



St. Mary's University

**DEVELOPING AN E-LEARNING FRAMEWORK FOR ETHIOPIAN HIGH SCHOOLS: THE
CASE OF Lycée Guebre-Mariam**

A Thesis Presented

by

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In Partial Fulfillment of the Requirements

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ACCEPTANCE

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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

Recently, with the advancement of information and communication technologies and widespread usage of the Internet, as result, E-learning technology has become a prominent element in educational settings. This type of technology can substitute traditional face to face teaching and learning methods and provides online courses, online exams, online cooperation, and remote assistance. The existing practice of E-learning in Ethiopian high schools faces a challenge to implement the infrastructure and E-learning design problems. This research study aims to understand the current practices of e-learning in Ethiopia and investigate the factors that can be used to develop a common framework that will be used as a guideline for Ethiopian high schools in implementing an e-learning system. Data were collected from Lycée Guebre-Mariam students, teachers, and participants of the school's staff members who are actively engaged in e-learning. Firstly, the literature study led to the identification of factors necessary for facilitating effective e-learning and the discovery of factors regarded as important for promoting effective e-learning. The data gathered using a fully structured and semi-structured questionnaire is processed using the statistical analysis method to analyze and prepare an SRS document. The study results and findings indicate that effective e-learning can be achieved by having well-established e-learning policies, institutional readiness for e-learning, quality e-learning systems, quality course design, awareness of e-learning benefits, experience in e-learning, and interactive discussions. At the end of this research, the framework will be implemented using the "Learn Cube" E-Learning platform, which is identified as a suitable platform to implement a successful E-Learning system, especially in the secondary school curriculum.

Key Words E-Learning; High School; E-Learning framework

Chapter One

1.1 Introduction

E-learning is a combination of various technologies to support the teaching and learning process more attractive, allowing the learners and the instructors to access educational materials everywhere, and every time through the internet. e-learning framework design is not a trivial task and requires an understanding of the diverse background of the learners, instructors, course delivery methodologies or learning theories, and available resources in the institutions [1]. Higher institutions implement e-learning in a different mode to provide a mixture of face-to-face classroom teaching, live e-learning, self-paced e-learning, and distance learning [2]. However, e-learning technologies are adopted in educational institutions without any grade difference.

Some researchers pointed out the importance of e-learning adoption in Ethiopian high schools [3]. This adoption might increase the great access to educational materials via electronic devices and enhance course delivery approaches using simulations, illustrations, and other online learning practices. However, there is a lack of ICT infrastructure in Ethiopian higher schools[4]. In other words, e-learning is the integration of the school and the classroom into a new environment where students, teachers, parents, and administrators interact comfortably. It is an environment that is a part of their daily life and educates them through all facets involved. The information that they obtain is not presented to them as a separate course; instead, they are learning in their natural environment where the teaching and learning process occur together.

All information systems built for educational support are summarized under the term e-learning. Installation and operation of an e-learning environment are already playing an important role in educational facilities. Currently, most high schools in Ethiopia don't apply the e-learning system as a core means of learning but because of recent events like the coronavirus, e-learning has become a necessary thing to implement. In Lycée Guebre-Mariam high school the trend of e-learning plays a major role, especially in the times of coronavirus since students use some off-the-shelf systems like zoom as compared to other high schools. The trend of using the computer for education continues after the COVID-19 pandemic but the result is not satisfactory [4]. In this

research paper, we will try to implement a common e-learning framework for Ethiopian high schools that will be used as a guide for e-learning implementation.

1.2 Statement of the problem

eLearning platform in Ethiopian high school does not widespread throughout the country due to the lack of infrastructure and lack of best-suit e-learning platform fit to students learning capabilities. For example, during the widespread COVID-19 most high school substituted the conventional teaching and learning process with telegram and open-source e-learning platforms. Thus, enhancing the quality of education in Ethiopian high schools requires an eLearning framework design to meet the needs of the learners and instructors.

High school education in Ethiopia plays an important role in the development of the country by producing educated people every year [3]. The finding of the research shows that the quality delivery of education in high school is low due to various factors [4, 5, 19]. However, the teaching and learning practices in Ethiopian high schools do not support eLearning platforms for sharing educational resources, providing assessments, and others.

Previous research indicated that e-learning has many challenges teachers may lack the skill to practice different teaching techniques, and students lack interest in e-learning methods [4]. Therefore, the school administrators, deans, or other shareholders should improve the awareness of the staff and students on the usage of e-learning systems to make e-learning implementation sustainable.

Several types of eLearning models exist in the literature to reduce complexities and related problems with students and teachers. eLearning model is proposed to facilitate self-learning for learners, provide assessments, and track other activities related to teaching and learning as well as the infrastructures [5]. eLearning model improves the interaction between the learners with the user interface to increase the usability of the platform and the adoption of the teaching methodology and learning style into the eLearning platform. Ferhan et al.[6] proposed an eLearning user interface to enhance the effective usage of the eLearning platform and the designed interface is tested empirically by teachers and students.

Apart from some newly or recently established schools, most high schools in Ethiopia don't deploy an e-learning system [7] [4]. However, some mostly new high schools tend to implement e-learning systems in the high school including Lycée Guebre-Mariam high school but the current system has some limitations such as:-

There was no integration among them to share their educational resource across multiple high schools which led to huge limitations in combining the e-learning services of various high schools. Due to this, there is a need of enabling connectivity across several e-learning data centers to allocate resources among various high schools found in different geographical regions [19].

There was a lack of ICT infrastructure to develop e-learning solutions. The huge investment involved in installing and managing e-learning systems and the failure to achieve the expected benefits from such investment [5]. There was a lack of qualified IT professionals in the development and management of e-learning systems for high schools [4]. Sometimes server was down and the service failure was not noticed. There is no also system study that guides how e- learning is implemented in Ethiopian high schools [4].

To solve the above problem, we develop an e-learning framework for Ethiopian high schools. The proposed framework will support several high schools to collaborate and share learning resources.

Research Questions

This research has addressed the following research questions:

- What is the capability of schools to implement e-learning?
- How we develop an e-learning framework for Ethiopian high schools?

1.3 Objective of the research

1.3.1 General Objective

The general objective of the study is to identify the current educational problems in Ethiopian high schools and develop a common framework that will be used as a guideline for Ethiopian high schools in implementing an e-learning system.

1.3.2 Specific Objective

- To identify the current educational problems in Ethiopian high schools
- To review the literature on best practices in e-learning implementation for high schools.
- To develop a framework for implementing an e-learning system
- To evaluate a prototype of the developed framework

1.2 Significance of the study

The study has significance for learners, teachers, and other stakeholders who work in Ethiopian higher schools. This study identifies the factors to design and implement the eLearning system in Ethiopian high schools. The proposed e-learning will help school administrators to implement e-learning in their schools and improve the quality of teaching and learning experiences. It also gives opportunity for students to learn by their own pace and schedule.

1.3 Scope of the study

This study is geographically limited to Addis Ababa city, particularly Lycée Guebre-Mariam secondary high school. The scope of this study is to investigate the challenges of implementing the eLearning platform in high school, and existing practice and propose a new eLearning framework to overcome the challenges, design a prototype, and test the usability of the framework by students and teachers.

1.4 Organization of the Study

This Thesis is organized into five chapters. The first chapter is an introductory part. It introduces the background of the study which gives insight into the use of e-learning and an analysis base for the study. A statement of the problem answers why this research was conducted. The general and specific objectives of the study are also included in this chapter based on the research questions. The significance of the study which is about who will be benefited from the finding of this research is also part of this chapter. The scope and limitations of the study are also included in this chapter. Chapter Two presents a review of literature that could be gathered from both conceptual and empirical literature sources. Chapter Three presents research methods and materials. In this chapter data collection tools and techniques, research design, sampling methods, data type, and sources, and data analysis and interpretation techniques were discussed. Chapter Four presents the results and discussions of the data, and Chapter Five presents the conclusions and framework development recommendations of the research.

Chapter Two

2. Literature Review

2.1 Introduction

eLearning is a technology that is used to teach various subjects such as mathematics, engineering, physics, statistics, and so on. Recently, it is become essential in the educational setting, especially in transforming traditional learning methods to integrate electronic technology for more successful teaching and learning experiences [8]. As a result of student enrolment being doubled in the last decade, secondary schools now have to accommodate a drastic increase in student numbers. These numbers have ended up in several different secondary schools hence the heavy pressure on the limited resources that these institutions have. To ensure that the increasing numbers of students get quality education, new and innovative ways to improve the quality of teaching and teaching materials are being sought.

eLearning is a structured course or learning experience delivered electronically; it can also include performance support content. Many different elements can make up an e-learning program, such as live or pre-recorded lecture content, video, quizzes, simulations, games, activities, and other interactive elements.

Keep in mind that you may also see the term e-learning more broadly as a catchall for any learning content delivered electronically. E-learning courses are typically managed and administered via learning management systems. An E-learning system is a multiuser software application, usually accessed through a web browser. It helps organizations manage training events, self-paced courses, and blended learning programs. It provides automation that replaces rigorous and expensive manual work, saves time, and enables you to organize your content, data, and learners. It tracks and reports on training activity and results [9].

The successful implementation of the E-learning tool depends on whether or not the students, teachers, and school administrators are willing to adapt and accept the technology. However, a recent study shows that e-learning implementation is not simply a technological

solution, but also a process of many different factors such as social factors, economical factors, technical factors, and soon.

2.2 Definition of e-learning

E-Learning is one of the educational processes that are developed through using ICT. Its general concept involves education in modern ways through the usage of electronic resources such as computers, mobiles, and the internet. While teaching can be based outside of the classrooms, with e-learning the learners and the teachers can be anywhere and anytime.

There are two types of e-learning methods:

Asynchronous e-learning is a learner might be able to teach themselves, the learners taking the course on their own; the programs may include prerecorded video, visuals/texts, knowledge or quizzes, simulations, games, and other interactive elements.

Synchronous e-learning it's more likely referred to as live online training or virtual classroom training. The teachers and the learners must be online at the same time but everyone can be geographically dispersed. The training typically uses a web –conferencing or virtual classroom platform such as zoom, Google classroom, and soon.

As mentioned above the e-learning can be taken anywhere and e-learning can be taken anywhere and anytime so it reduces its time away from the traditional classroom.

In developing countries like Ethiopia, e-learning might face many factors like economical, technical, and social factors, to come up with solutions to these problems the willingness of students, teachers, school administrators, and government plays a major role.

eLearning has several definitions provided by several authors and no a single consensus definition. Clark et al.[10] defined eLearning as training delivered on a computer that is designed to support individual learning or organizational performance goals. eLearning system is a type of Open and Distance Learning or web-based learning designed to provide teaching and learning through the help of electronic communication. The eLearning design to be effective like the traditional in-class face-to-face teaching and learning, the teaching methods should be

appropriately implemented in a well-organized manner among the student and teacher interaction. The quality of eLearning design is useful to deliver the quality of teaching and learning effectively and efficiently.

These four major categories of defining e-learning are:

1. **Technology-Driven Definitions:** This category represents e-learning as the use of technology for learning.
2. **Delivery-System-Oriented Definitions:** These groups define e-learning as a way of accessing knowledge (through the teaching and learning process) emphasizing on ease of accessibility to educational resources.
3. **Communication-Oriented Definitions:** This category considers e-learning to be a communication, interaction, and collaboration tool and assigns secondary roles to its other characteristics.
4. **Educational-Paradigm Oriented Definitions:** This category defines e-learning as a new way of learning/ an improvement to the existing educational paradigm.

2.3 Advantages of E-learning

It is important to cover briefly the major benefits of E-Learning to provide a context aimed at explaining why E-Learning is crucial for the development of the learning process and the reasons why E-Learning provides more efficient learning environments compared with the traditional learning experience [11]. E-Learning provides a wealth of benefits for educational stakeholders in the learning environment, mainly for students and teachers. These include increased accessibility to information, better content delivery, personalized instruction, content standardization, accountability, on-demand availability, self-pacing, interactivity, confidence, and increased convenience. E-Learning reduces costs, enables consistent delivery of content, and improves tracking. The benefits of E-Learning can be as follows:

Delivering Effective Learning

E-Learning has the potential to create successful and meaningful learning environments that motivate the learners and offer powerful tools for interaction and communication[11].E-Learning creates an opportunity for learners to learn according to their learning styles and preferred cognitive style, be it visual, audio, or text-oriented, and allows learners to arrange the content and knowledge for their own needs and learning styles, and to improve the quality of learning experience and support learning by offering differentiated learning.

Enabling Interaction and Communication

E-Learning has the potential to enhance the traditional communication patterns between students and teachers and students themselves by creating a new learning environment. The relationship between teachers and students is no longer a one-way relationship, but rather it is about creating more collaboration and interaction between students to increase their participation and involvement in the classroom. E-Learning can be more flexible and often involves technologies such as audio-chatting, video-conferencing online discussion, which provide learners the opportunity to interact with teachers and others students effectively and flexible[11]. The literature highlights that the role of teachers and students is changing under the impact of the new learning environment [12].These changes have repercussions on the roles of both teachers as well as students. Student play a vital role in collaborative learning environments as they participate in discussions among the whole class or within smaller groups, search for information, and exchange opinions with their peers, where there is both shared and individual responsibility for their success in the learning process. Students work collaboratively with other students and with their teachers to achieve success, and that their role of team members is supported through the use of communication hardware and software [12]. Additionally, teachers play a vital role in E-Learning as collaborators. Teachers work with other teachers to create a variety of activities and to improve the instruction process. They also work with students to achieve the same ends. Providing teachers and students with opportunities to interact, collaborate and use educational technologies improve students' participation in the educational process [9]. This indicates that E-Learning creates real prospects for learners and teachers to get more involved in the learning process by allowing them to share their ideas and suggestions in different E-Learning modes (synchronous and asynchronous

E-Learning). Moreover, E-Learning environments encourage students to construct knowledge and to communicate with the teacher to enhance the learning experience and educational performance[12].

Providing Flexibility in Learning Delivery

One of the main potentials of E-Learning is flexibility. “There are two fundamental equalizers in life: the Internet and Education” – CISCO. E-Learning eliminates the barriers of time and distance, creating universal, learning-on-demand opportunities for people, companies, and countries [9]. In this context, many researchers support the fact that E-Learning projects provide flexibility and offer improved learning environments by focusing on learning without any bounded geographical location [9]. The flexibility of E-Learning can be provided by the various forms of learning materials which allow the learner to select from a variety of options based on their needs and demands[11]. The flexibility of E-Learning consists of different aspects like time, place, and online feedback, as they increase the opportunities for life-long learning [9]. This indicates that E- Learning implementation and development can generate flexible learning environments, bring together different people from different locations and increase accessibility to information.

2.4 E-Learning Challenges

While E-Learning provides several benefits to educational settings which enhance the quality of education and develop the learning environments, conversely there remain many challenges that hinder the exploration and utilization of its [13]. The multidimensionality of E-Learning projects denotes the existence of an extensive multiplicity of challenges that hinder its implementation and development [13]. E-Learning is costly, involves conflict priorities, and requires technical and academic confidence, social support and motivation, technical skill and competency, and stable technical infrastructure. Implementing E-Learning necessitates the examination of the following crucial factors: cost, time, technology, attitudes, management awareness, and support. Furthermore, inherent issues of E-Learning include ICT infrastructure, accessibility issues, quality and efficiency of E-Learning, the usefulness of technology, and pedagogical consideration. The crucial factors of E-Learning include learners’ characteristics and motivation, instructors’

characteristics, E-Learning environment, institution and service quality, infrastructure and system quality, and course and information quality quality[14].

Access: The use of ICT for distance education makes access to the technology an enabling or disabling factor, but access also refers to the quality of the connectivity. The reliability of this connection and the bandwidth will affect the users' ability to access the full range of the content needed[13]. In the Ethiopia case, this issue is discussed in terms of infrastructure outreach and the quality of the connection.

Adjustment: Switching to online learning itself can be difficult, many people are used to studying in a classroom, co-working space, or library[15]. Online learning is accessible from everywhere, it doesn't require any specific physical space, but many students might need to get used to it. One of the main aspects that influence the transition to online learning is communication. The traditional model of education enables students and teachers to interact freely. Educators should do their best to ensure the same effectiveness of communication when it comes to eLearning as well. Of course, real-time communication may be impossible when students take classes at different times.

2.5 The adoption of e-learning

The first step in starting an e-learning program is usually to understand and convince others of its advantages. Since e-learning can be taken anywhere and anytime its cost-effectiveness and time usability increases access as primary advantages.

In the adaption of e-learning, some technical skills such as platform skills; communication skills via computer technologies, authoring, HTML, and web-research skills are required for both the learners and the teachers [6]. The researchers found that the e-learning tools have affected the students' results. The belief of the e-learning tool may harm students who will depend on given materials was disproved. By the data collected from 15 documents from relevant research studies conducted on the effect of ICT-based e-learning on academic achievement examined the relationship between e-learning and students' academic achievement in higher education. The

researcher found that ICT had a statistically significant positive influence on e-learning based students 'academic achievements. The results also indicated that ICT had a significant positive influence on students 'educational overall academic achievements.

2.6 Learning Theories

There are three basic types of learning theory, namely behaviorist, cognitive constructivist, and social constructivist that are used as a guide for e-learning design and development [16]. These learning theories are helpful to design eLearning modules with appropriate content based on the learner's style and patterns [17].

Behaviorist theory: states that learning is the association of stimulus and response [18]. It focuses on observable behaviors[19] [20]. According to this theory, the instruction designer defines a list of behaviors to be achieved at the end of the instruction. This theory employed positive reinforcements can be incorporated into the eLearning design to encourage the learner to be engaged. Behavioral learning theory aims to define a clear goal for the instruction, sequence the subject content logically, allow the learner's pace of learning, and provide immediate feedback for the learner's performance [21].

For example $2+5=?$. Here the equation is the stimulus and the answer by the student is a response. The learners are assessed whether they can perform those behaviors or not. Teachers are the source of knowledge for learners and learners are expected to memorize what is told by the teachers. This theory views knowledge as a repertoire of behavioral responses to environmental stimuli, learning as passive absorption of a predefined body of knowledge by the learner that is promoted by repetition and positive reinforcement, and motivations as extrinsic, involving positive and negative reinforcement. This theory's implications for teaching are correct behavioral responses are transmitted by the teacher and absorbed by the students.

The cognitivist theory states that learning is a mental process that includes thinking, problem-solving, language, concept formation, and information processing [22]. According to this theory, learning is a personal experience and reflection[23]. It focuses on the design of instruction materials that facilitate the acquisition of new knowledge by the learners. Learning is simply a

change in the quantity of knowledge absorbed by the learners. Learners are assessed on whether they acquire new knowledge or not. For example, the instructor gives multiple-choice questions to assess learners' acquisition of new knowledge. According to constructivist learning theory, learning is defined as the active construction of new knowledge based on a learner's prior experience [23]. Both behaviorists and cognitivist are objectivists, which accept the world is real, external to the learner [20]. Knowledge is a function of how the individual creates meaning from his or her own experiences [22]. Behaviorism and cognitivism view knowledge as a representation of external reality in the mind but constructivism assumes that learners are not empty vessels to be filled with knowledge. Learners manipulate inputs from the environment based on their prior knowledge and construct their own unique reality [20]. Humans create meaning as opposed to acquiring it [22]. The cognitivist theory holds that knowledge systems of cognitive structures are actively constructed by learners based on pre-existing cognitive structures, views learning as active assimilation and accommodation of new information to existing cognitive structures, views motivations as intrinsic, meaning learners set their own goals and motivate themselves to learn. This theory's implication for teaching is the teacher facilitates learning by providing an environment that promotes discovery and assimilation/accommodation.

Constructivist learning theory states that learning is personal meaning-making. Constructivism describes the nature of learning; how people develop as meaningful learners. It involves the learner's process of understanding how to perform a task according to a previous experience [24]. Learning environments are designed to support multiple views and representation of knowledge, with students as active knowledge constructors, teachers as facilitators, and development of metacognition, self-analysis -regulation, reflection, and awareness [20], [23]. Goals and objectives are derived by the student or in negotiation with the teacher. Learning is intended to develop learners problem-solving skills and deep learning [23]. This is a post-graduate class so students are encouraged to construct knowledge by interacting with learning resources rather than passively receiving from instructors. Hence, constructivist learning theory is appropriate to guide the e- learning course design for this research. The constructivist theory holds that knowledge is constructed within social contexts through interactions with a knowledge community, views learning as the integration of students into a knowledge community and collaborative assimilation and accommodation of new information, views motivations as intrinsic and extrinsic meaning

learning goals and motives are determined both by learners and extrinsic rewards provided by the knowledge community. This theory's implication for teaching are collaborative learning is facilitated and guided by the teacher and group work is encouraged.

2.7 Approaches to E-learning Design

There are five main approaches to e-learning.

- Synchronous Learning - means that although you will be learning from a distance, you will virtually attend a class session each week, at the same time as your instructor and classmates.
- Asynchronous Learning – means that students access content without respect to or with reduced dependence on their peers. It allows students to learn on their own schedule, within a certain timeframe. Students are able to access and complete lectures, readings, homework and other learning materials at any time during a one- or two-week period.
- Blended Learning - is a method of teaching that integrates technology and digital media with traditional instructor-led classroom activities, giving students more flexibility to customize their learning experiences.
- Mobile Learning – this approach is defined as a way to access learning resources and content from any mobile device. Learners have access to learning materials and learning support anywhere and anytime.
- Flipped Learning – with this model, the main content is usually delivered through online videos prepared by the teacher or a third party. Students watch the assigned short instructional videos by themselves before class which can be effective in making the learning process begins before the class.

2.8 Interaction Design and eLearning

Interaction design and eLearning interaction might have six forms of educational interactions in online learning: student-student interactions, student-content interactions, student-teacher interactions, teacher-content interactions, teacher-teacher interactions, and content-content interactions[25]. eLearning interface provides to create a collaborative learning environment among learners, subject content, and the teacher[26]. In an eLearning environment, the learner interacts directly with the interface to maintain the other interactions: with the teacher, with the content, and with other students. The interaction design of eLearning should consider four additional interactions: content interface, learner-interface, teacher interface, and interface- interface[24].

2.9 Components of E-learning System

E-learning implementation can be successful if it considers all the necessary variables to achieve the learning goals. Good technical design cannot ensure successful e-learning implementation [19]. Students and teachers must understand the benefits of e-learning. They must also acquire the necessary knowledge and skills to work in an e-learning environment. The following section discusses the different components required for e-learning system design.

Learners' characteristics

- Learners need to perceive the benefits of using e-learning systems. E-learning has no value without learners knowing how to use e-learning systems.
- Students have become more diverse while the demand for education is increasing. For example, increases in the demand for education are coming from female non-traditional students with grown children, full-time students that work part-time, and part-time students that work full time [14].

Instructors' characteristics

Instructors' characteristics also play an important role in the perception of the effectiveness of learning management systems. Both technologies, as well as the implementation of technology, impacts educational learning outcomes. Attitude toward technology, teaching styles, and technology control also influence learning [18].

2.10 E-learning System Functionality

eLearning system functionality include the feature the system should provide service to store learning content, uploading leaning materials, modifying existing contents, retrieval support for learning materials, interaction among students and between students and teachers or tutors, assessment functionality and feedbacks on students learning experience. E-learning functionality refers to where students access online resources, use systems for access to online curriculum and communication, obtain tutor assistance, and receive assessment [12]. A positive e-learning environment contributes to learning success. Successful outcomes of e-learning include providing opportunities for interactions, facilitating the exchange of information among learners and instructors, synchronous and asynchronous communication, and online assessment. Online interactions among learners as well as between learners and instructors increase learners' participation in educational activities [12]. An e-learning environment also includes instruction and school's support. Factors relevant for a positive e-learning environment include social influence, learners' perceived interactions with others, diversity in assessment, and perceived autonomy support.

Technology has an important role in delivering learning outcomes because learners interact more in e-learning environments than with traditional face-to-face instruction [16]. System design facilitates formative interactions, controls organizational activities, and provides correct and sufficient information to reduce. System quality relates to a learner's belief about e-learning performance characteristics and is measured by functionality, ease of use, reliability, flexibility, data quality, portability, integration, and importance. System quality has a strong positive effect on learners' satisfaction [17]and directly affects the users. Factors that are relevant for

infrastructure and system quality include Internet quality, facilitating conditions, reliability, ease of use, system functionality, system interactivity, system response, and equipment accessibility [11].

2.11 E-learning Framework

A framework shows the main building blocks of a system to be constructed. It shows system elements and interconnections. It guides for effective system development. The e-learning systems' theoretical framework contains the three main components of information systems. These components are people, technologies, and services. People interact with e-learning systems. E-learning technologies enable the direct or indirect interaction of different groups of users. It provides support to integrate content, enable communication, and provide support for collaboration [27]. At the same time, systems provide services according to the specified strategies for activities. In other words, service specifications are e-learning activities aligned with the e-learning models and the instructional strategies. System modeling is the process of developing abstract models of a system, with each model presenting a different view of that system.

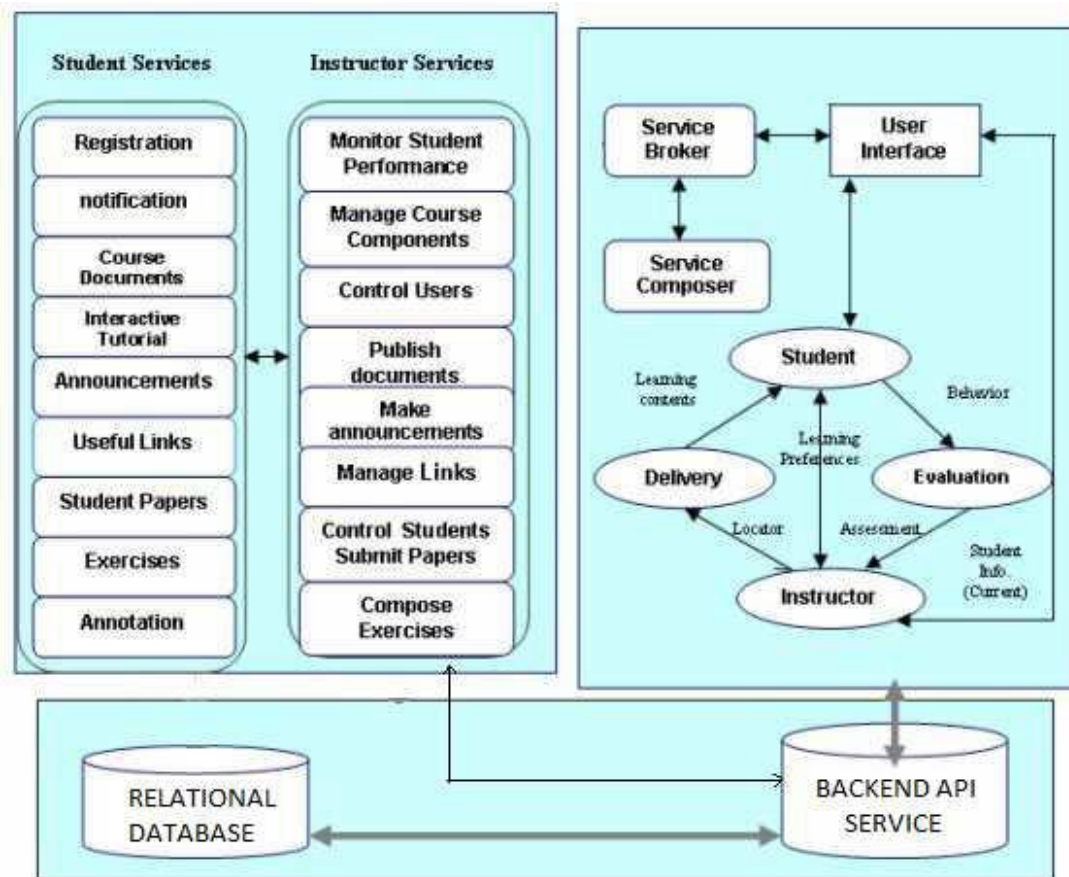


Figure 1 - Framework system model for web-based e-learning system[27]

This e-learning framework is proposed for a web-based e-learning system. This model is designed to use the REST API Architecture for a separation of the backend services and the front-end service. It provides the learning and teaching process with learning content and Assessment content. Each content has different types of services such as:

Learning services: registration, online course, Interactive tutorial, course documents (is a repository for files that the instructor has made available to the student as a part of your course), announcements (displays information to the students that the instructors of the course want him to know), links (displays a list of useful URL links that have been

identified by the course instructors), student papers (students can post/upload requests files to the instructor).

Assessment services: provide exercises and quizzes for evaluation of the student knowledge. During the learning process, a dynamic selection presentation of both contents will be accomplished. On the other hand, our model, allows teachers (professors, lecturers) to create and admin course websites through a browser.

Admin, public, or private discussion forums

Manage a list of links: displays a list of URL links that have been identified by the course instructors.

Create student groups

Compose exercises

Structure an agenda with tasks and deadlines

Have students submit papers: students can post/upload requests files to the instructor.

2.12Khan's Octagonal Framework

Badrul Khan's e-learning framework provides a framework that enables educators to select appropriate ingredients for flexible learning environments. Khan's framework can serve as a guide to plan, develop, deliver, manage and evaluate blended learning programs. The framework consists of eight dimensions. These dimensions are institutional, pedagogical, technological, interface design, evaluation, management, resource support and ethical. Each of these dimensions in the framework represents a category of issues that need to be addressed in order to create a meaningful learning experience[28].



Figure 2 - Khan's Octagonal Framework[28]

We have selected Khan's Octagonal Framework as the main guide for this study's e-learning design.

2.13 Review of Related Literature

A Framework for the Integration of E-Learning in Higher Education Institutions in developing countries by Geoffrey Kituyi and Irene Tusubira examined the face-to-face and e-learning teaching and learning methods used by higher education institutes and while it found both methods to be lacking in a number of aspects when treated separately, the study findings indicated that the methods can perform better if integrated. The requirements for e-learning integration and most applicable feature of e-learning information systems were identified. The study has put forward a framework that can help improve e-learning integration in HEIs in developing countries and puts emphasis on the infrastructure and the ICT skills that must be attained by management, lecturers and students of HEIs in developing countries.

Using Design-Based Research to Develop a Mobile Learning Framework for Assessment Feedback by Mireilla Bikanga Adahis is a study that contributes to the body of knowledge on assessment feedback in mobile learning through the development of a Mobile Learning Framework for Assessment Feedback (MLFAF). The framework highlights the importance of pedagogy and pedagogical practices as the core aspect of an environment that fosters the use of student-owned devices for assessment feedback. It is designed to provide educators, policy-makers and researchers with a representation of how student devices could be harnessed in the context of assessment feedback in order to increase their engagement and foster communication and feedback dialogue with their lecturers. It also provides a broader view that takes into account the key aspects to be considered, which are likely to succeed or may not succeed in any mobile learning implementation.

Tawafak et al.[29] presented the intention to establish a perspective to improve university education and learning and the dynamics of course evaluations by analyzing the relationship between the e-learning implementation variables and the paradigm for technology adoption, presenting a high degree of relevance and reliability outcomes.

Vasconcelos et al.[30] presented decision-making methods based on multidisciplinary requirements and various criteria for the configuration of online course programs. The 23 decision-maker configuration model developed, program institution-based mentors listed practices relevant to the consistency of service design implementation processes.

Sarwar et al.[31] proposed a mathematical model for online learners using machine learning techniques. The learners of this method were divided into separate divisions.

2.14 Summary

This chapter critically reviewed the literature related to e-learning systems and identified some of the most influential factors used in the field of information systems research. More specifically, this paper had an insight into the characteristics as well as the limitations, weaknesses, and strengths of e-learning systems. Indeed, not every manual process has a problem but the fact that the technologies are improving and is now playing a big role and contributing a big impact in the society today the present time problems might occur one way or another, and sooner or later this is why e-learning is going to be very helpful. Student variables, such as behaviors and attitudes, cultural backgrounds, and other characteristics like economic power are important variables that influence student learning, especially in a collaborative e-learning environment. Understanding these variables is now helpful for instructors to design meaningful educational activities to promote student knowledge construction and make learning more effective and appealing. This can help to achieve the most effective deployment of such a system and also helps to improve strategic decision-making about technology in the future and can decide on the best approach that fits the students before implementing any new technology.

Chapter Three

3.1 Research Design and Methodology

This chapter identifies and discusses the nature of the research methodology within which the research process will be conducted. Research strategy, the research method, data collection instruments, data sources, the research approach, the methods of data collection, the research process, the type of data analysis, the ethical considerations and the research limitations of the project data are included in this chapter.

Research Design

This research study is intended to design a common framework that will be used as a guideline for Ethiopian high schools in implementing an e-learning system based on Lycée Guebre-Mariam School Addis Ababa, Ethiopia. This research took into consideration numerous pieces of previous academic research regarding the development of e-learning systems in Ethiopia.

To satisfy the objectives of this research, this study used a mixed-method research design. It uses both quantitative and qualitative data collection and analysis methods. This method provides unique advantages to triangulate results that are derived from different research methods [19]. The quantitative research method is used for assessment and feedback from Lycée Guebre-Mariam students while the qualitative method is used for the assessment of Lycée Guebre-Mariam staff that are actively engaged in e-learning in the school. Both student's and school's satisfaction are two crucial elements of the E-learning framework[19].

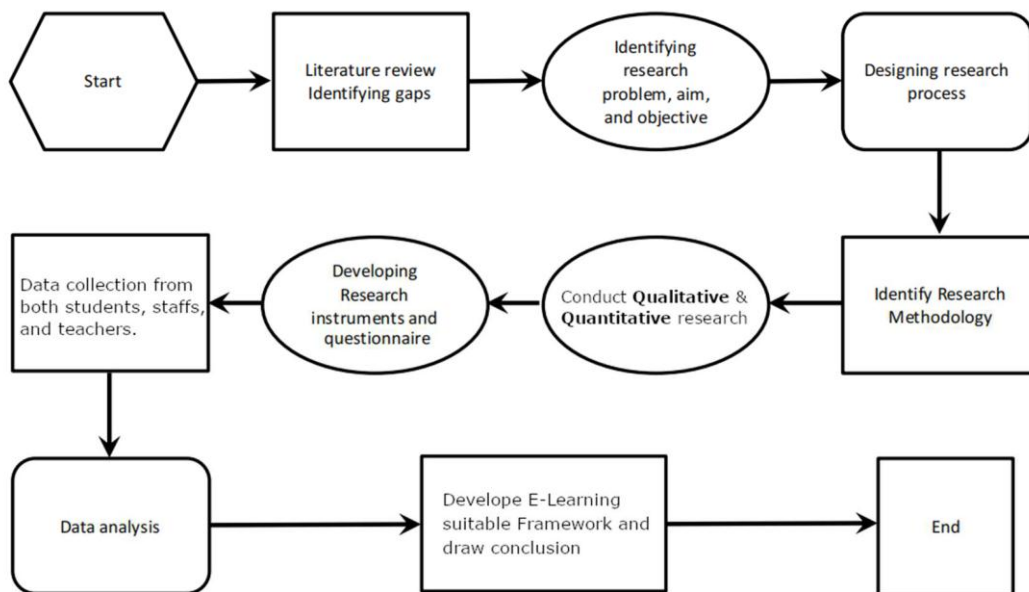


Figure 3 - Stages of the Research Process

For the quantitative research, randomly selected Lycée Guebre-Mariam students were selected to answer an organized set of paper-based questions. This was done to explore the approaches appropriate for facilitating effective e-learning. Using of quantitative research method, a broader study can be made, involving more subjects and enabling more generalization of results[9]. As for the qualitative research, interviews were arranged with participants actively engaged in e-learning in the school's staff members. The main characteristic of qualitative research is that it is most appropriate for small samples, while its outcomes are not measurable and quantifiable[18]. Its basic advantage, which also constitutes its basic difference with quantitative research, is that it offers a complete description and analysis of a research subject, without limiting the scope of the research and the nature of participant's responses [12].

3.2 Data collection

To secure reliable and adequate information, selection of appropriate data collection instrument is essential. For this research, three type of data collection methods namely, Questionnaire, interview, and observation to acquire relevant data for the study. In-depth interviews were used with staff members who have active engagement in e-learning in the school. The main advantage of personal interviews is that they involve personal and direct contact between interviewers and interviewees, as well as eliminate non-response rates, but interviewers need to have developed the necessary skills to successfully carry an interview[12]. What is more, unstructured interviews offer flexibility in terms of the flow of the interview, thereby leaving room for the generation of conclusions that were not initially meant to be derived regarding a research subject.

Questionnaire was used to collect numerical data from students of the school and teachers. Using survey questionnaires and analyzing it with statistical methods, it is possible to test the relationships among a set of variables.

3.2.1 Questionnaire development

A questionnaire was developed in order to collect data in two phases. The questionnaire had two parts: demographic questions and questions related to perceived ease of use and important features in E-learning.

- Some sample questions that were included in the semi-structured interview were the following: (The full questionnaire is available in the annexes)
- What Is the Right Content for Learning Apps?
- What factors are necessary for facilitating effective e-learning in the school?
- What factors make up a structure of a model for facilitating effective e-learning in schools?
- What resources are available in school that will support the E-learning process?
- Is basic computer usage skill requirement in the hiring process?

3.2.2 Sample selection

Data required for this study analyzed accordingly. The quantitative research data collected through questionnaires included 36 academic teaching staff. The questionnaires were used to analysis teaching staff and students' views on the E-learning program. The questionnaires distributed in the first term in the academic year 2021/22.

	FREQUENCY	
GENDER	MALE	20
	Female	16
Education Background	First Degree	28
	Second Degree	5
	MS/MSc	2
	Above	1
Previous use of E-Learning Platform	Yes	11
	No	25

3.3.3 Data analysis

For this research, content analysis was used to analyze the data which was gathered from the interaction of stakeholders' interviews. This is the type of research whereby data gathered is categorized into themes and sub-themes, to be able to be comparable, the main advantage is that it helps in data collected being reduced and simplified, while at the same time producing results that may then be measured using quantitative techniques [10] for the questionnaires. Moreover, the content analysis gives the ability to researchers to structure the qualitative data collected in a way that satisfies the accomplishment of research objectives.

Descriptive data analysis method was used for data collected through questionnaire. It provides more structured information to describe the current status of ICT infrastructure, student and teachers use of technological devices for learning. Frequency tables and charts were used to present the processed data from the questionnaire.

Chapter Four

4. Assessment of Existing ICT infrastructure

The Lycee Gebre Mariam School has adequate ICT infrastructure to support different school activities. There are 7 computer labs for teaching basic computer skills and to access learning materials from Internet. The computer labs are used by students and teachers. The School has also broad band Internet connection.

Table --- Existing ICT Infrastructure

ICT resources	Numbers
Desktop computers	123
Computer labs	7
ICT - staff	3
Software	Pronote , and Padlet,Zoom

PRONOTE is a type of ERP system. It is used by more than 9,000 schools worldwide for all school levels. The software integrates all school life. It also supports all pedagogical activities which include school calendar, homework, assessment results, student attendance, learning resources, school life, surveys, internal messaging, diary and report cards. Students, teachers and parents access the system from their smartphone. They access real time data in a secured environment, wherever they need.

Each new message is signaled by a notification. Students always know where they stand, parents are reassured and involved, and teachers have a broader view of their students. With 3.41 billion connections by 2020-2021, PRONOTE is now bringing together the entire educational

community (staff, teachers, parents, students) and is establishing itself as the leading creator of digital uses in education.

Online learning has already been experiencing rapid growth during the last few years. During COVID-19 pandemic, e-learning is the only option available for educators and students. According to the data we derived from the questionnaire while most teachers either own or have easy access to computers and an internet connection not all students have access to computers or an internet connection. A few students are good at using computers; however, most students do not have a good understanding of how to use computers and have to be trained. Due to a lack of access to computers some students are against e-learning. While most teachers are familiar with using computers they require training in order to use specialized programs efficiently. Most teachers were supportive towards e-learning.

4.1 System Requirements Specification

E-Learning is based on investing in the opportunities already available in learning environments to enrich the learning process and achieve a quality education. Although E-Learning has various advantages in the field of education, the failure percentage when implemented is still relatively high and is something which is an increasing concern for educational institutions [9]. This chapter discusses the software requirement specification and proposed framework for e- learning.

A software requirements specification (SRS) is a description of a software system to be developed. The software requirements specification lays out functional and non-functional requirements, and it may include a set of use cases that describe user interactions that the software must provide to the user for perfect interaction.

4.2 Functional Requirements

Functional requirements define the fundamental actions the system must perform. Like any other system, this will have an input, process, output, prerequisites, conditions, side effects, post conditions, integration of functions (modules), and problems in the process[27]. According to the researcher's analysis, the following functional requirements are drawn:

- System shall let students create accounts.
- System shall provide login & authenticate the user.
- System should have search functionality where students can attend a class.
- Teachers shall be able to rate students.
- System shall provide a login for the teacher and administrator as well as students.
- Admin shall be able to add& delete the course schedules.
- Admin shall be able to add new students.
- Admin shall be able to update, edit & delete student details.
- System shall be able to generate student reports.

4.3. Non-Functional requirements

Non-functional requirements describe aspects of the system that are not directly related to its functional behavior. Nonfunctional requirements are the ones that act to constrain the solution. Nonfunctional requirements are sometimes known as constraints or quality requirements. They can be further classified according to whether they are performance requirements, maintainability requirements, safety requirements, reliability requirements, security requirements, interoperability requirements, or one of many other types of software requirements [17].

Other non-functional requirements may include using a specific hardware platform for the system, security requirements, how the system should deal with failures and faults, and how to provide backward compatibility with an old system that the client is unwilling to retire [17]. During

this activity, developers, users, and clients agree on aspects that are visible to the user, but not directly related to functionality. These include constraints on the performance of the system, its documentation, the resources it consumes, its security, and its quality.

4.4 System model

Based on our framework design on *figure-2* the main findings show that e-learning system is composed of four components, mainly; the instructor, learner, course, and information and communication technologies, in addition to the context determinants of e-learning system success.

4.4.2 Actor identification

An actor describes any entity that interacts with the system (e.g., a user, another system, the system's physical environment) [17]. Actors initiate a use case to access system functionality. Based on this we identified the following actors for our system: -

- Student
- Administrator
- Teacher

4.4.3 Use cases

A use case is initiated by an actor. After its initiation, a use case may interact with other actors, as well. Use cases focus on the behavior of the system from an external point of view. A use case describes a function provided by the system that yields a visible result for an actor.

4.4.4 Use case diagram

Use case diagram captures the functional requirement of the intended behavior of the system and shows the relationships between the use cases & actors.

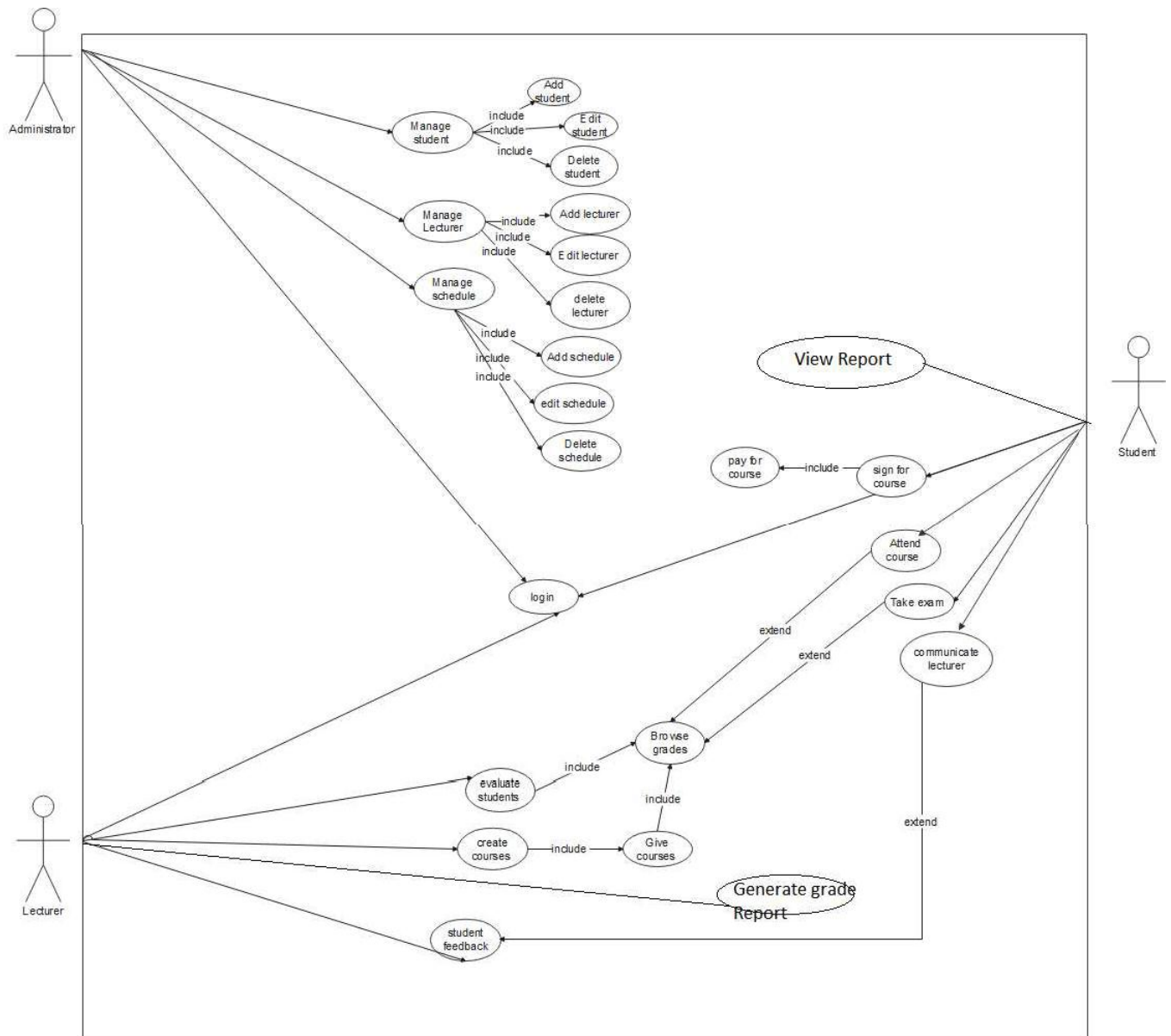


Figure 4 - Use case diagram

4.4.5 Use case description

A text-based **use case description** can be used to provide additional information to support the use case definition. This description can contribute significantly to the use case's value. The

description text can be captured in the model as single or multiple comments. It is also possible to treat each step in a use case description as a requirement. A typical use case description may include the following:

- **Actors:** are the people or systems that interact with the use case.
- **Pre-conditions:** the conditions that must hold for the use case to begin.
- **Post-conditions:** the condition that must hold once the use case has been completed.
- **Primary flow:** the most frequent scenario or scenarios of the use case.
- **Alternate and/or exception flow:** the scenarios that are less frequent or other than nominal. The exception flows may reference extension points and generally represent flows that are not directly in support of the goals of the primary flow.

Use Case Id	UC-01
Use Case Name	Authentication
Participating Actors	Student, Administrator, Teacher
Description	The system allows the user to log in for better access.
Pre-Condition	To log in, they should have a user account.

Flow of Event	<ol style="list-style-type: none"> 1. The user clicks on the login link 2. The system displays the Login form. 3. The user enters the username and password. 4. The user clicks on the Login button. 5. The system validates the username and password filled by the user. 6. The system takes the user to their window depending on the type of the user.
The alternative flow of the event	Step 5: If the username and password filled by the user are invalid. The system displays an invalid message. Then go to step 2
Post Condition	The user logs into the system.

Table 1 Use Case Description for Login

Use Case Id	UC-02
Use Case Name	Registration
Participating Actors	Student

Description	All students must be registered.
Pre-Condition	Students must log into register.
Flow of Event	<ol style="list-style-type: none"> 1. The student click on the register link. 2. The system displays the registration form. 3. The student fills in the required information. 4. The student clicks on the register button to submit the information. 5. The system validates the information filled in by the customer. 6. The system saves the actor data into the database.
The alternative flow of the event	Step 5: If the information filled in by the student is invalid. The system displays an invalid message. Then go to step 2
Post Condition	A new student is successfully registered into the system.

Table 2 Use Case Description for Registration

Use Case Id	UC-03
Use Case Name	Attend course
Participating Actors	Student
Description	A student can attend a course if he/she registered
Pre-Condition	Students must register to attend a course.
Flow of Event	<ol style="list-style-type: none"> 1. The system displays the home page. 2. The student types on the course of his/her registration. 3. The system validates the data filled by the students. 4. The system shows the list of courses that meet the student's criteria.
The alternative flow of the event	Step 3: If the data filled by the student is invalid. The system displays nothing. Then go to step 2

Post Condition	A student will be provided with a list of events that meet the specified criteria.

Table 3 Use Case Description for attending the course

Use Case Id	UC-04
Use Case Name	Take exams
Participating Actors	Student
Description	Students must take an exam to finish the course given.
Pre-Condition	To take an exam they should have a student account.
Flow of Event	<ol style="list-style-type: none"> 1. The student click on the login link 2. The system displays the Login form. 3. The student enters the username and password. 4. The system validates the username and password filled by the user. 5. The student enters course name and id 6. The system takes the student to their window depending on the type of the given information

The alternative flow of the event	Step 5: If the username and password filled by the student are invalid. The system displays an invalid message. Then go to step 2
Post Condition	The student takes the exam

Table 4 Use Case Description for taking exams

Use Case Id	UC-05
Use Case Name	View reports
Participating Actors	Teacher
Description	Allows the teacher to view the report that is generated by the system. It helps the teacher to track information about the student.
Pre-Condition	The teacher must log into view the report.
Flow of Event	<ol style="list-style-type: none"> 1. The system opens the teacher home page. 2. The teachers click on a student report. 3. The system displays a current report.
The alternative flow of the event	Step 3: if there is no exam taken in the system it doesn't display the information it required
Post Condition	The report is displayed successfully

Table 5 Use Case Description for view reports

4.4.6 Class Diagram

The object model, represented in UML with class diagrams, describes the structure of the system in terms of objects, attributes, associations, and operations. During requirements and analysis, the object model starts as the analysis object model and describes the application concepts relevant to the system. During system design, the object model is refined into the system design object model and includes descriptions of the subsystem interfaces. During object design, the object model is refined into the object design model and includes detailed descriptions of solution objects [17]. Class diagrams represent the static structure of a system in terms of objects, their attributes, operations, and relationships [17].

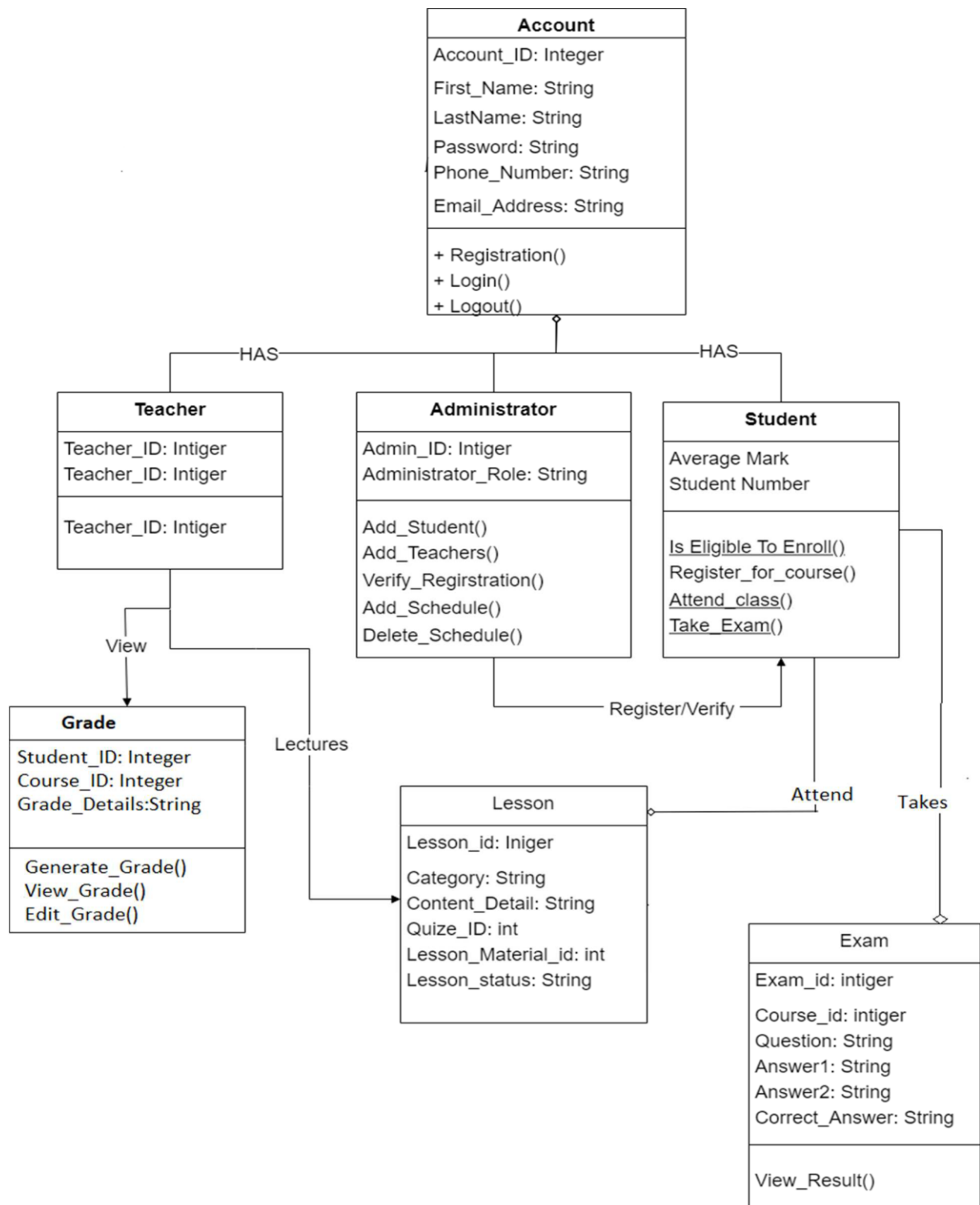


Figure 5 - Class Diagram

4.4.8 Sequence Diagrams

A sequence diagram ties use cases with objects. It shows how the behavior of a use case (or scenario) is distributed among its participating objects. Sequence diagrams are usually not as good a medium for communication with the user as use cases are since sequence diagrams require more background about the notation. For computer-savvy clients, are intuitive and can be more precise than use cases. In all cases, however, sequence diagrams represent another shift in perspective and allow the developers to find missing objects or grey areas in the requirements specification [17].

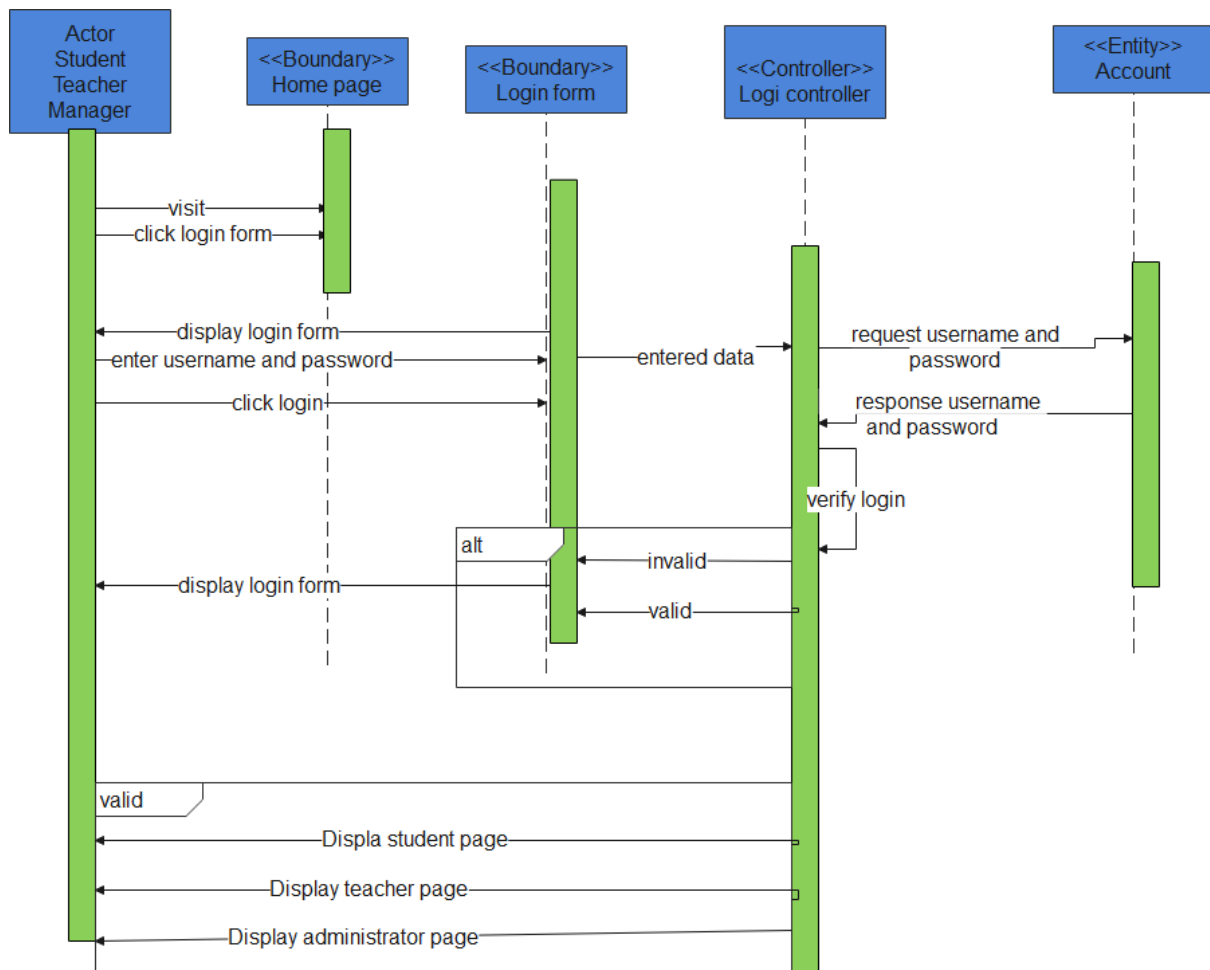


Figure 6 - Sequence diagram for login

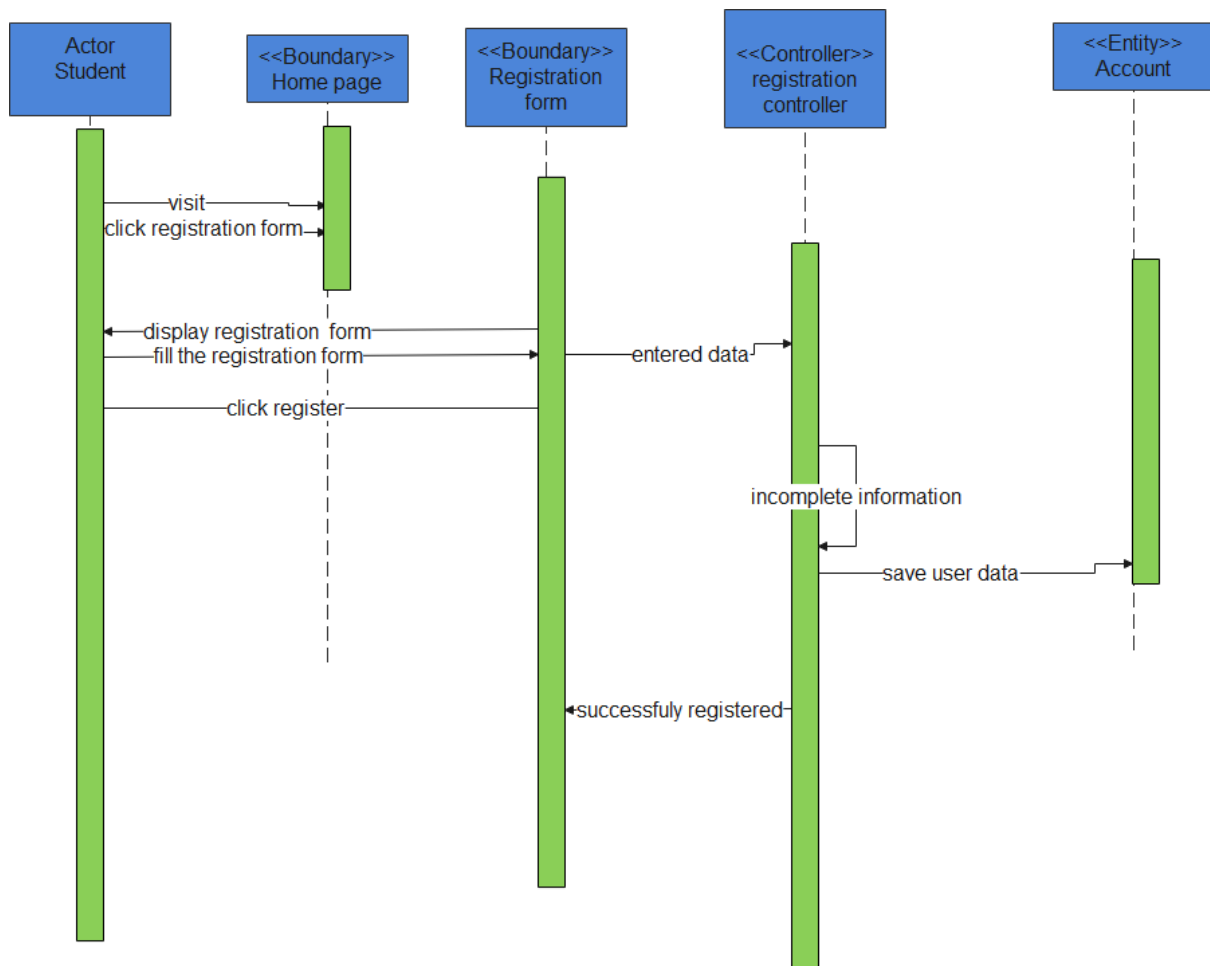


Figure 7 - Sequence diagram for registration

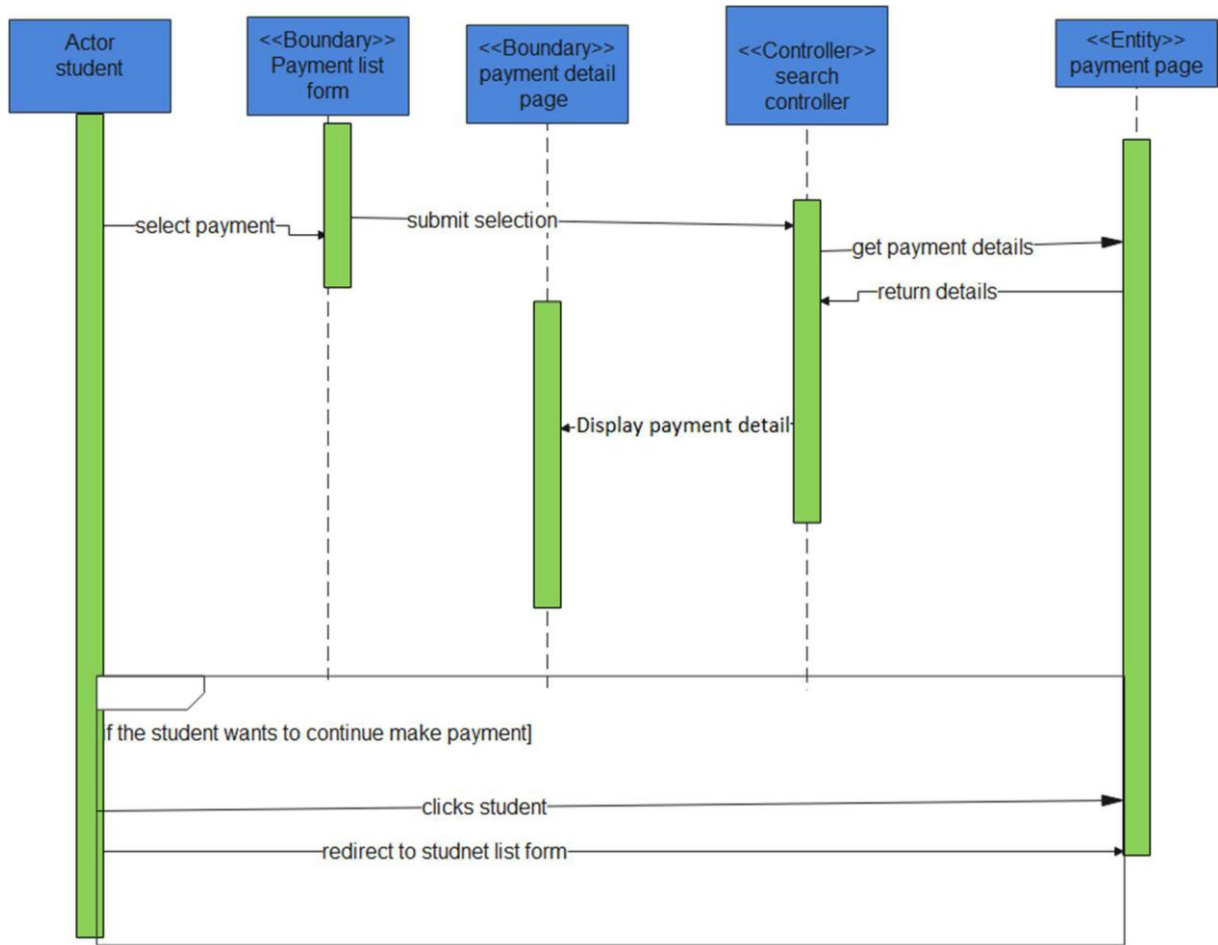


Figure 8 - Sequence diagram for payment

4.4.7 Activity Diagrams

UML activity diagrams represent the sequencing and coordination of lower-level behaviors. An activity diagram denotes how behavior is realized in terms of one or several sequences of activities and the object flows needed for coordinating the activities [17]. Activity diagrams are hierarchical: an activity is made out of either an action or a graph of sub-activities and their associated object flow.

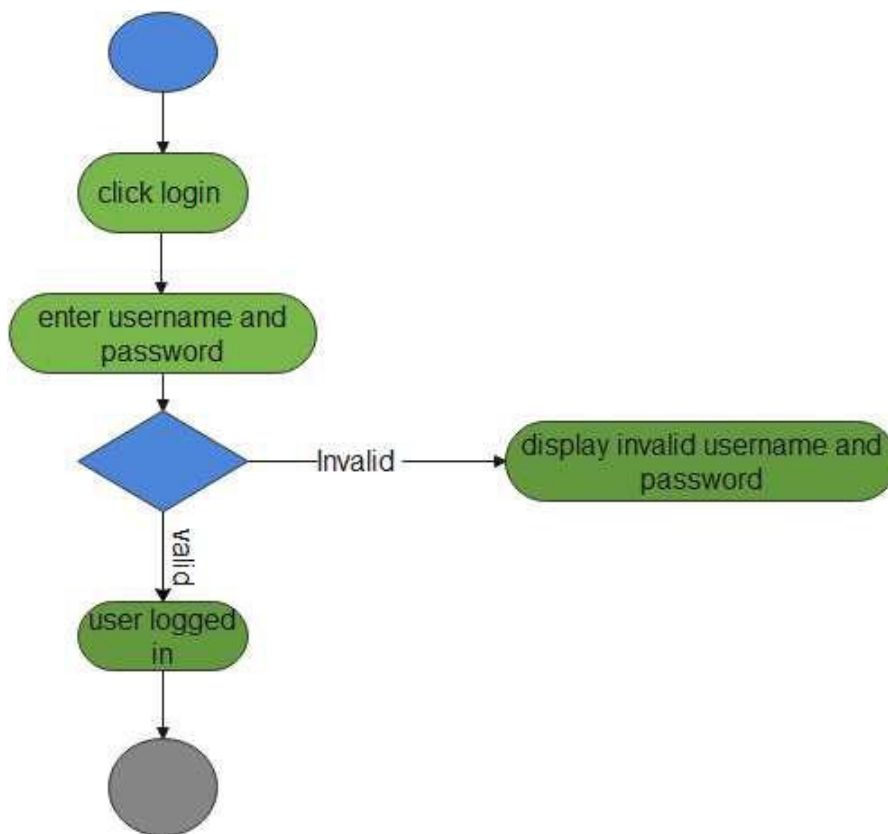


Figure 9 - Activity diagram for login

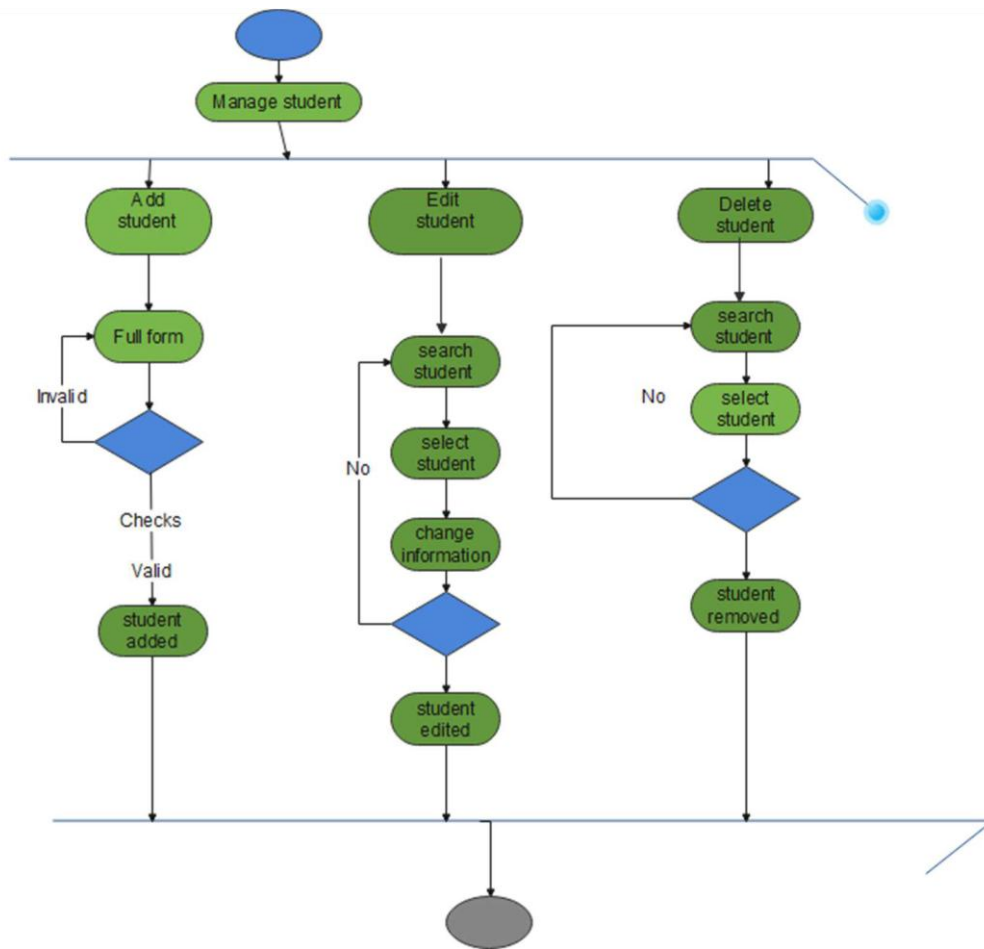


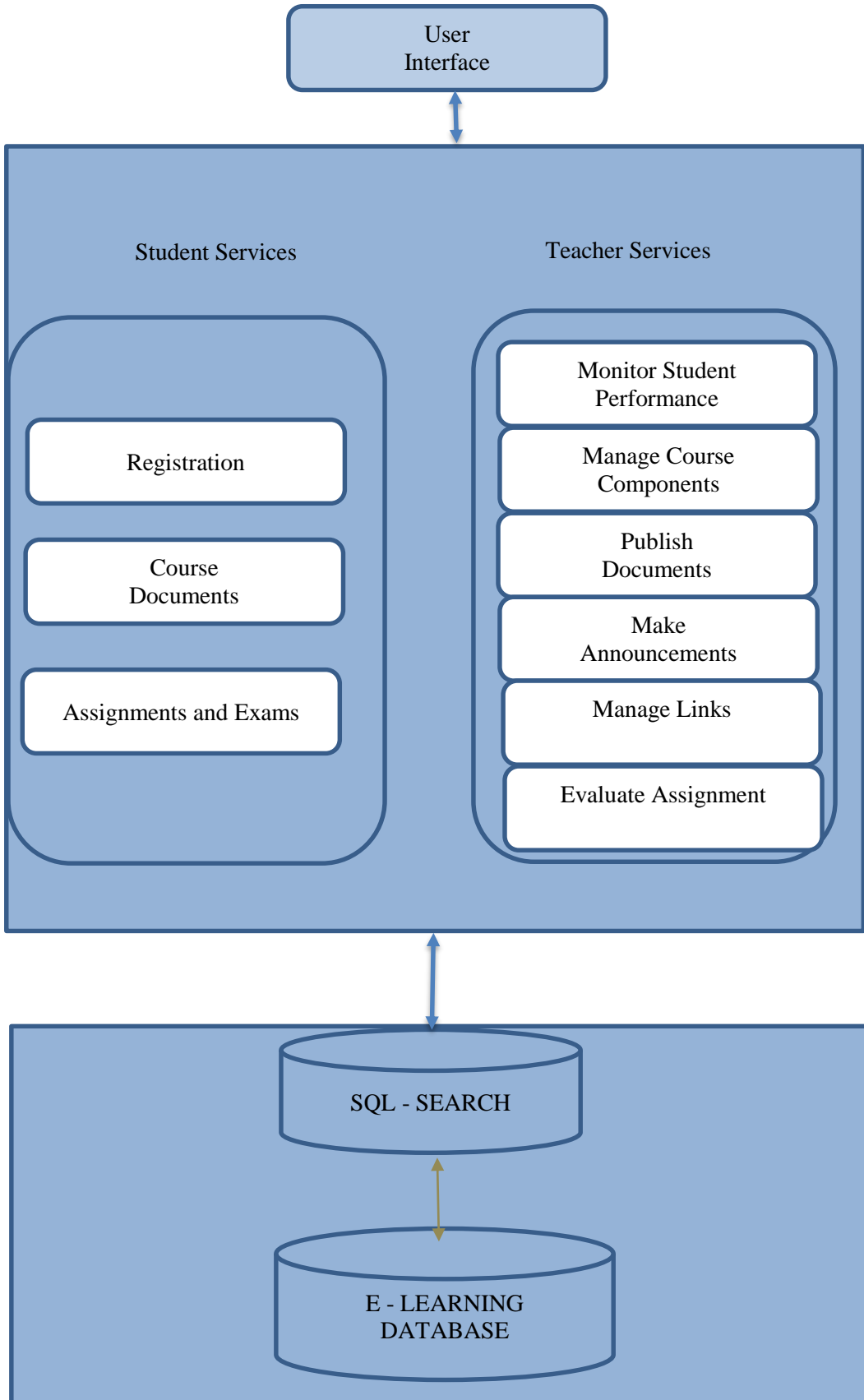
Figure 10 - Activity diagram for managing student

4.4.9 Proposed E-learning Framework

This study has proposed the following e-learning framework by adopting Aparicio, Bacao, and Oliveira's e-learning framework. The main components of the framework are user interface, student service, teacher service, search facility and databases.

The user interface component allows students and teachers to interact with the system. It serves as a door to access the system. It receives requests from the users and submits to the search component. When the search component retrieves and sends to the user interface component, the user interface component displays

the results to the system users.



Student service component allows users to perform different activities with the system. It allows student registration, access course materials, submit assignments and exams. It provides a virtual classroom environment for the students.

Teacher service component allows teachers to perform different activities. It allows teachers to monitor students, publish course materials and assignments to students, send assessment results to students and send announcement to students.

Data base component stores all teaching resources that are prepared for the course. It stores course reading materials, student assignments, exam questions and assessment results. It also stores textbooks and other additional reading materials for further reference.

Search component is the brain of the system. It receives requests from the user interface and searches the database for matching contents. When it finds the content in the database, it sends back to the user interface.

4.4.10 Proposed Software Architecture

We proposed a three-tier software architecture to implement the eLearning framework. This system architecture is proposed based on the web-based e-learning framework which was discussed in Chapter Two. The presentation layer contains an eLearning user interface for students, teachers, and administrators (academic support staff). The presentation layer interacts with business logic to access or retrieve the business logic through HTTP/HTTPS. The business logic

contains six modules to maintain the students, teacher, administrator, assessment, and security management. Third-tier is the data tier for storing the data.

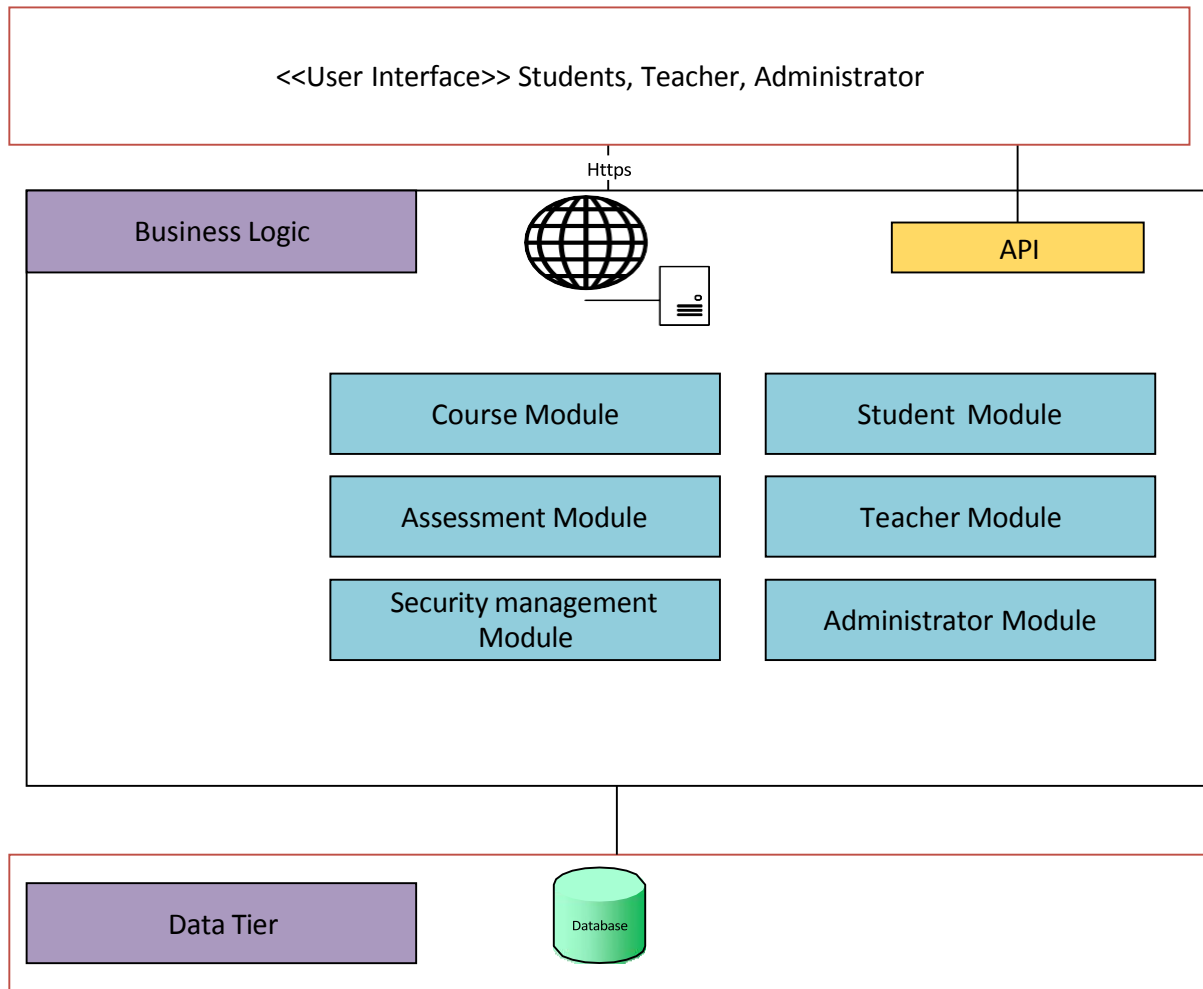


Figure 11 – proposed software architecture

Course Module: this module allows the storage of learning content, uploading and downloading learning content, and modifying existing learning content.

Assessment Module: this module allows to stores of the assessment result of each course where the student's scores, assessment history of the students, and results.

Student Module: this module allows the students to enroll in the courses and allows to learn to access the educational resources.

Teacher Module: this module allows the teachers to upload the learning materials.

4.5 Summary

In this chapter we made an assessment of the existing ICT infrastructure and found out that while most teachers either own or have easy access to computers and internet connection not all students have access to computers or internet connection and that while a few students are good at using computers, most students do not have a good understanding of how to use computers and have to be trained. While most teachers are familiar with using computers they require training in order to use specialized programs efficiently. Most teachers were supportive towards e-learning however due to lack of access to computers some students are against e-learning.

This chapter also discusses the software requirement specification for the proposed framework for e-learning. We found and listed the functional and non-functional requirements for the proposed system. We also developed a system model and identified the actors that interacted with the system. These actors are students, teachers, and administrators. We also developed the use cases, class diagram and activity diagrams and sequence diagrams needed for the system model.

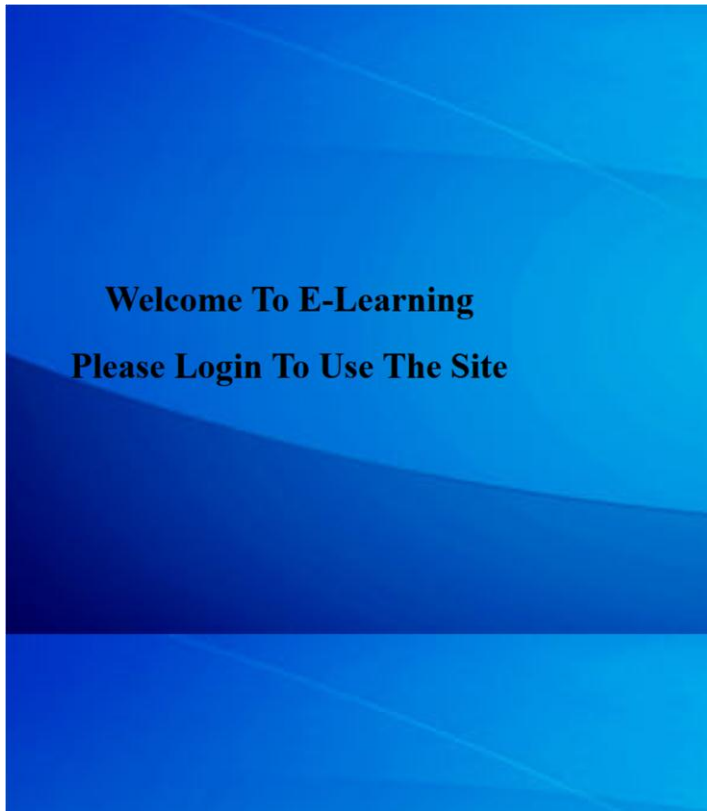
Chapter Five

5. Development of E-learning Prototype

The prototype for this system is in the form of a website and is developed using Html and JavaScript for the front end and PHP for the backend such as database. It accepts the id and password of users (administrators, lecturers and students) to enter and use the site. Administrators have the ability to add students and lecturers to the database as well as the ability to modify the data of students and lecturers. They also have the ability to add and edit schedules. Administrators also manage courses, registrations and batches. They also approve or reject the registration requests, add course requests or drop course requests of students. Lecturers have the ability to create new courses, grade student performance and give out course materials such as useful links, course files and course exercises. They also give online classes and tests.

Students have the ability to register for courses according to their assigned batches, make add course requests or drop course requests. Students also take online classes and tests. Students also receive course materials such as useful links, course files and course exercises. Students also receive notifications and announcements from lecturers and administrators. All users are able to send messages to each other. Administrators and lecturers can send notifications and announcements to students.

Login Page



Enter User ID

AD1000

Enter Password

••••••••

Login

Administrator Basic Information Page

Home
Profile
Basic Info
Change Password
Useful Sites
Student Management
Add Student
Manage Student
Lecturer Management
Add Lecturer
Manage Lecturer
Schedule Management
Add Schedule
Manage Schedule
Announcements
Give Announcements
Send Notification
Communications
Messages
Courses
Manage Courses


Basic Information

Full Name - Bekele Girma
ID No - AD1000
Nationality

Telephone

Email

Date of Birth



Administrator Add Student

Home
Profile
Basic Info
Change Password
Useful Sites
Student Management
Add Student
Manage Student
Lecturer Management
Add Lecturer
Manage Lecturer
Schedule Management
Add Schedule
Manage Schedule
Announcements
Give Announcements
Send Notification
Communications
Messages
Courses

Add Student

Student's Full Name:
Student ID
Password
Select Batch
Date of Birth
Email
Telephone
Nationality

Administrator Manage Student

The screenshot shows the 'Manage Students' page. On the left is a blue sidebar menu with the following items: Home, Profile, Basic Info, Change Password, Useful Sites, Student Management (with sub-items Add Student and Manage Student), Lecturer Management (with sub-items Add Lecturer, Manage Lecturer), Schedule Management (with sub-items Add Schedule, Manage Schedule), Announcements (with sub-items Give Announcements, Send Notification), and Communications (with sub-items Messages, Courses). The 'Manage Student' option is highlighted in purple. The main content area has a blue header with the title 'Manage Students'. Below the title is a search bar with the text 'Search Term :' and a 'Search' button. A table displays student information with columns for Student ID, Student Name, and Batch. The table contains one row with the following data: Student ID: ST1000, Student Name: Adam Abera, Batch: DRB2021A. To the right of the table are three buttons: View, Edit, and Delete.

Student ID	Student Name	Batch			
ST1000	Adam Abera	DRB2021A	View	Edit	Delete

Administrator Add Lecturer

The screenshot shows the 'Add Lecturer' page. The sidebar menu is identical to the previous page, but the 'Add Lecturer' option under 'Lecturer Management' is highlighted in purple. The main content area has a blue header with the title 'Add Lecturer'. Below the title are several form fields: Lecturer's Full Name, Lecturer ID, Password, Date of Birth (with a date picker showing 'mm / dd / yyyy'), Email, and Telephone. At the bottom of the form is a 'Hire' button.

Administrator Manage Lecturer

- Home
- Profile
- Basic Info
- Change Password
- Useful Sites
- Student Management**
- Add Student
- Manage Student
- Lecturer Management**
- Add Lecturer
- Manage Lecturer
- Schedule Management**
- Add Schedule
- Manage Schedule
- Announcements**
- Give Announcements
- Send Notification
- Communications**

Manage Lecturer

Search Term :

Lecturer ID	Lecturer Name	Hired Date			
LE1000	Girma Mulugeta	2022-03-13	<input type="button" value="View"/>	<input type="button" value="Edit"/>	<input type="button" value="Delete"/>
LE1001	Abebe Markos	2022-03-13	<input type="button" value="View"/>	<input type="button" value="Edit"/>	<input type="button" value="Delete"/>

Administrator Add Schedule

- Home
- Profile
- Basic Info
- Change Password
- Useful Sites
- Student Management**
- Add Student
- Manage Student
- Lecturer Management**
- Add Lecturer
- Manage Lecturer
- Schedule Management**
- Add Schedule
- Manage Schedule
- Announcements**
- Give Announcements
- Send Notification
- Communications**
- Messages
- Courses

Add Schedule

Select Batch

TIME TABLE

Day/Period	I 9:30-10:20	II 10:20-11:10	III 11:10-12:00	12:00-12:40	IV 12:40-1:30	V 1:30-2:20	VI 2:20-3:10	VII 3:10-4:00
Monday	Physics 12	Biology 12	Chemistry 12	L U N C H				
Tuesday					Chemistry 12			
Wednesday					Physics 12			
Thursday					Biology 12			
Friday								
Saturday								

Administrator Manage Schedule

- Home
- Profile
- Basic Info
- Change Password
- Useful Sites
- Student Management**
- Add Student
- Manage Student
- Lecturer Management**
- Add Lecturer
- Manage Lecturer
- Schedule Management**
- Add Schedule
- Manage Schedule
- Announcements**
- Give Announcements
- Send Notification
- Communications**
- Messages
- Courses**
- Manage Courses
- Registrations

Manage Schedule

Select Batch

TIME TABLE

Day/Period	I 9:30-10:20	II 10:20-11:10	III 11:10-12:00	12:00-12:40	IV 12:40-1:30	V 1:30-2:20	VI 2:20-3:10	VII 3:10-4:00
Monday	Chem12		Phy12	L U N C H		Bio12		Phy12
Tuesday	Phy12	Chem12			Chem12		Bio12	
Wednesday	Bio12		Chem12			Phy12		Bio12
Thursday	Chem12	Phy12				Bio12		Phy12
Friday	Phy12		Bio12			Chem12		Phy12
Saturday	Bio12	Chem12				Phy12		Chem12

Administrator Manage Registration

- Manage Student
- Lecturer Management**
- Add Lecturer
- Manage Lecturer
- Schedule Management**
- Add Schedule
- Manage Schedule
- Announcements**
- Give Announcements
- Send Notification
- Communications**
- Messages
- Courses**
- Manage Courses
- Registrations
- Manage Batches
- Requests**
- Registration Request
- Add Course Request

Registrations

Select Batch

New Course Registration

Course ID

Cost

Deadline

There are no current registrations on the server

Administrator Manage Courses

Manage Courses

Search Term :

Course ID	Course Name	Instructor Name	Course Description	No. of Students			
Chem12	Chemistry 12	Girma Mulugeta	Grade 12 Chemistry	1	<input type="button" value="View"/>	<input type="button" value="Edit"/>	<input type="button" value="Remove"/>

Administrator Manage Batches

Manage Batches

Batch Name

Batch ID

Search Term :

BatchID	Batch Name	Date of Batch Creation	No. of Students		
DRB2021A	DRB2021A	2022-03-13	1	<input type="button" value="View"/>	<input type="button" value="Remove"/>
DRB2021B	DRB2021B	2022-03-13	0	<input type="button" value="View"/>	<input type="button" value="Remove"/>

Administrator/Lecturer Send Notification

Send Notification

Student ID

Receiver	Sender	Notification	Date-Time	
ST1000	AD1000	Your registration request for Chem12 has been approved	2022-05-25 20:50:55	<input type="button" value="Remove"/>

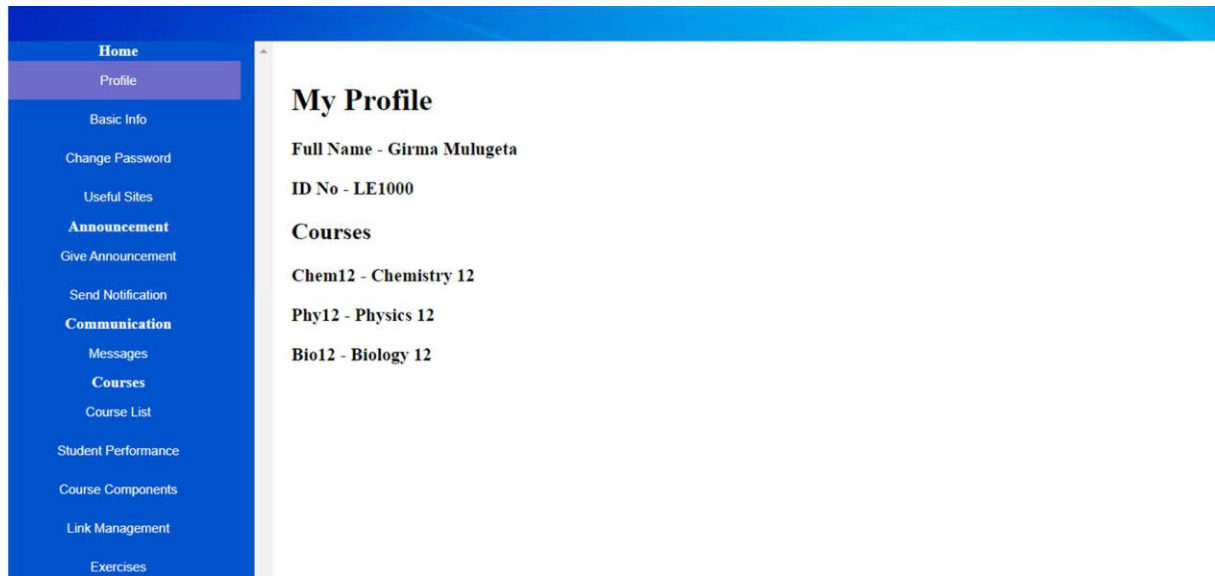
Administrator/Lecturer Give Announcement

Give Announcement

Select Batch:

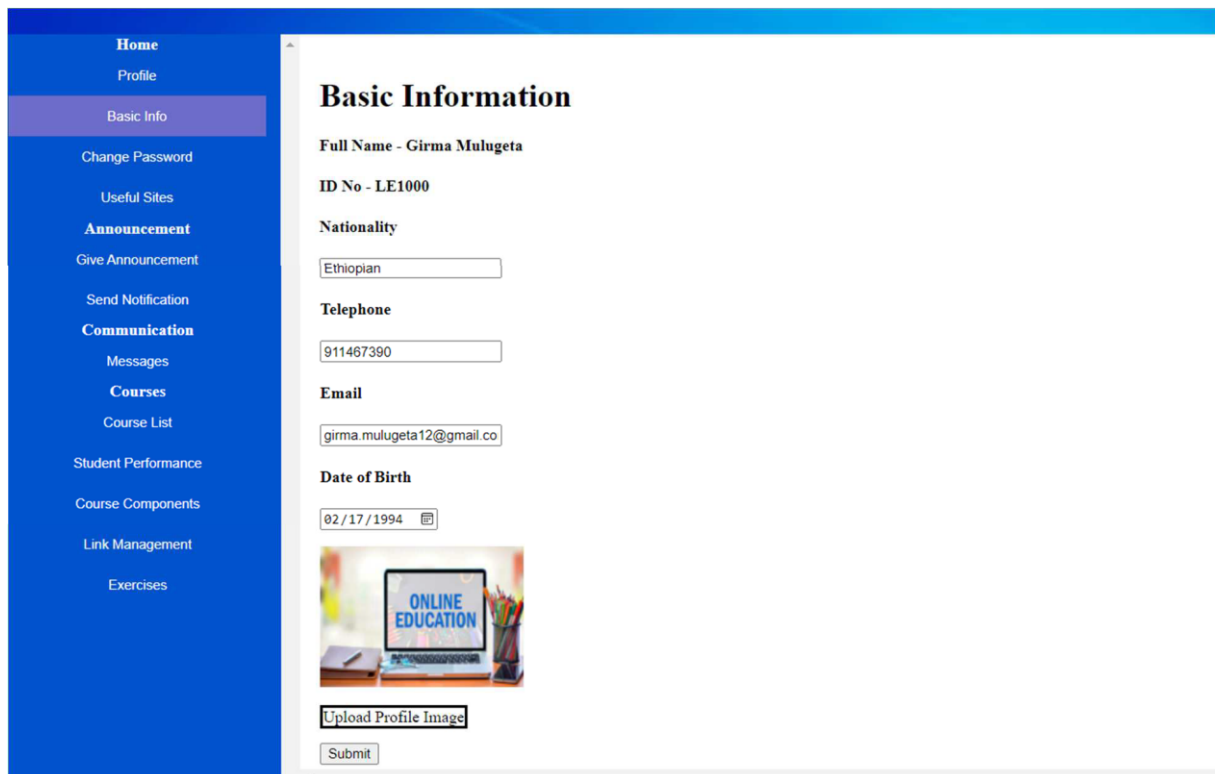
There are no announcements given.

Lecturer Profile Page



The screenshot shows a web application interface with a blue sidebar on the left and a main content area on the right. The sidebar contains a menu with the following items: Home, Profile (highlighted), Basic Info, Change Password, Useful Sites, Announcement, Give Announcement, Send Notification, Communication, Messages, Courses, Course List, Student Performance, Course Components, Link Management, and Exercises. The main content area is titled "My Profile" and displays the following information: Full Name - Girma Mulugeta, ID No - LE1000, Courses (Chem12 - Chemistry 12, Phy12 - Physics 12, Bio12 - Biology 12).

Lecturer Basic Info



The screenshot shows a web application interface with a blue sidebar on the left and a main content area on the right. The sidebar contains a menu with the following items: Home, Profile, Basic Info (highlighted), Change Password, Useful Sites, Announcement, Give Announcement, Send Notification, Communication, Messages, Courses, Course List, Student Performance, Course Components, Link Management, and Exercises. The main content area is titled "Basic Information" and displays the following information: Full Name - Girma Mulugeta, ID No - LE1000, Nationality (Ethiopian), Telephone (911467390), Email (girma.mulugeta12@gmail.co), Date of Birth (02/17/1994). Below the form fields is a placeholder image for a profile picture with the text "ONLINE EDUCATION" and a "Submit" button.

Lecturer Add Course

Course List

Create New Course

Course Name

Course ID

Course Description

Create Course

Course Name	Course ID	Course Description
Chemistry 12	Chem12	Grade 12 Chemistry

Lecturer Edit Student Performance

Student Performance

Select Course: Refresh

Student ID	Student Name	Quarter One	Quarter Two	Semester One Final	Semester One	Quarter Three	Quarter Four	Semester Two Final	Semester Two	Year Total	
ST1000	Adam Abera										Edit

Lecturer Course Components

The screenshot shows a web application interface for 'Course Components'. On the left is a blue sidebar menu with options: Home, Profile, Basic Info, Change Password, Useful Sites, Announcement, Give Announcement, Send Notification, Communication, Messages, Courses, Course List, Student Performance, Course Components (highlighted), Link Management, and Exercises. The main content area has a title 'Course Components' and a 'Select Course:' dropdown menu set to 'Chemistry 12'. Below this is a blue button labeled 'Add Course Materials'. The main form area has a teal background and contains the following fields: 'Course ID' (Chem12), 'Material Name' (text input), 'Material Type' (dropdown menu set to 'Images'), 'Material Description' (text area), and 'Choose file to upload' (file input) with an 'Upload' button.

Lecturer Link Management

The screenshot shows a web application interface for 'Link Management'. On the left is a blue sidebar menu with options: Home, Profile, Basic Info, Change Password, Useful Sites, Announcement, Give Announcement, Send Notification, Communication, Messages, Courses, Course List, Student Performance, Course Components, Link Management (highlighted), and Exercises. The main content area has a title 'Link Management' and a 'Select Course:' dropdown menu set to 'Chemistry 12'. Below this is a blue button labeled 'Add New Link'. The main form area has a teal background and contains the following fields: 'Course ID' (Chem12), 'Link Name' (text input), 'Site Discription' (text area), and 'Link URL' (text input) with an 'UPLOAD' button.

Lecturer Give Exercises

- Home
- Profile
- Basic Info
- Change Password
- Useful Sites
- Announcement**
- Give Announcement
- Send Notification
- Communication**
- Messages
- Courses**
- Course List
- Student Performance
- Course Components
- Link Management
- Exercises**

Exercises

Select Course:

Course ID

Exercise Name

File Type

Submission Deadline

Choose file to upload

Student Basic Info

- Home
- Profile
- Basic Info**
- Change Password
- Schedule
- Student Grades
- Useful Sites
- Registration**
- Register for Courses
- Add Course
- Drop Course
- Announcements**
- Recieve Announcements
- Recieve Notification
- Communications**
- Messages
- Courses**
- Course Components
- View Links
- Exercises

Basic Information

Full Name - Adam Abera


ID No - ST1000

Nationality

Telephone

Email

Date of Birth



Student Schedule

- Home
- Profile
- Basic Info
- Change Password
- Schedule
- Student Grades
- Useful Sites
- Registration**
- Register for Courses
- Add Course
- Drop Course
- Announcements**
- Recieve Announcements
- Recieve Notification
- Communications**
- Messages
- Courses**
- Course Components
- View Links
- Exercises

My Schedule

TIME TABLE

Day/Period	I 9:30-10:20	II 10:20-11:10	III 11:10-12:00	12:00-12:40	IV 12:40-1:30	V 1:30-2:20	VI 2:20-3:10	VII 3:10-4:00
Monday	Chem12		Phy12	L U N C H		Bio12		Phy12
Tuesday	Phy12	Chem12			Chem12		Bio12	
Wednesday	Bio12		Chem12			Phy12		Bio12
Thursday	Chem12	Phy12			Bio12		Phy12	
Friday	Phy12		Bio12			Chem12		Phy12
Saturday	Bio12	Chem12			Phy12		Chem12	

Student Registration

- Home
- Profile
- Basic Info
- Change Password
- Schedule
- Student Grades
- Useful Sites
- Registration**
- Register for Courses
- Add Course
- Drop Course
- Announcements**
- Recieve Announcements
- Recieve Notification
- Communications**
- Messages

Registration

Pay first in order to register by CBE Birr using short code 564582

Course Name	Course ID	Instructor	Cost	Deadline	
Physics 12	Phy12	Girma Mulugeta	230	2022-06-01	<input type="button" value="Register"/>

Student Add Course

Home
Profile
Basic Info
Change Password
Schedule
Student Grades
Useful Sites
Registration
Register for Courses
Add Course
Drop Course
Announcements
Recieve Announcements
Recieve Notification

Add Course

Course ID

Student Drop Course

Home
Profile
Basic Info
Change Password
Schedule
Student Grades
Useful Sites
Registration
Register for Courses
Add Course
Drop Course
Announcements
Recieve Announcements
Recieve Notification

Drop Course

Course Name	Course ID	Instructor	CourseDescription	
Chemistry 12	Chem12	Girma Mulugeta	Grade 12 Chemistry	<input type="button" value="Drop Course"/>

Student Receive Announcement

Recieve Announcements

Receiver	Sender	Announcement	Date-Time
DRB2021A	AD1000	This is an announcement to inform all student that we will no be accepting any late registrations.	2022-05-27 09:48:45

Student Receive Notification

Recieve Notifications

Receiver	Sender	Notification	Date-Time
ST1000	AD1000	Your registration request for Chem12 has been approved	2022-05-25 20:50:55

Student Course Materials

Course Components

Select Course:

Name	Type	Size	Description	Date-Time	
Chemistry 12 Schoolbook 50-Chemistry Grade 12.pdf	Ebooks/pdf	62.2KB	This is the chemistry book we will use as our reference for this course.	2022-05-25 20:49:23	<input type="button" value="Download"/>

Student View Links

Link Management

Select Course:

Description	Date-Time	Link
A site that shows the historical matters of chemistry	2022-05-25 21:11:50	A brief history of chemistry

Student Exercises

- Profile
- Basic Info
- Change Password
- Schedule
- Student Grades
- Useful Sites
- Registration**
- Register for Courses
- Add Course
- Drop Course
- Announcements**
- Recieve Announcements
- Recieve Notification
- Communications**
- Messages
- Courses**
- Course Components

Exercises

Select Course: Chemistry 12

Name	Type	Size	Sent Date	Deadline		
Exercise 1 89-Exercise 1.pdf	Ebooks/pdf	62.2KB	2022-05-25 21:12:49	2022-06-03	Download	Submit

Common Messages

- Home
- Profile
- Basic Info
- Change Password
- Useful Sites
- Student Management**
- Add Student
- Manage Student
- Lecturer Management**
- Add Lecturer
- Manage Lecturer
- Schedule Management**
- Add Schedule
- Manage Schedule
- Announcements**
- Give Announcements
- Send Notification
- Communications**
- Messages
- Courses**
- Manage Courses
- Registrations

Messages

[Send New Message](#)

Receiver ID:

Message:

Attachment Type: Images

Click to Upload Attachment

From	To	Message	Attachment Info	Attachment Name	Message Date-Time	Download
AD1000	LE1000	nve	Images.jpg 651.8KB	filel-robot-4k-nj-1920x1080.jpg	2022-05-04 21:52:03	Download Attachment

5.2 Prototype Evaluation

To validate the prototype, a sample of 34 respondents was selected from Lycée Guebre-Mariam School members using purposive sampling method to the validation questionnaire. This sample was in line with Roscoe's 1971 rule of thumb that any sample size ranging from 30-500 is considered to be adequate and representative of the population. Table below presents the validation sample:

Participant	Sample		Total
	Male	Female	
Administrator	1	1	2
Student	8	9	17
Teacher	9	6	15
Total	18	16	34

Respondents were asked about the capabilities of their E-Learning platforms. Descriptive means were used to analyze the data on a five point of scale, where a mean close to 1 implied Strong Disagreement while a mean close to 5 implied Strong Agreement. The following table presents the findings.

Capabilities of the E-Learning platform	N	Minimum	Maximum	Mean	Standard Deviation
Registration	34	2	5	3.9	0.977
Video Learning	34	1	4	2.97	0.936
Grading	34	2	5	4.11	0.945
Instant Messaging	34	3	5	4.44	0.746
Bulletin Boards	34	3	5	4.14	0.743

Content Management	34	3	5	4.41	0.743
Exercises	34	2	5	4.05	1.013
Tests	34	2	4	4	0.887

Results from primary data in Table above show that respondents Agree that prototype supported Registration (mean=3.9), Video learning (mean=2.5), grading (mean = 4.11), Instant Messaging (4.29), bulletin boards (mean = 4.14), Content management (mean=4.41), Exercises (mean=4.05) and Tests (mean=4) capabilities. From the above table the respondents mean to most of the variables is greater than 4. This showed most respondents were certain about the prototype's capabilities.

Data were generated to analyze the basic characteristics such as gender, designation and Applicable of E-Learning Framework to help understand the kind of people who validated the proposed prototype. The results in Table below indicate that 15 respondents were Teachers, 17 respondents were Students, and 2 respondents were administrative staff. Of the 17 Students, 8 were male and 9 were female. On the other hand, 17 staff members, 10 were male while 7 were female.

Acceptance to apply E-Learning Framework prototype		Respondent		Total
		Students	Staff	
Acceptance	Very Applicable	3	2	9
	Applicable	8	9	14
	Somewhat Applicable	4	3	7
	Not Applicable	2	2	4
Total		17	17	34

An analysis of respondent's Acceptance of E-Learning framework prototype applicability showed that most respondents were approved the e-learning framework prototype by saying applicable (8

Students and 9 staff members). 3 Students and 2 staff members said very applicable about e- learning framework prototype. 6 student and 5 staff members said somewhat applicable and not applicable about the e-earning framework prototype.

5.3 Usability Testing of the proposed eLearning platform

The proposed eLearning framework usability testing using for maths and English courses. The finding of result is shown as

	Mean	Standard deviation
Learnability	3.15	1.009
Content and navigation	3.7	0.913
Accessibility	2.25	1.05

Learnability: Learnability stands for how the learners and instructor are experienced in the eLearning system and how easy for them to accomplish the basic tasks for accessing the educational resources. However, this eLearning system lacked most of the user-friendly features

for easy access to the eLearning, i.e, it is unable to support the user interface customization based on the preference of the learner's local language and user experiences.

Content and Navigation: The content and navigation are considered the main attribute elements in the interactivity design of eLearning page content design and interrelated page organization. More than half of the participants responded that the implemented eLearning system content and navigation were well-designed for easy accessibility of the instructional materials.

Accessibility: The accessibility in the eLearning context stands for the eLearning is free from any technical problems. Most of the respondents has been replied the implemented eLearning platform has accessibility problems due to poor internet connection and infrastructure.

6. Conclusion and Recommendation

6.1 Conclusion

This study was conducted in order to find out the capability of schools to implement e-learning and how we develop an e-learning framework for Ethiopian high schools. After critically reviewed the literature related to e-learning systems we identified some of the most influential factors used in the field of information systems research and gained insight into the characteristics, limitations, weaknesses, and strengths of e-learning systems. We showed that understanding the variables that influence student learning, especially in a collaborative e-learning environment, is helpful for instructors to design meaningful educational activities to promote student knowledge construction and make learning more effective and appealing and how this can help to achieve the most effective deployment of such a system and also help improve strategic decision-making about the technology in the future to decide on the best approach that fits the students before implementing any new technology.

We used a mixed-method research design for this study. We used both quantitative and qualitative data collection and analysis methods. The quantitative research method was used for assessment and feedback from Lycée Guebre-Mariam students while the qualitative method was used for the assessment of Lycée Guebre-Mariam staff that are actively engaged in e-learning in the school. Questionnaire, interview, and observation were used to acquire relevant data for the study and content analysis was used to analyze the data which was gathered from the interaction of stakeholders' interviews.

We identified both the functional and non-functional requirements for the e-learning system to be developed and developed a system model for it. We proposed a conceptual framework, the LearnCube, which contains 6 main dimensions, Student, Teacher, Technology, Course Content, Design and Support, as well as 18 number variables within the dimensions. LearnCube is proposed to model the CSF in a multi-dimensional model.

We developed a web-based prototype for the e-learning system. The system has three types of accounts. Administrators manage students' accounts, lecturers' accounts, schedules and registrations. Lecturers manage courses and provide online classes and digital resources for students. Students take online classes and tests and receive course materials such as useful links, course files and course exercises.

The contribution of this research is to provide a way in which multiple high schools can work together in order to provide education through e-learning to a greater number of students than they would be able to educate through standard face-to-face learning.

6.2 Recommendation

The high schools intending to introduce and integrate E-Learning should first acquire and set up adequate ICT infrastructure in order to offer excellent E-Learning platforms to the Students and Teachers. In addition, administrators of high schools should ensure that the infrastructure in place is upgraded periodically in order to match the changing technology. Exploration of the various funding alternatives such as forming partnerships with governments and private sector players is one way of achieving infrastructural requirements. This can help them to fundraise for necessary ICT infrastructure.

To overcome the problem of lack of knowledge, high schools should train their personnel and hold workshops on using E-Learning teaching methods. Basic computer skills are needed so that Teachers and Students will be able to produce E-Learning media and use it effectively. Finally, Trainers should be motivated to embrace the technology and to receive support in terms of time and guidance for uploading their material online for the Students to access them.

Based on the results, the study recommends improvement of the technical infrastructure and facilities including providing higher internet speed, wireless internet at the high schools and stronger servers, working on supporting the notion of e-learning among teachers and students, intensifying English language courses, social mobilization of community members to interact with this type of education.

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Appendix

Appendix A: Sample Survey instrument and letter to the participants.

Dear Prospective Survey Participant,

I am a master's degree student from St. Mary's University, and I am conducting this research study as part of my MSc degree requirements. My study is entitled, "***Developing an e-learning framework for Ethiopian High Schools: The Case of Lycée Guebre-Mariam***". This is a letter of invitation to participate in this research study. The purpose of this research study is to understand the current practices of e-learning in Ethiopia and investigate the factors that can be used to develop a common framework that will be used as a guideline for Ethiopian high schools in implementing an e-learning system.

By agreeing to participate in the study, you will be giving your consent for the researcher or principal investigator to include your responses in their data analysis. Your participation in this research study is strictly voluntary, and you may choose not to participate without fear of penalty or any negative consequences. You will be able to withdraw from the survey at any time and all survey responses will be removed. There will be no individually identifiable information, remarks, comments, or other identification of you as an individual participant. All results will be presented as aggregate, summary data. The provided data **will not** be used for other than the titled research purpose and will not be transferred to a third party.

The survey will last no more than 10 minutes. Your participation will contribute to this and/or future research and development of an e-learning framework for Ethiopian High Schools that will help several students to get quality education and develop innovative ways to improve the quality of teaching. No compensation will be offered for your participation.

Thank you for your consideration, Genet Jordano

Demographic Information of Teachers/Staff Members

1. What is your current education level?

- Doctoral Degree
- Master's Degree
- Postgraduate Diploma
- Bachelor's Degree

2. What is your current designation?

- School Director
- Supervisor
- Senior Lecturer
- High School Teacher (Grade 9-12)
- Preparatory and Elementary Teacher (Grade 1-9)
- E-Learning Expert
- E-Learning System Developer
- Other (Please Specify) _____

3. Have you used/ how long have you been using e-learning technologies?

- No I have not used e-learning technologies
- 1 to 5 years
- 6 to 10 years
- Over 10 years

4. Have you used/ how long have you been using e-learning technologies?

- No I have not used e-learning technologies
- 1 to 5 years
- 6 to 10 years
- Over 10 years

5. How frequently do you access websites/Internet from home, school, or public terminals (e.g library, cyber cafe)?

- Daily
- Weekly

- Monthly
- Never/I don't have internet access

6. How frequently do you access websites/Internet from home, school, or public terminals (e.g library, cyber cafe)?

- Daily
- /0Weekly
- Monthly
- Never/I don't have internet access

7. What type of device do you use to access internet?

- Phone
- Personal Computer
- Desktop Computer
- Other (Please specify) _____

These are questions for the schools' administration and head of the E-Learning team on how important are these items in defining the quality of e-learning systems that promote effective e-learning?

Potential Items	Not Important	Somewhat Important	Quite Important	Very important
<p>1. Adaptability of Course Platform</p> <p>The course platform allows lecturers to add content, activities and assessments to achieve learning opportunities</p>				
<p>2. Ease of Navigation</p> <p>The course is easy is to navigate thus allowing students to easily move between the sections of the course</p>				
<p>3. Consistency of course platform</p>				

<p>The sections of the course marked with specific colors, graphics, icons, and text styles are consistent throughout the course</p>				
<p>4. Accessibility of course content</p> <p>The course makes use of a variety of content media resources so that content is available in numerous formats such as video, CDs, podcasts are available online and can be accessed anywhere at anytime</p>				
<p>5. Event management</p> <p>The e-learning system offers up-to-date calendars and time schedules for each of the courses for which students are enrolled</p>				
<p>6. User management</p>				

<p>The system allows registration of students and lecturers thus providing login credentials to allow participants to access the systems whenever required hence ensuring interaction and collaboration between and/or amongst students and lecturers</p>				
<p>7. Security of User Data</p> <p>The student and lecturer login credentials are protected and encrypted at all times while interacting via the internet.</p>				
<p>8. Collaborative learning</p> <p>The system provides opportunities for lecturer-student or student-student interactions to enable mastery of course content</p>				

<p>through emails, discussion forums, synchronous chats, webinars, and lab activities.</p>				
<p>9. Interactive learning</p> <p>The system allows students to locate students and people of similar interests outside of their module, course, and year of study or institution</p>				
<p>10. Student tracking</p> <p>Student attendance is captured and logged whenever the course is running using tools that allow the automatic student registration</p>				
<p>11. Time Management</p>				

<p>The system allows students to plan, organize and manage the individual work according to their time and learning style</p>				
<p>12. Learning tracking</p> <p>The system allows the students to monitor their learning activities and gauge their level of achievement</p>				

Semi-Structured Interview Guide

Thank you so much for taking time for this interview as this would allow me to clarify the following items. Given your current position as a school administrator and/or your valuable experiences in e-learning, I would like to get your insights into the current state of affairs of e-learning implementation in the school. Several questions are listed below that form the basis of our discussion during the interview. Kindly, do examine these beforehand. All responses will be treated as anonymous, and in no case will the individual information be identified.

Questions on Policy and general objective

1. What is the school's policy on e-learning
2. What is your school's motivation for adopting e-learning?
3. What are the expected outcomes of e-learning in the school?
4. What incentives/funds are being used to achieve these outcomes?
5. What are the key drivers for the University adopting blended e-learning?
6. What indicators are being used to measure the school's e-learning success?
7. Do you think these approaches would work in other schools?
8. Are any of these approaches specific to your schools?
9. Does the school offer staff mentoring support e-learning to staff members and students?

Usage and Evaluation of e-learning Questions

1. Who is responsible for ensuring that e-learning is sustained?
2. What roles and responsibilities exist in terms of e-learning administration?
3. Who is responsible for the management of the E-learning framework?
4. Have you experienced any problems while delivering e-learning?
5. Have you identified any long-term e-learning support challenges and requirements?
6. Are their e-learning management systems being used by the school?
7. How do you describe e-learning system should be; student-centered or teacher-centered?

Usability evaluation of the eLearning platform

St. Mary's University

School of Graduate Studies

Purpose

This questionnaire is prepared to evaluate the usability of the existing eLearning platform.

Instructions:

Please complete the questions with your best answers. Your information will be kept strictly confidential; please don't write your names on the paper. Thank you in advance.

The following Questions should be filled by a secondary school instructor and students?

Part I: Background

1. Age in years
 - a. 18-25
 - b. 26-35
 - c. 36-45
 - d. more than 45
2. Gender
 - a. Male
 - b. Female
3. Educational Background
 - a. BA/BSC
 - b. MA/MSC
 - c. PhD
4. Health Status
 - a. Normal
 - b. Visual impaired
 - c. Hearing problem
5. Department
 - a. social science
 - b. natural science

No	Learnability: It concerns the eLearning system is easy to learn and understand.	Strongly Agree	Agree	Undecided	Disagree	Strongly disagree
1	Do you think that the e-Learning platform substitute the conventional teaching and learning process?					
2	The e-learning platform has the online assistance to help the learners to access the course (register, access starting page)					
3	The e-learning platform can understand the learners need and provide the educational resources accordingly.					
4	The eLearning platform designed to provide important information for the learners/instructors and has easily accessible links.					
5	The e-learning platform records the learners/instructors spent time for managing and					
6	The self-assessment method is measuring the status of the					

	students and provide fair grading					
7	The eLearning is designed to support different learning approaches for delivery the course (easy to participate group discussion, online presentation, link reference etc.)					
8	The eLearning platform aligned learning objectives, instructional and assessment strategies					
9	The eLearning platform learning objects easily created and reused					
10	The eLearning support multiple assessment strategies to measure content knowledge, skills, and performance standards.					

No	e-Learning Content and Navigation: Concerns the course content preparations fit	Strongly Agree	Agree	Undecided	Disagree	Strongly disagree
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	to eLearning and has attractive interface design.					
11	The eLearning system used easy vocabulary and terminology that are appropriate for the learners.					
12	Educational resources are prepared attractive and readable for learners.					
13	The e-learning platform can understand the learners need and provide the educational resources accordingly.					
14	The e-learning system` present abstract concepts (principles, formulas, rules, etc.) are illustrated with concrete and specific examples.					
15	The assessments and instructional feedback are prepared at the end of each					
16	Fonts (style, color, saturation) are easy to read in both on-screen and printed versions.					
17	The e-learning system support the Learners always know					

	where they are in the course (the completed chapter and left)					
18	The e-learning system monitors and follow-up the learners are engaged in the course or not.					
19	The e-learning allow the learner to leave whenever desired but easily return to the closest logical point in the course.					
20	All pages in the eLearning have consistent header and footer, attractive background color and allow the learns to spent long time.					

No	Interactivity: the eLearning stimulate the conventional teaching and learning process.	Strongly Agree	Agree	Undecided	Disagree	Strongly disagree
21	The courses contents used simulations, role-playing activities, and case studies to					

	gain the attention and maintain motivation of learners.					
22	The courses contents prepared in different file formats and it support virtual online presentation.					
23	The eLearning provide self-check assessments like quiz, test interactively.					
24	The eLearning platform provide multiple interactions and communications among students, to instructors and to course contents.					
No	Accessibility: all users can access the eLearning	Strongly Agree	Agree	Undecided	Disagree	Strongly disagree
25	The eLearning is designed free from technical problems (hyperlink errors, programming errors, etc.)					
26	The eLearning platform can be access in the case of low internet connection.					

27	The learners/Instructors gain sufficient training for accessing the eLearning/ the learners familiarize with the eLearning.					
28	The e-learning platform is designed for all type of learners' i.e. for normal, or visual impaired					
29	The eLearning support easy to upload/download course related files.					