial services, improves or motivates distance learners to attend or follow up tutorials.

Finally this evaluation fulfills to solve the findings of the empirical study key challenges that SMU distance learners faced like missing tutorial sessions, limited expertise and experience of tutors, Lack of practice of relating theory to practice and poor quality of tutorial packages.

CHAPTER SEVEN

CONCLUSIONS AND FUTURE WORKS

This chapter provides a summary of the research presented in this thesis and discussed the future work in the areas of M-Tutoring in distance learning tutorial services.

7.1. Conclusions

The objective of this study is to design and develop mobile-based tutoring system that can address the existing challenges and provide effective tutorial services to distance learners by taking St. Mary's University as a case. A survey was conducted to identify the existing practices and challenges associated with tutorial services. This empirical study provided input for the design of mobile based tutoring system. Some of the major inputs include tutorial supported by video and/or audio recorded information which was indicated as the most preferred mode followed by comments from tutors on assignments and providing academic counseling. It was also found that largest proportion of respondents have smartphone which implies that learners have mobile phones with advanced features and can use them for accessing and exchanging any multimedia content.

The results of these studies provide contributions to the design of a prototype mobile based tutoring system for distance learning. This system introduced a new approach for providing feedback to students. This study implemented a mobile tutoring system that facilitates interaction between distance learners and tutors using video as well as SMS text exchanges. The system is validated by users and they proved that the system has contribution in enhancing the provision of tutorial services and feedback to students. It can also address the challenges of getting well

qualified and experienced tutor and missing tutorial sessions by students due to various problems.

7.2. Future works

Since the present study was restricted only at SMU as a case in a distance education research should be conducted for investigation in the practices and challenges of distance education at country level to enhance the features of the system and make it applicable. In addition, further research should be conducted with the aim of improving the functionality of introducing additional features for mobile based tutoring of distance education.

References

[1] "Khalifa University of Science, Technology and Research," pp. 155–160, 2010.

[2] R. A. Chabaya, P. Chadamoyo, and C. Chiome, "Student Perceptions of Service Delivery at the Zimbabwe Open University : Masvingo Regional Campus," vol. 1, no. 1, 2011.

[3] M. D. Lerra, "The Dynamics and Challenges of Distance Education at Private Higher Institutions in," vol. 1, no. 3, pp. 137–150, 2014.

[4] A. G. Larson and M. Owusu-acheaw, "INFORMATION NEEDS OF DISTANCE LEARNERS : A CASE OF WINNEBA STUDY CENTER , UNIVERSITY OF EDUCATION , WINNEBA , GHANA," no. July, pp. 62–75, 2016.

[5] A. G. Larson and M. Owusu-Acheaw, "Information needs of distance learners: A case of Winneba study center, university of education, Winneba, Ghana," *Turkish Online J. Distance Educ.*, vol. 17, no. 3, pp. 62–75, 2016.

[6] Thierry Volery and Lord Deborah, "Critical success factors in online education," *Int. J. Educ. Manag.*, vol. 14, no. 5, p. 216, 2000.

[7] N. Akhter, "ANALYSIS OF FACE TO FACE TUTORIALS OF DISTANCE LEARNERS FOR PROSPECTIVE," vol. 45, no. 1, pp. 233–254, 2016.

[8] I. Women, O. Journal, and D. E. January, "STUDY HABITS AND DEMOGRAPHIC CHARACTERSTICS LEARNERS ' ATTRIBUTES AND PERCEPTIONS OF EFFECTIVENESS OF GENDER-SENSITIVE AND RESPONSIVE TEXTS AND TUTORIALS OF OPEN SCHOOL OF BANGLADESH," pp. 1–7, 2015.

[9] J. Valk, A. T. Rashid, and L. Elder, "Using Mobile Phones to Improve Educational

Outcomes : An Analysis of Evidence from Asia," vol. 11, no. 1, pp. 13–14, 2010.

[10] F. Martin and J. Ertzberger, "Here and now mobile learning: An experimental study on the use of mobile technology," *Comput. Educ.*, vol. 68, pp. 76–85, 2013.

[11] G. Adedoja and F. Egbokhare, "Learners ' Acceptance of the Use of Mobile Phones to Deliver Tutorials in a Distance Learning Context : A Case Study at the University of Ibadan," vol. 5, no. 3, 2013.

[12] Y. M. Islam, M. Ashraf, Z. Rahman, and M. Rahman, "Mobile telephone technology as a distance learning tool," *Proc. Seventh Int. Conf. Enterp. Inf. Syst.*, pp. 25–28, 2005.

[13] M. I. Yousuf, "EFFECTIVENESS OF MOBILE LEARNING," no. October, pp. 114–124, 2007.

[14] Y. Fung and R. Carr, "Open Learning : The Journal of Open , Distance and e-Learning Face-to-Face Tutorials in a Distance Learning System : Meeting student needs," no. October 2014, pp. 37–41, 2010.

[15] M. Makoe, "The Pedagogy of Mobile Learning In Supporting Distance Learners."

[16] G. S. Ntloedibe-kuswani, "Exploring the Use of Electronic Mobile Technologies among Distance Learners in Rural Communities for Safe and Disruptive Learning," 2013.

[17] M. A. Oladejo, "Trends and Future Directions in Open and Distance Learning Practice in Africa," vol. 5, no. 18, pp. 132–139, 2014.

[18] M. Adeyemi, "The development of distance education in Nigeria: Challenges and prospects," *Turkish Online J. Distance Educ.*, vol. 12, no. 1, pp. 13–20, 2011.

[19] M. G. Kudryavtseva, “Possibilities of Distance Learning as a Means of Foreign Language Learning Motivation among Students of Economics,” *Procedia - Soc. Behav. Sci.*, vol. 152, no. 987, pp. 1214–1218, 2014.

[20] A. M. A.-K. Al-Arimi, “Distance Learning,” *Procedia - Soc. Behav. Sci.*, vol. 152, pp. 82–88, 2014.

[21] T. A. Ogina, “Experiences of tutorial sessions as learning support for distance education students,” vol. 35, no. 1, pp. 104–118, 2013.

[22] D. Valentine, B. Gellman-Danley, and M. Fetzner, “Distance Learning : Promises , Problems , and Possibilities,” *J. Distance Learn. Adm.*, vol. 1, no. 1, pp. 1–7, 1999.

[23] A. Kafyulilo, “Access , use and perceptions of teachers and students towards mobile phones as a tool for teaching and learning in Tanzania,” pp. 115–127, 2014.

[24] V. Chikoko and C. Chiome, “Quality tutorials in open and distance learning : Exploring experiences of Zimbabwe Open University students,” vol. 1, no. October, pp. 152–160, 2013.

[25] Y. Fung and R. Carr, “Face-to-face tutorials in a distance learning system: meeting student needs.,” *Open Learn.*, vol. 15, no. 1, pp. 35–47, 2000.

[26] K. M. R. Rahman and A. Sadat, “Analysis of Tutorial Services for Distance Learners : A Case of Bangladesh Open University,” vol. 5, pp. 1–5, 2007.

[27] P. B. Williams, “Should Tutoring Services be Added to our High-Enrolling Distance Education Courses ?,” 2003.

[28] E. A. Booth, M. M. Capraro, R. M. Capraro, J. Dyer, and M. P. Marchbanks III, “Innovative Developmental Education Programs: A Texas Model,” *J. Dev. Educ.*, vol. 38, no. 1, pp. 2–18, 2014.

[29] G. Hagenauer and S. E. Volet, “Teacher–student relationship at university: an important yet under-researched field,” *Oxford Rev. Educ.*, vol. 40, no. 3, pp. 370–388, 2014.

[30] M. Smits, D. Sluijsmans, and W. Jochems, “The effects of a competency-oriented learning environment and tutor feedback on students’ reflection skills.,” *Assess. Eval. High. Educ.*, vol. 34, no. 5, pp. 491–498, 2009.

[31] J. Tait, “The tutor/facilitator role in student retention,” *Open Learn.*, vol. 19, no. 1, pp. 97–109, 2004.

[32] G.-J. Hwang, “Definition, framework and research issues of smart learning environments - a context-aware ubiquitous learning perspective,” *Smart Learn. Environ.*, vol. 1, no. 1, p. 4, 2014.

[33] N. Akhter, “Satisfaction of Distance Learners with the Quality of Teacher Education in Pakistan : A case study of AIOU , Islamabad Key w ords : Quality , Distance Education , Assessment , AIOU , Examinations , Assignments,” vol. 17, no. 1, p. 2014, 2014.

[34] H. D. March, T. Author, A. R. Reserved, and P. D. Doi, “views from Specialists of Information and Instructional Technology in Sudanese Universities,” vol. 4, no. 1, pp. 269–276, 2015.

[35] A. Islam, “Usages of Mobile Technology to Enhance Teaching and Learning Methods for Different Level of Programs of Bangladesh Open University,” pp. 1–6.

[36] T. A. Ogina and S. T. Mampane, “Experiences of tutorial sessions as learning support for distance education students,” *Progressio*, vol. 35, no. 1, pp. 104–118, 2013.

[37] H. Mothudi, “The Impact of Face-To-Face Tutorials on College of Education Students : A Case of Unisa ’ s Ekurhuleni Regional Service Centre,” no. June 2016, 2014.

[38] W. S. Njaruba, “UTILIZATION OF MOBILE PHONE IN ENHANCING LEARNER SUPPORT SERVICES FOR DISTANCE EDUCATION PROGRAMMES :,” 2014.

[39] F. L. At, “First Look At,” no. January, pp. 48–50, 2008.

[40] S. Holla and M. M. Katti, “ANDROID BASED MOBILE APPLICATION,” vol. 3, pp. 486–490, 2012.

[41] R. K. Sharma, “Android Interface based GSM Home Security System,” pp. 196–201, 2014.

[42] M. Nauman, S. Khan, and X. Zhang, “Apex : Extending Android Permission Model and Enforcement with User-defined Runtime Constraints.”

[43] K. Dhokale, N. Bange, S. Pradip, and P. S. Malave, “Implementation of SQL Server Based on SQLite Engine on Android Platform,” vol. 2, no. 4, pp. 602–610, 2014.

[44] L. Vogel and L. Vogel, “Android Development Tutorial,” pp. 1–53, 2013.

[45] P. D. S and M. S. Srinath, “GSM based Automatic Irrigation Control System for Efficient Use of Resources and Crop Planning by Using an Android Mobile,” *IOSR J. Mech. Civ. Eng.*, vol. 11, no. 4, pp. 49–55, 2014.

[46] Google, “Update the IDE and Tools.” .

[47] P. X. W. Zou, R. Y. Sunindijo, and A. R. J. Dainty, “A mixed methods research design for bridging the gap between research and practice in construction safety,” *Saf. Sci.*, vol. 70, pp. 316–326, 2014.

[48] D. S. Size, “Using Published Tables Using Formulas To Calculate A Sample Size Using A Census For Small Populations.”

[49] F. Shehu, K. Ict, and C. Studies, “Icts and Educational Development : the Utilization of Mobile Phones in Distance Education in Nigeria,” no. January, pp. 63–77, 2017.

[50] M. Lear and S. Section, “Recommended citation,” no. 1, pp. 142–151, 2014.

[51] J. Traxler and M. Koole, “THE THEORY PAPER : WHAT IS THE FUTURE OF MOBILE LEARNING ?,” pp. 289–293, 2014.

Appendix A

ST.MARY'S UNIVERSITY

SCHOOL OF GRADUATE STUDIES

FACULTY OF INFORMATICS

Questionnaire

My name is Mohammed Ali. I am a student of St. Mary's University, School of Graduate Studies, Computer Science Department. This questionnaire is prepared to gather information for the study to be conducted on Mobile Based Tutoring in Distance Learning: The Case of St. Mary's University. The purpose of this self–administered questioner is to collect data from learners in order to identify the existing practice of tutoring and challenges with the aim of designing and implementing mobile based tutoring system. I thank you in advance for taking your time to answer the questions.

PART I: Socio-Demographic Characteristics of the Participants

1. Sex ☐ Male ☐ Female
2. Age ☐Less than 25 ☐26-35 ☐36-45 ☐ 46 & above
3. Department _____
4. Center_____
5. Admission Year _____
6. Current Year ☐ 1st Year ☐ 2nd Year ☐ 3rd Year ☐ 4th Year

Part II: Tutorial Service

1. Of your distance-learning coursework, what has been more difficult to complete? (Please check all that apply.)

   - ☐ understanding the module content
   - ☐ solving problems or answering self –check exercise in the module
   - ☐ Final exams
   - Assignments

2. Which of the following tutoring services did you use? (Please check all that apply)

   - ☐ Lecture by focusing on the full content of the course
   - ☐ A mixture of lecture and discussion
   - ☐ Tutoring for specific assignments in the course I'm taking
   - ☐ Academic counseling (e.g. study techniques, time management, examination skills)
   - ☐ Other (please specify) _____

3. Why do you attend tutorials? (Please check all that apply.)

   - ☐ Listen to the tutor explaining the course material
   - ☐ Receive guidance from tutors on study skills
   - ☐ Receive guidance from tutors on examinations
   - ☐ Exchange viewpoints with tutor and other students
   - ☐ Discuss course content with other students
   - ☐ Share experience with other students
   - ☐ Get some psychological support from tutors and students
   - ☐ Make more friends

4. What gain do you expect from tutorial session? (Rate)

	Strongly Disagree (1)	**Disagree (2)**	**No Idea (3)**	**Agree (4)**	**Strongly Agree (5)**
More knowledge and better understanding of the course	☐	☐	☐	☐	☐
Greater insight into what had been studied	☐	☐	☐	☐	☐
Additional information outside the course content	☐	☐	☐	☐	☐
Ability to relate theory to practice	☐	☐	☐	☐	☐
Improved ability to work on assignments	☐	☐	☐	☐	☐
Improved ability to cope with the examination	☐	☐	☐	☐	☐
Improvement in study skills	☐	☐	☐	☐	☐
Building up relationships with other students and forming study groups	☐	☐	☐	☐	☐

5. What is your **preferred** mode for tutorials service?

	N/A	**Less preferred**	**Preferred**	**Most preferred**
Tutors lead whole-group discussion using a 'question and answer' approach				
Tutors lecture to the whole group				
Tutors organize small-group discussion				
Tutors give individual guidance to students				
Tutors provide academic counseling (e.g. study techniques, time management, examination skills)				
Tutorial services to be supported by video and/or audio recorded information				
Comments from Tutors on Assignments				

6. What is the extent to which each tutoring mode had been used during the year? (Using a 5-point Likert scale ranging from 1 ‘most of the time’ to 5 ‘never’).

Approaches Used in Tutorials	**Strongly Disagree (1)**	**Disagree (2)**	**No Idea (3)**	**Agree (4)**	**Strongly Agree (5)**
Tutors lead whole-group discussion using a ‘question and answer’ approach	☐	☐	☐	☐	☐
Tutors lecture to the whole group	☐	☐	☐	☐	☐
Tutors organize small-group discussion	☐	☐	☐	☐	☐
Tutors give individual guidance to students	☐	☐	☐	☐	☐
Tutors provide academic counseling (e.g. study techniques, time management, examination skills)	☐	☐	☐	☐	☐
Tutorial services to be supported by video and/or audio recorded information	☐	☐	☐	☐	☐
Comments from Tutors on Tutor Marked Assignments	☐	☐	☐	☐	☐

7. How frequent did you attend tutorial service?

☐ Never attended ☐ Very seldom ☐ Seldom

☐ Neither often or seldom ☐ Often ☐ Very often

8. If you’ve ever dropped or had difficulty succeeding in a distance-learning course, what were the reasons? (Please check all that apply.)

☐ No enough tutors ☐ Tutors are not serious

☐ Tutors are not teaching well ☐ Tutors are absent

- ☐ I don't understand anything the tutor delivers
- ☐ I didn't have enough time to study
- ☐ Course assignments too difficult
- ☐ Directions for assignments were unclear
- ☐ I couldn't get help when I needed it
- ☐ May not have possessed the skills to succeed
- ☐ Too much course work or too difficult
- ☐ Low quality course design or delivery

9. How do you rate the quality of tutorial services?

Approaches Used in Tutorials	**Strongly Disagree (1)**	**Disagree (2)**	**No Idea (3)**	**Agree (4)**	**Strongly Agree (5)**
St. Mary's University (SMU) tutors are readily available when I need them	☐	☐	☐	☐	☐
Communication style with tutors is suitable for me	☐	☐	☐	☐	☐
My interaction with tutors is informative	☐	☐	☐	☐	☐
I always feel free to seek help from tutors	☐	☐	☐	☐	☐

10. How did you rate the effectiveness of the tutorials you experienced?

☐ Excellent ☐ Good ☐ Satisfactory ☐ Fair ☐ Poor

11. Check the kinds of mobile phone you own:

☐ Standard Cellular phone (primarily voice features)

☐ Smartphone (extended features beyond phone)

☐ Other (please specify) _____

12. Check which functions are available on your mobile phone?

☐ Voice calling ☐ Texting ☐ Photography/camera ☐ Video camera

☐ Playing Music/audio ☐ Internet browsing

☐ Additional functions (Please specify) _____

13. Check the frequency in which you use your mobile phone? (Check the ONE closest indication of your use frequency)

Uses	Several times a day	Once a day	Less than daily, several times a week	Once a Week	Few Times a Month	Once a Month or less	Never
Contact others (voice)	☐	☐	☐	☐	☐	☐	☐
Contact others (texting)	☐	☐	☐	☐	☐	☐	☐
Take/store/view/pictures	☐	☐	☐	☐	☐	☐	☐
Take/store/view video	☐	☐	☐	☐	☐	☐	☐
Record/store/play audio	☐	☐	☐	☐	☐	☐	☐
Browse internet	☐	☐	☐	☐	☐	☐	☐

14. If St. Mary's University (SMU) introduces tutoring service using mobile phone, would you use it?

☐ Yes ☐ No ☐ Maybe

15. If your answer to question number 14 is No, what is your reason?

---

16. How can St. Mary's University (SMU) improve the usefulness of the current tutorial services? (Please check all that apply.)

☐ More reading materials for learners

☐ Study groups

☐ Introduce video tutorials

☐ Practical sessions

☐ Motivating learners to do assignments on time

☐ Toll free number so that learners can always ask if they have questions

- ☐ Academic counseling and student guidance
- ☐ Provide more teaching aids
- ☐ SMS services to learners
- ☐ Others _____

Interview Questions (Students)

1. What method do you think is appropriate for tutorial session?
2. How often do you expect to be in contact with the tutor?
3. What do you dislike when tutors teach at tutorials?
4. What are the major challenges in tutorial services?
5. Do you use your mobile phone for supporting your distance learning? If so, how does using your mobile phone help your learning?

Interview Question (for Tutors)

1. What approach do you follow when you teach at tutorials?
2. Have you ever checked about the appropriateness of your approach by asking feedback from students? If yes, what input have you gained from students?
3. Have you ever changed your teaching approach based on their feedback?
4. What major challenges did you face in teaching at tutorials?
5. What improvements do you suggest?
6. How does mobile phone support tutorial services?
7. How valuable is mobile phone to support your work as tutor?

THANK YOU!

Appendix B

መጠይቅ

በቅድስት ማርያም ዩኒቨርስቲ

ሶፕንና ርቀት ትምህርት ኮሌጅ ተማሪዎች የሚመለስ

የሶፕንና ርቀት ትምህርት

ውድ ተማሪ

ፈሴን እንዳስተዋውቅ ደፈቀድልኝ፣ መሀመድ ዓሊ እባላለሁ። በቅድስት ማርያም ዩኒቨርስቲ ድኅረ ምረቃ ፕሮግራም የኮምፒውተር ሳይንስ ተማሪ ነኝ። በርቀት ትምህርት ስርዓት ውስጥ በሞባይል የተደገፈ የቱቶሪያል ስርዓት እንዲዘረጋ ለማስቻል ፅቅድ አለኝ። ለዚህ እቅዴ መሳካት ለዚህ መጠይቅ የሚሰጠኝ መልስ አስፈላጊ ነው ብዬ እገምታለሁ። በመሆኑም መጠይቁን በመሙላት እንድትተባበረኝ በትህትና እጠይቃለሁ።

ክፍል 1. ግለ ማንነት እባክዎን ሳጥኑ ውስጥ √ ምልክት ያድርጉ

1. ፃታ ☐ ወንድ ☐ ሴት
2. እድሜ ☐ ከ25ዓመት በታች ☐ 26-36 ዓመት ☐ 37-46 ☐ 47 በላይ
3. የትምህርት ዘርፍ (ዲፓርትመንት) _____
4. የትምህርት ማዕከል (ሴንተር) _____
5. የቀበላ ዘመን (Year of Admission) _____
6. የትምህርት ደረጃ ☐ 1ኛ ዓመት ☐ 2ኛ ዓመት ☐ 3ኛ ዓመት ☐ 4ኛ ዓመት

ክፍል 2. የገፅ- ሰገፅ ትገሰግሱት

1. ከርቀት ትምህርቱ ክፍል ውስጥ የትኛውን ከባድ ሆኖ አገኙት

ሀ) የመማሪያ መፅሐፍን ይዘት

ለ) ግሰ- ፍተሻ ጥያቄ ክፍሱን

ሐ) የኮርስ ማጠቃለያ ፈተና

መ) የቤት ስራ ጥያቄዎች

2. ከሚከተሉት ገፅ-ሰገፅ ትምህርት ውስጥ የትኞቹን ተጠቅመው ያውቃሉ? የሚመለከታቸውን ይክበቡ

ሀ) ጠጥ ገለፃ

ለ) ገለፃና ውይይት

ሐ) አንዳንድ የቤት ስራዎች ላይ ያተኮረ

መ) የአጠናን ዘዴዎች የጊዜ አጠቃቀም፣ የፈተና ጥያቄ አመላለስ ክፍሎች

ሠ) ሌላ _____

3. ገፅ-ሰገፅ ፕሮግራምን ለምን ይከታተላሉ?

ሀ) መምህረ የሚለውን ለማዳመጥ

ለ) ስለአጠናን ክህሎች መምህረ የሚሉትን ለማወቅ

ሐ) ፈተናን በተመለከተ መምህረ የሚሉትን ለመለማት

መ) ከመምህረና ከተማሪዎች ጋር ስለ ትምህርቱ ሀሳብ ለመለዋወጥ

ሠ) ስለ ትምህርቱ ይዘት ከተማሪዎች ጋር ሀሳብ ለመለዋወጥ

ረ) ከተማሪዎች ጋር ልምድ ለመጋራት

ሰ) ከመምህረና ከተማሪዎች የስነ ስዕምሮ ድጋፍ ለማግኘት

ሸ) ጓደኖች ለማፍራት

4. ከገፅ-ለገፅ ንርግፈሙ ምን የሚያተርፍ ደመስልዎታል

Gains	በጣም አልስማማም (1)	አልስማማም (2)	አልወሰንኩም (3)	እስማማለሁ (4)	በጣም እስማማለሁ (5)
ሀ) ጠቀም ያለ ሰውቀት	☐	☐	☐	☐	☐
ለ) ለስ ኮርስ ጠቀም ያለ ግንዛቤ	☐	☐	☐	☐	☐
ሐ) ከኮርስ ውጪ ተጨማፊ ትምህርት	☐	☐	☐	☐	☐
መ) ቲዮፊ (ፅንሰ ሐሳብ) እና ተግባርን ማዛመድ	☐	☐	☐	☐	☐
ሠ) የቤት ሥፌዎችን በተሻለ ሁኔታ መከወን	☐	☐	☐	☐	☐
ፈ) የፌተና ጥያቄዎችን በተሻለ ሁኔታ መመለስ	☐	☐	☐	☐	☐
ሰ) የስጠናን ዘዴዎችን ማሻሻል	☐	☐	☐	☐	☐
ሸ) ከተማፊዎች ጋር ግንኙነት ማዳበር	☐	☐	☐	☐	☐
ቀ) የጥናት ብድን ማቋቋም					

5. የገፅ- ለገፅ ትምህርት በየትኛው መልክ ቢሰጥ ደጠዳሉ?

	ቅያስኪድም	ቅደመፈጥም	ደመፈጣል	በጣም ደመፈጣል
ሀ) በመምህሪ የተዘጋጀ የጥያቄና መልስ ስካሄድ				
ለ) በመምህሪ ገስፃ ሳደ ብቻ የተመሰረተ				
ሐ) በመምህሪ በተቋቋሙ ጥቂት ጥቂት ተማፊዎችን ባካተቱ ቡድኖች ውደይት				
መ) በመምህሪ ለተማፊዎች በነፍስ- ወከፍ በሚሰጥ እገዛ				
ሠ) ለስ ጥናት ዘዴዎች፣ ገዜ ለጠቃቀምና የፌተና ጥያቄዎችን ለመሳለስ ለስመልክት በመምህሪ በሚሰጡ ምክሮች				

ሬ) በቪዲዮና ኦዲዮ የተደረገ ገፅ-ለገፅ ገለፃ				
ሰ) የሠራኋቸው የቤት ስራዎች ላይ በመምህሩ በሚሰጡ ገንቢ ሃሳቦች				

6. የገፅ - ለገፅ መምህርዎ ቀጥሎ የተጠቀሱትን የትምህርት አሰጣጥ ዘዴዎች በምን ያህል ጥልቀት ተጠቀመውባቸው እንደሆነ በሰንጠረዡ ላይ ከ1 እስከ 5 መላኪያ ይግለጹ

Approaches Used in Tutorials	በጣም አልስማማም (1)	አልስማማም (2)	አልወሰንኩም (3)	እስማማለሁ (4)	በጣም እስማማለሁ (5)
ሀ) መምህሩ ጥያቄና መልስ ብቻ በመጠቀም ውይይት ያካሂዳሉ	☐	☐	☐	☐	☐
ለ) መምህሩ ተማሪዎችን አንድ ላይ በማሰባሰብ ገለፃ ብቻ ያደርጋሉ።	☐	☐	☐	☐	☐
ሐ) መምህሩ ተማሪዎችን በቡድን አድርገው እንዲወያዩ ያደርጋሉ።	☐	☐	☐	☐	☐
መ) መምህሩ ተማሪዎችን በነፍስ- ወከፍ ያስተምራሉ	☐	☐	☐	☐	☐
ሠ) መምህሩ ያጠናን ዘዴዎችን፣የጊዜ አጠቃቀምንና የፈተና ጥያቄዎች አመላለስን አስመልክተው ትምህርታዊ ምክር ይሰጣሉ	☐	☐	☐	☐	☐
ረ) መምህሩ የገፅ - ለገፅ ትምህርቱን በቪዲዮና ኦዲዮ ማሽን አስደግፈው ይሰጣሉ	☐	☐	☐	☐	☐
ሰ) መምህሩ ያሳቸውን አስተያየት በተማሪው የቤት ስራ መልስ ወረቀት ላይ ተጥተው ተማሪው እንዲያውቀው ያደርጋሉ።	☐	☐	☐	☐	☐

7. የገፅ - ለገፅ አገልግሎት በስሚስተር ሰንት ጊዜ ይሳተፋሉ?

ሀ) ☐ ጭራሽ አልሳተፍም ለ) ☐ በብዛት

ሐ) ☐ አልፎ አልፍ መ) ☐ በጣም በብዛት

8. ስለ ኦንላና ርቀት ትምህርት ቅር የሚያሰኝዎትና ምንድን ነው?

ሀ) ☐ የበቂ ገፅ- ለገፅ ምህራን ስለመኖር ሠ) ☐ የትንግርቱ ብዛት

ለ) ☐ የመምራኑ ዕውቅት ብቃት ማነስ ረ) ☐ የጥናት ጊዜ ማጣት

ሐ) ☐ የሚሰጡት የቤት ስራዎች ክብደት ሰ) ☐ የጥያቄዎች መመሪያ ግልፅ ስለመሆን

መ) ☐ ርዳታ በምፈልግበት ወቅት ማግኘት ስለመቻሌ ሸ) ☐ የሞጁሎች ጥራት ማነስ

9. ከገፅ -ለገፅ መምህራን ጋር ያለዎ ግንኙነት ምን ያህል የጠበቀ ነው?

Approaches Used in Tutorials	በጣም አልስማማም (1)	አልስማማም (2)	አልወሰንኩም (3)	እስማማለሁ (4)	በጣም እስማማለሁ (5)
ሀ) መምህሬኑ በተፈለገው ጊዜ ደገኛሉ	☐	☐	☐	☐	☐
ለ) የመምህራኑ አቀራረብ ጥሩ ነው	☐	☐	☐	☐	☐
ሐ) የመምህሬን አቅሬረብ ዕውቀት አዘል ነው	☐	☐	☐	☐	☐
መ) መምህሬኑ ተማሬን ለመርዳት	☐	☐	☐	☐	☐

10. እስካሁን የወሰዱዋቸውን ገፅ - ለገፅ ትምህርቶች እንዴት ደገጥሚቸዋል?

ሀ) ☐ እጅግ በጣም ጥሩ ሐ) ☐ አጥጋቢ

ለ) ☐ ጥሩ መ) ☐ መለስተኛ ሠ) ዳካማ☐

11. ያለዎት ሞባይል ምን ከሚከተሉት ውስጥ የትኛው ነው?

ሀ) ☐ ስታንዳርድ ሌሱላር

ለ) ☐ ስመርት ፎን

ሐ) ☐ ሌላ (እባክዎ ይግለፁት)_____

12. ሞባይልዎ ከሚከተለት ውስጥ የትኛው አገልግሎት አለው?

ሀ) ☐ ቮይስ ኮሲንግ ሠ) ☐ ፎቶ ግራፍ ካሜራ

ለ) ☐ ፕሌይ ሚዩዚክ ረ) ☐ ቪዲዮ

ሐ) ☐ ቴክስቲንግ ሰ) ☐ ተጨማሪ አገልግሎት (እባክዎ አገልግሎቱን ይግለፁ

መ) ☐ ኢንተርኔት ብራውዚንግ _____

13. ሞባይልዎን ለምን አገልግሎት ምን ያህል ጊዜ አዘወትረው እንደሚጠቀሙበት በሳጥኑ ውስጥ ያመልክቱ

Uses	በቀን ብዙ ጊዜ	በቀን አንድ ጊዜ	በሳምንት አንድ ጊዜ	በሳምንት ብዙ ጊዜ	በወር አልፎ አልፎ	በወር አንድ ጊዜ	ፈጽሞ አልጠቀምም
ሀ) ለመነጋገር	☐	☐	☐	☐	☐	☐	
ለ) በፅሁፍ	☐	☐	☐	☐	☐	☐	
ሐ) ፎቶ ለማንሳት ወየም ለማየት	☐	☐	☐	☐	☐	☐	
መ) ድምፅ ለመቅረፅ ወይም ለማጫወት	☐	☐	☐	☐	☐	☐	
ሠ) ኢንተርኔት ለማየት	☐	☐	☐	☐	☐	☐	

14. ቅድስት ማርያም ዩኒቨርስቲ የሞባይልዎን ቴቶሪያል ሰርቪስ መስጠት ቢጀምር ይጠቀሙበታል?

ሀ) ☐ እጠቀምበታለሁ ለ) ☐ አልጠቀምበትም ሐ) ☐ እርግጠኛ አይደለሁም

15. ለ14ኛ ጥያቄ መልስዎ አልጠቀምበትም ከሆነ ምክንያትዎ ምንድነው?

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16. ቅድስት ማርያም ዩኒቨርስቲ የገፅ ለገፅ ፕሮግራሙን ለማሻሻል ከሚከተሉት የትኛቹን ሊያካትት ይገባል ይላሉ? መልስ ሊሆኑ ይገባል የሚሉዋቸውን ብቻ ይክበቡ፡፡

ሀ) ☐ አጋዥ መፃሐፍትን ማደል

ለ) ☐ የጥናት ቡድኖች ማቋቋም

ሐ) ☐ የቪዲዮ ቱቶሪያል መጠቀም

መ) ☐ ተግባራዊ ልምምድ ፕሮግራም መዘርጋት

ሠ) ☐ ተማሪዎች የቤት ስራዎቻቸውን እንዲሰሩ ማበረታታት

ረ) ☐ ተማሪዎች ስጥያቄዎቻቸው መልስ እንዲያኙ ነፃ የቴሲፎን አገልግሎት መዘርጋት

ሰ) ☐ የምክር አገልግሎት መስጠት

ሸ) ☐ ተጨማሪዎች የትምህርት መረጃ መሳሪያዎችን ማዘጋጀትና ማሰራጨት

ቀ) ☐ ለተማሪዎች የኤስ ኤም ኤስ አገልግት መስጠት

በ) ☐ ሌሎች_____

አመሰግናለሁ