STUDY ON E-LEARNING INFRASTRUCTURES IN SOMALIA

BY

Abdulkadir Jama Ahmed
ID: 221-17-510

This Report Presented in Partial Fulfillment of the Requirements for the
Degree of Master of Science in Management Information System

Supervised By

Sheak Rashed Haider Noori, PhD
professor and Associate Head
Department of CSE
Daffodil International University
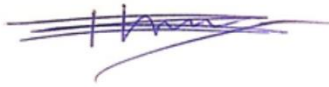

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APPROVAL

This Thesis titled **"Study on E-Learning Infrastructures in Somalia"**, submitted by Abdulkadir Jama Ahmed to the Department of Computer Science and Engineering, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of MS. in Management Information System and approved as to its style and contents. The presentation has been held on 24, January 2023.

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Faculty of Science & Information Technology
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Department of CSE
Jahangirnagar University

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I hereby declare that, this thesis has been done by me under the supervision of **Dr. Sheak Rashed Haider Noori, Professor and Associate Head**, Department of CSE Daffodil International University. I also declare that neither this thesis nor any part of this thesis has been submitted elsewhere for award of any degree or diploma.

Supervised by:

Dr. Sheak Rashed Haider Noori,
Professor and Associate Head
Department of CSE
Daffodil International University

Submitted by:

Abdulkadir Jama Ahmed
ID: 221-17-510
Program: MS in MIS
Department of Management Information System
Daffodil International University

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ABSTRACT

E-learning in Somalia is likely limited due to the challenges the country faces with regard to infrastructure and access to technology. However, with the increasing availability of mobile devices and internet connectivity in some areas, e-learning has the potential to provide access to education for individuals who otherwise may not have it. It's also possible that international organizations or non-profits are implementing e-learning programs to support education in Somalia. For any student, acquiring and expanding their knowledge is essential to success. Since there were no online resources back then, knowledge sharing was very challenging. Later, the internet emerged and was a huge boon to society. Many technologies have been created thanks to the internet. All learners can learn electronically through e-learning, and the most recent method to emerge from it is cloud computing-based electronic learning frameworks. An e-learning system based on cloud computing is an online educational platform that utilizes cloud-based technology to deliver and manage course content, resources, and communication between students and teachers. These systems are hosted on remote servers and accessed via the internet, allowing for easy access and collaboration for both students and teachers. The benefits of cloud-based e-learning systems include accessibility, scalability, cost-effectiveness, and collaboration. They are a cost-effective and flexible way to deliver education online. This thesis book discusses a method for using cloud computing for E-learning as well as various cloud-related topics. With its most recent features, the word "Cloud" has gained significant importance in society.

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CHAPTER 1

INTRODUCTION

1.0 Introduction

Education, also known as learning, is a crucial part of life, and without it, no human being can properly survive. There are many paradigms available today for learning or acquiring knowledge. Electronic learning has proven to be one of education's most promising paradigms. "The deliberate application of networked information and communications technology (ICT) for coaching and learning is referred to as e-learning". It is also called Virtual Learning, Online Learning, Network Learning, Distributed Learning, and Web-Based Learning [1]. Expansion learning is immediately associated with ICT's expanding availability and declining cost. The ability of ICT to support learning and teaching based on multimedia resources is also related to the growing interest in e-learning. The learning environment, teachers, and students can all suffer from a lackluster or inadequate technology infrastructure. Although the price of the hardware and software are decreasing, the deployment of e-learning initiatives frequently overlooks other costs. The most significant of these are the expenses related to infrastructure support and upkeep as well as staff training that is necessary for them to fully utilize technology. A new paradigm known as "cloud computing" uses virtualized resources as a utility over the network and dynamic scaling to offer a suitable pool of computing resources. Internet servers, software, infrastructure, platform components, and services are examples of resources. Cloud computing offers enough network access, a data resource environment, and user adaptability. Services are delivered autonomously based on demand. The storage, memory, and processing power of PCs and servers are centralized by this technology, increasing computing efficiency and lowering costs. We anticipate that the area of online learning education will undergo a revolution due to cloud computing's immense advantages. Applications for cloud computing give educational institutions, including universities and schools, flexibility. For their dynamic demands, institutions' campuses' cloud platforms offer efficient deployment models and infrastructure. The advantages of cloud computing can help educational institutions address some of the typical issues they face, including cost savings, quick and effective communication, security, privacy, flexibility, and accessibility [2]. The next recognized step in the development of on-demand

information technology services and products is "cloud computing." Through the use of cloud computing, processing work can be transferred from local devices to data center facilities. Applications and data are kept on numerous servers that can be accessed via the Internet, and the software is viewed as a service. However, traditional web-based e-learning modes have many issues because system development and maintenance take place inside businesses or educational institutions. Cloud computing offers predictable performance, reduced initial investment (that is, software, hardware, and specialized staff to maintain server and software upgrades), high availability, fast startup times, and infinite scalability, it has many advantages such as incredible fault tolerance, accessibility, and more. It also has many other benefits, including improved collaboration and mobility, which let users use any device, including a phone, PC, etc. Due to its dynamic scalability and efficient use of resources, cloud computing is quickly gaining popularity as a technology that can be used in situations where there aren't enough resources available. The effect of cloud computing on the creation of e-learning solutions is discussed in this paper.

3.0 Background Study

By selecting cloud computing, instructional establishments can increase their offerings and use assets in a bendy way withinside the cloud. When customers want greater assets for their online learning system, they don't have to put in a software program or buy hardware, however, those assets are mechanically transferred to the user, which constitutes a cost-powerful platform to reply to academic needs. Moreover, cloud-primarily based totally e-learning helps the introduction of a brand-new era of e-learning structures that can be capable of running on some hardware devices, whilst storing records withinside the cloud. Also, cloud computing affords an herbal platform to help e-learning structures, and this is accomplished by way of permitting the implementation of records mining strategies that will become crucial whilst big databases are getting used in order that means may be extracted from records [3]. Also, the usage of cloud computing in e-learning permits coping with academic and technical responsibilities better. With the usage of cloud computing, instructional establishments grow to be chargeable for the content material introduction, content material control, and content material delivery, whilst the cloud vendors are chargeable for building in addition to control of the e-getting to know the system. Finally, cloud computing

responds to the cause for which e-learning structures had been created in instructional establishments:

collaboration, interplay, and change among freshmen and teachers. Thus, e-getting to know primarily based totally on the cloud is a brand-new version that complements productiveness in digital learning surroundings and affords learning surroundings where freshmen may want to proportion instructional assets and actively collaborate.

3.0   Problem statement

In Somalia, there are many students in the regions going to universities and facing many challenges but if they had access to online learning they would not go there. Another significant problem is the rising cost of university administration as well as the living costs of students who travel to cities for their academic interests. Some parents are not happy about allowing their children to study in cities, in particular female students. In addition to the enormous growth of universities over the past few decades, universities in Somalia are willing to improve their educational system by using e-learning. These problems prompted the researcher to look into whether e-learning programs are good for students. The purpose of this research is to find out if students are able to learn at home without any obstacles.

3.0   Research Questions

This research asked the following questions

1. Are all students able to access the internet at home, at work, etc.?
2. Do the students have experience using computers and mobile devices?
3. How do students feel about online learning?

3.0   Significance of the Study

The result of this study will assist educators and students in comprehending how the cloud-based e-learning system functions. Since the main tenet of online learning is accessibility from any location, at any time, and on any device, using cloud computing is a wise decision because it gives teachers access to the scalability, flexibility, and security of the cloud.

3.0   Scope of the study

- In this study, I am looking at how students use e-learning systems based on cloud computing,

- Is online learning beneficial to students?
- Are students able to take classes online?
- This paper discussed the key elements of an e-learning platform and concentrated on the benefits and drawbacks of such systems for our tertiary institutions.

3.0 Main objective of the study

The general objective of this study is to investigate whether students are able to learn at home without any issues.

3.0 Specific objectives

- The first objective is to ensure that students are able to access the internet while studying or taking online classes.
- The second objective is to find out if the students are proficient in using electronics or if they have access to the necessary equipment while taking online classes.
- The third objective is to see if the students have a good interest in online classes and whether they like online classes or not.
- To improve academicians' and students' abilities in the area of electronic learning

3.0 Purpose of the study

By providing answers to the following questions, this study hopes to improve the global e-learning environment. Are all students able to access the internet at home, at work, etc.? Do the students have experience using computers and mobile devices? How do students feel about online learning? This investigation sought to identify some needs for cloud-based e-learning. It is hoped that the study will be able to pinpoint elements like:

- Current e-learning system.
- Student satisfaction
- the differences between cloud-computing and traditional e-learning systems
- the benefits of cloud computing for educational institutions.
- challenges in cloud-based e-learning.

3.0 Summary

This chapter presents the basic common understanding of research, including the background of e-learning, and outlines the purpose of this research, including the purpose of the research, research problem and research questions, the significance of the research, and the intended target group. The next chapter provides a literature review on the intent to use e-learning and an overview of cloud computing.

CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

A cloud is a tool that can help scientists whenever their universities' local infrastructure cannot provide them with the necessary computing power [4]. Because of its method of operation as well as the benefits it provides to the general public, cloud computing is a computing environment that has significantly increased in popularity throughout the world. This environment depends on pooling computer resources rather than having separate computers handle each program. It is employed by schooling institutions to address issues with ICTs in the classroom. ICTs in education are thus discussed in this chapter, with a focus on education as an ICT technology. The researcher demonstrates e-Learning difficulties and also how cloud hosting can be used to address them. The advantages of cloud computing for eLearning and some of the most popular platforms of e-learning systems are also discussed in this chapter.

2.1 Overview

This proposed e-learning system has two modules. User and Admin. Admins can upload data to manage and control it. Users can log in with their user ID and password to access their uploaded data. The platform is hosted on cloud servers and data is accessed via MySQL.

- **Admin:**

Administrators have permission to add course materials, videos, and course descriptions. Administrators can also change course prices.

- **User:**

The person desires the login credential to get the right of entry to the content material from the website. Here the person can proportion their mind withinside the remark phase of every direction web page and the person also can speak with the opposite beginners approximately a topic.

2.2 E-learning

E-learning, also known as online learning or distance education, refers to the use of electronic media and information and communication technologies (ICT) to deliver educational content and support the learning process. E-learning can take place in a variety of settings, including primary and secondary schools, higher education institutions, and corporate training programs. E-learning can be delivered through a variety of formats, including web-based courses, video lectures, podcasts, and mobile apps. It can be self-paced or structured around a set schedule and may include interactive elements such as discussion forums and virtual classrooms. E-learning offers a number of benefits, including increased flexibility and accessibility for students, as well as the ability to scale courses to large numbers of students. It can also facilitate the delivery of specialized or niche courses, and allow students to learn at their own pace. However, e-learning also presents challenges, such as the need for effective course design and the integration of technology into the learning process, as well as concerns about data security and privacy. It is important for institutions and educators to carefully consider these issues when implementing e-learning programs [5].

2.3 Current e-learning systems challenges

It is clear that Web-based e-learning systems provide a number of advantages over traditional classroom-based education. Because these systems bring students from various geographic locations together and create the impression of a single classroom environment, they enable them and their teachers to share academic knowledge and
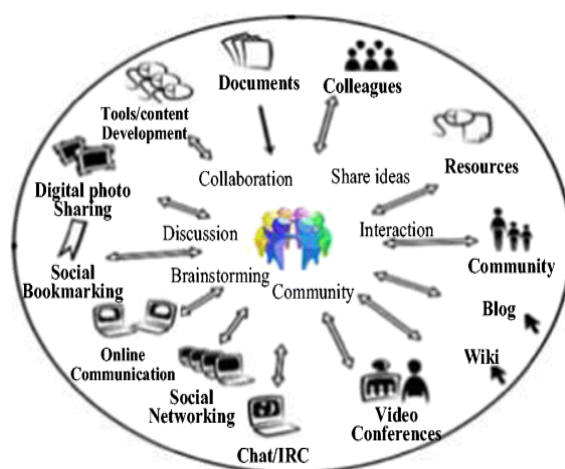

Figure 2.1: E-learning system trends

exchange experiences, which explains why e-learning and e-learning systems are becoming more and more popular [6]. To fulfill the constantly changing needs of educational institutions as well as learners' needs, active e-learning must be made widely available. Through standard e-learning systems, which are not dynamically expandable and do not fully utilize the resources, it is not possible to cater to unique requirements and preferences. The exponential expansion of knowledge at an ever-increasing rate presents substantial obstacles to e-learning. Prior to the full integration of e-learning into the academic sphere, these problems, which deal with pedagogical, technical, and organizational issues, must be addressed and handled. The analysis of some prior works in this subject [7, 8, 9] in this context demonstrates that the main difficulties that educational institutions face have to do with the effective use of the resources of e-learning systems. These difficulties also relate to keeping up with the swift growth in the quantity and variety of data in these systems. Because of this, eLearning systems still have scalability issues at the infrastructure level.

In an e-learning system, a number of resources are deployed and assigned only for particular tasks, implying that additional resources of the same type should be added and configured in response to heavy demands. Because of this, managing costs and resources are quite expensive [10].

E-learning system dimensions do, in fact, increase at an exponential rate with the tremendous rise of users (learners, trainers, etc.), services given, contents, and resources made available by educational institutions. The challenges associated with this new evolution, which relate to the optimization of computing resources as well as storage and communication needs, highlight the need for the adoption of a platform that satisfies scalable requirements and cost control. Additionally, the source [11] makes evident some of the major difficulties associated with the pedagogical, technological, and financial effects of the available e-learning tools. According to the author, hosting e-learning systems that allow multimedia content is hampered by the difficulty of finding storage facilities [12].

Finally, it's critical to realize that maintaining hardware resources, such as computers, servers, data centers, and computing centers, as well as software resources, costs money for an e-learning system. The institution would then be responsible for covering the

costs of a site license, installation, and technical support for the individual software packages [13].

2.4 Cloud Computing

Cloud computing refers to the delivery of computing services, such as servers, storage, databases, networking, software, analytics, and intelligence, over the Internet (the cloud). It enables users to access and use these resources on demand, without the need for physical infrastructure or local software installation.

Cloud computing can be classified into three main categories:

1. Infrastructure as a Service (IaaS): This refers to the delivery of infrastructure resources, such as servers, storage, and networking, over the Internet. Users can rent these resources and access them through APIs or a web-based control panel.
2. Platform as a Service (PaaS): This refers to the delivery of a platform for developing, testing, and deploying applications over the Internet. Users can build and run their applications on the provided platform, without the need to worry about the underlying infrastructure.
3. Software as a Service (SaaS): This refers to the delivery of software applications over the Internet. Users can access and use these applications through a web browser, without the need to install them locally.

Cloud computing has several benefits, including cost savings, scalability, agility, and increased flexibility. It allows users to access and use resources on demand, pay only for what they use, and scale up or down as needed. It also enables users to focus on their core business, rather than worrying about infrastructure and maintenance.
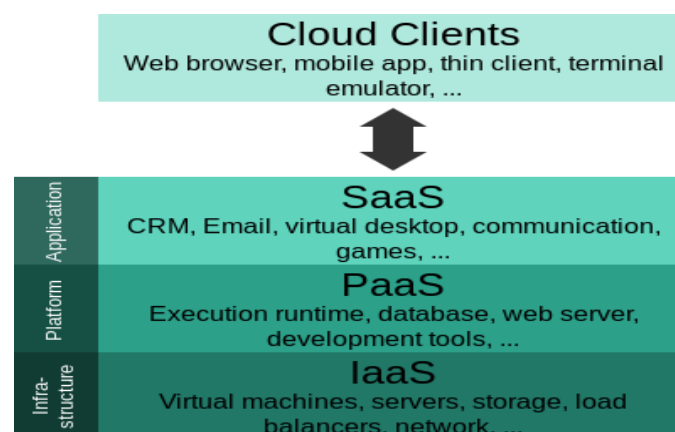

Figure 2.1: The layers for the services of cloud computing [14].

2.5 Models of cloud computing

There are several models of cloud computing, which are based on how the cloud resources are provided and accessed:

1. Public cloud: In this model, the cloud resources are owned and operated by a third-party provider and made available to the public over the Internet. Users can access these resources on a pay-per-use basis, without the need to invest in their own infrastructure. Examples of public cloud providers include Amazon Web Services (AWS), Microsoft Azure, and Google Cloud Platform.

2. Private cloud: In this model, the cloud resources are owned and operated by a single organization and are not made available to the public. Private clouds are often used by organizations that have strict security and compliance requirements, or that want to have more control over their infrastructure. Private clouds can be built on-premises or hosted by a third-party provider.

3. Hybrid cloud: In this model, an organization uses a combination of public and private clouds to meet its computing needs. The organization can use the public cloud for burst capacity or for resources that don't require strict security and compliance, and the private cloud for sensitive data or applications.

4. Community cloud: In this model, the cloud resources are shared by a group of organizations with similar computing needs, such as a group of hospitals or a group of government agencies. The cloud resources are owned and operated by a third-party provider or by the participating organizations themselves.

5. Multi-cloud: In this model, an organization uses multiple cloud platforms from different providers to meet its computing needs. This can provide the organization with greater flexibility and choice, but also introduces additional complexity in terms of management and integration.

2.6 Advantages of Cloud-Based Electronic Learning

2.6.1 Low costs

E-learning users do not always require high-end computers set up for e-learning. To run cloud applications, they can utilize a PC, a mobile device, or a tablet PC with minimal setup and internet connectivity. Because the data is created and accessed in the cloud, the user does not need to invest more money in pricey large memory for data storage in

local machines. Organizations must also pay per use, which lowers the cost and only requires the necessary space.

2.6.2   Enhanced performance:

Client machines do not adversely affect performance when they are in use because the majority of the applications and processes in cloud-based e-learning applications are in the cloud.

2.6.3   Quick software upgrades:

Because the cloud-based electronic learning application uses cloud power, the software is automatically updated there. As a result, e-learners constantly get updates right away.

2.6.4   Increased compatibility with document formats:

Because some data types and fonts do not open fully on some laptops, PCs, and mobile phones, cloud-powered e-learning applications do not need to worry about those types of problems. As with cloud-based e-learning applications, the cloud file is opened.

2.6.5   Advantages for students:

The advantages of cloud-based e-learning for students are greater. They have the option to take courses, pass exams, and receive instructor feedback online. Additionally, they can submit online projects and assignments for their teachers.

2.6.6   Advantages for teachers:

Using cloud-based e-learning has many benefits for teachers as well. Through content management, teachers can improve the resources available to students, manage and grade tests, homework, and assignments submitted by students, provide feedback, and communicate with students through online forums.

2.6.7   Data protection:

Data security is a major concern because both the software and the data are kept on cloud computers that might break down or simply disappear at any time. Despite the fact that it may not make sense, businesses and individuals who use or create e-learning solutions can benefit greatly from the security advantages of cloud computing.

2.7 Some of the main drawbacks of cloud computing:

- Internet connection speed can have an impact on overall performance;
- Long-term costs of data center subscriptions may be higher than those of hardware purchases;
- When it comes to data security, service quality and the need for backups are both essential.

Google, Microsoft, Yahoo, Amazon, and some legacy hardware manufacturers like IBM and Intel are the major players in cloud computing.

Applications for cloud computing are primarily designed to assist organizations and individuals in making the most efficient use of their resources by migrating all data to the cloud. Google is one of the largest advocates of cloud computing. The massive computing infrastructure (the cloud) that connects millions of people is already owned by Google. Today, Google Apps, a software-as-a-service suite for data sharing and security, provides access to the Google cloud. Messaging (Gmail, Calendar, Google Talk), Collaboration (Google Docs, Video, Sites), and Security are the three main areas that Google Apps addresses (Email Security, Encryption, and Archiving). For the purpose of running cloud-based applications, Microsoft is creating a new Windows platform called Windows Azure. Amazon launched Amazon Elastic Compute Cloud in 2006 as a new part of its AWS (Amazon Web Services) product line (or EC2). Users are now able to use Amazon's computing power for eight days to run their own applications. Remote access virtual machines are available for rent from Amazon to EC2 users. The user's ability to launch, quit, and create virtual machines using his web service makes the cloud flexible. For renting virtual machines, there are three standard sizes: Depending on the performance of the physical hardware, small, medium, or large. In contrast to a large group of separate interconnected systems, grid computing is a new development in distributed computing that aims to create the illusion of a single powerful computer. Running your application remotely on a different machine than the one you typically run it on is the simplest way to use the grid. You can run the application on an additionally available computer from the grid network if the first computer is in use. The remote computer must satisfy your application's hardware, software, and resource requirements. It's simple to imagine a cloud data center as a grid of computers. Utilizing resources more efficiently, grid computing can achieve a better balance of usage.

2.8 Popular e-learning systems

There are many popular e-learning systems available on the market. Some examples include:

2.8.1 Blackboard:

Blackboard is a comprehensive e-learning platform that offers a range of tools and features for delivering online courses, including course management, assignment submission, discussion forums, and assessments.

2.8.2 Moodle:

Moodle is an open-source e-learning platform that is widely used by education providers around the world. It offers a range of tools and features for delivering online courses, including course management, assignment submission, discussion forums, and assessments.

2.8.3 Canvas:

Canvas is a cloud-based e-learning platform that offers a range of tools and features for delivering online courses, including course management, assignment submission, discussion forums, and assessments.

2.8.4 Edmodo

Edmodo is a cloud-based learning management system (LMS) that is designed for K-12 educators and students. It offers a range of tools and features for delivering and managing online courses, including course management, assignment submission, discussion forums, and assessments. One of the main features of Edmodo is its emphasis on collaboration and communication between teachers, students, and parents. It includes tools for creating and managing groups, as well as a messaging system for teachers to communicate with students and parents. Edmodo also offers a range of educational resources, including lesson plans, activities, and assessments, that can be used by teachers to create engaging and effective online learning experiences.

2.8.5 Skillport

Skillport is a cloud-based learning management system (LMS) that is designed to help organizations deliver and manage training and development programs. It offers a range of tools and features for creating and delivering online courses, including course management, assignment submission, discussion forums, and assessments. One of the

main features of Skillport is its extensive library of online courses and resources, which includes thousands of courses on a wide range of topics, including leadership, business skills, and technical skills. These courses can be customized and tailored to the needs of individual organizations. In addition to its course library, Skillport also includes a range of tools and features for managing and tracking training programs, including the ability to create and track assignments, manage user accounts and permissions, and generate reports on training progress and results.

2.9 Differences between cloud-based software and traditional e-learning software

There are several key differences between cloud-based software and traditional e-learning software:

1. Hosting: Cloud-based software is hosted on remote servers and accessed over the internet, while traditional e-learning software is typically installed on a local computer or network.

2. Maintenance: Cloud-based software is typically maintained by the provider, while traditional e-learning software requires the user to handle updates and maintenance.

3. Accessibility: Cloud-based software can be accessed from any device with an internet connection, while traditional e-learning software is typically limited to the computer or network on which it is installed.

4. Cost: Cloud-based software is often subscription-based and may have a lower upfront cost compared to traditional e-learning software, which typically requires a one-time purchase.

5. Scalability: Cloud-based software can easily scale up or down as needed, while traditional e-learning software may require additional hardware or resources to accommodate a larger user base.

6. Security: Cloud-based software may offer increased security compared to traditional e-learning software, as the provider is responsible for maintaining and updating security measures.

Overall, cloud-based software can offer increased accessibility, scalability, and security compared to traditional e-learning software, but it may require a stable internet connection and may have ongoing subscription costs. Traditional e-learning software

may have a higher upfront cost, but it may offer more control and customization for the user.

2.10 Summary

In conclusion, institutions are using technology more and more to offer e-learning services. When putting these systems into place, these institutions must overcome a variety of obstacles, including costs, a lack of technical resources, and opposition from important stakeholders. Cloud-based learning platforms are quickly becoming a popular way to offer e-learning services. Because there is less need for on-site maintenance and fewer hardware and software requirements, they can lower costs. Since they are managed from a central location, they are also simpler to deploy across numerous locations. In terms of compatibility, security, and accessibility, they also benefit end users. However, the limitations of cloud-based learning systems include the necessity of an Internet connection, the inefficiency of providing e-learning services over slow connections, and the lack of clarity surrounding cloud security concerns. It appears likely that cloud computing for e-learning will gain popularity as Internet speed and reliability continue to increase.

CHAPTER 3

RESEARCH METHODOLOGY

3.0 Introduction

In this chapter, the mixed methodology used in this study is outlined and discussed. To determine if e-learning systems in Somalia are satisfied or dissatisfied students, a mixed methods approach was used. An anonymous survey was used in this study to gather both quantitative and qualitative data. Following a thorough explanation of the survey's development and plan, the ethical issues raised by this study are discussed.

3.1 Target audience

The target audience for a Study on E-learning Infrastructure in Somalia would depend on the specific goals and objectives of the system. Some potential target audiences for an e-learning system in Somalia could include: Students, the e-learning system could be targeted at students of all ages and levels, from primary school to higher education and also universities. How could provide access to educational materials, online courses, and virtual classrooms? Students in Somalia, specifically those attending universities and taking online courses, are the research's target audience.

3.2 Purpose of the study

By providing answers to the following questions, this study hopes to improve the global e-learning environment. Are all students able to access the internet at home, at work, etc.? Do the students have experience using computers and mobile devices? How do students feel about online learning? This investigation sought to identify some needs for cloud-based e-learning. It is hoped that the study will be able to pinpoint elements like:

- Current e-learning system.
- Student satisfaction
- The differences between cloud-computing and traditional e-learning systems
- The benefits of cloud computing for educational institutions.

- Challenges in cloud-based e-learning.

The main important purpose of the study is to investigate how students are satisfied and dissatisfied with e-learning platforms. Furthermore, if the results of this study were to give rise to a better match between the technology systems and the learning or teaching needs, it would benefit those who rely on e-learning systems.

3.3 Research Approaches

Using qualitative research, a problem can be found and understood. This kind of research involves formulating questions, choosing a course of action, gathering participant data, building an inductive data analysis, and addressing particular general themes before the researcher interprets the significance of the data [15].

A quantitative approach frequently entails a straightforward analysis, allowing it to be applied broadly to participants' larger demographic groups. Additionally, it is simple for participants to understand and interpret, which enables them to respond quickly when there is a time crunch [16].

3.4 The data collection instrument

An anonymous online survey containing a mix of open-ended and closed-ended questions was administered to Somali students between October and November 2022. One of the fundamental ways to gather data for research projects is through surveys. A survey must be designed to be "valid, reliable, and unambiguous" [17]. The three main categories of surveys are closed-ended questions (also known as structured surveys), open-ended questions (also known as unstructured surveys), and mixed-mode surveys. Open-ended questions allow for the collection of both qualitative and quantitative data by researchers.

3.4.1 Survey

A survey is a research method used to gather information from a group of people, typically through the use of a questionnaire. Surveys are used to collect data about attitudes, opinions, behaviors, and other characteristics of a group of individuals. Surveys can be administered in a variety of ways, including online, by phone, by mail, or in person. Surveys are often used in fields such as market research, social research,

and political research to gather data about a specific topic or population. Surveys are typically designed to be representative of a larger population, and the results of a survey can be used to make inferences about that population.

3.4.1.1 The survey instruments

The study employed a self-administered, semi-structured online survey built on the Google Forms platform. Three categories of survey questions were used: demographics, which had closed-ended questions; e-learning, which had a mix of closed- and open-ended questions; and learning needs, which had open-ended questions.

In order to accommodate respondents, the survey was available in both English and Somali.

3.4.1.2 Google form survey

Google Form Survey is a tool platform that can be utilized online for the creation and distribution of surveys, as well as the analysis of the data, gathered. It supports a wide range of methodologies and is thought to be simple to use. In this study, survey questions were created using Google Forms as an online tool and sent to university students in Somalia who responded via email.

3.5 Survey design

Instead of focusing on a statistical summary, the goal of this survey was to be descriptive in order to enable an understanding of participants' opinions and perceptions. Identifying the problems and viewpoints of e-learning users as well as their self-identified primary learning needs is also important.

There were three sections and a total of 17 questions in this survey. Three demographics-related, closed-ended questions were posed to the participants in the first section to learn more about their age, gender, level of education, and how long they had been using e-learning platforms.

Three mixed-mode, open- and closed-ended questions made up the second section, which was devoted to inquiries about technology. The participants' computer and internet usage history were elicited through these questions.

Nine open-ended questions about the participants' needs for learning were posed to them in the third section. It included the main advantages and drawbacks of using an e-learning system as well as the aspects of learning that they felt an e-learning system supported or did not support well. They could also give their current system a rating.

3.6 Ethical issues

Moreover, the researcher assured respondents that the data collected would be used only for academic purposes by structuring the questions in a way that prevented embarrassing the consent process. The researcher ensures the confidentiality of data and that the consent was informed regarding the purpose of the study before responding.

3.7 Data analysis

Researchers can use mixed methods to gain a deeper understanding of a problem rather than just one method [18]. In order to gather and analyze the data derived from the answers to the closed-ended and open-ended questions, a quantitative and qualitative process was used. Instead of focusing on statistical analysis, this study used descriptive analysis to understand and organize participants' opinions and perceptions [19]. After the data were collected, they were exported into an Excel file to make them ready for analysis. The researcher removed any incomplete responses from the data and manually verified each response to make sure it related to the questions. When conducting data analysis, [20] asserts that the approach taken to identify the paradigms and relevant connections to research questions must be consistent with the fundamentals of research. The data analysis procedure was created to enable the researcher to comprehend the views of both satisfied and dissatisfied students in this regard. This made it easier for the researcher to interpret the results based on a clear understanding of the participants' e-learning system usage experiences.

3.8 Descriptive analysis

Descriptive statistics are used to collect, summarize, and explain the data collected from respondents. It was convenient for researchers to get an overview of vital statistics. Data collected from respondents will also be investigated using Excel. Descriptive analysis is also used to analyze respondents' data on the level of intent to use e-learning courses as a student. Analysis of the data obtained through the survey uses commonly used measurements such as average, frequency, percentage, and total data.

3.9 Summary

The purpose of this study was to determine whether e-learning systems could effectively support the tertiary education platform by examining the experiences of e-learning users at Somali Students using a mixed methods approach. Using the Google form tool, an anonymous online survey with both closed- and open-ended questions was created. By organizing the Data, a request was sent to the participants. Online survey responses from 201 people were received as a result. However, only 1 surveys were gathered for analysis after blank responses were removed and the data was cleaned. To analyze the quantitative information gathered for this study, descriptive statistics were used. The data analysis and results are presented in the following chapter.

CHAPTER 4

DATA ANALYSIS AND RESULT

5.0 Introduction

Presented in this chapter are the results of data analysis and interpretation from respondents of Study on E-learning Infrastructures in Somalia. According to the research goals and reliability, the data were analyzed and presented. In order to illustrate the distribution of respondents to different questions, I used tables and graphics. In order to explain and analyze the findings and draw conclusions, the collected data was presented and analyzed using frequency and percentage. A total of 147 responses were received from the Google Forms surveys I shared. The answers to all questions were correct. The descriptive statistics provided by Social Science Statistics Package 26 (SPSS) were used for analyzing the population statistics data. According to the demographic profile section of the survey, respondents were asked about their gender, age, and education level.

4.1 Data preparation and cleaning

Data preparation and cleaning is an important step in the data science process because it ensures that the data you are working with is accurate, consistent, and properly formatted. In a quick overview, I summarized that Google Forms had collected 207 "submitted" responses and over 250 were "in progress." Of the 207 responses submitted, only 147 were usable because the other 60 responses were blank or incomplete.

4.1.1 Demographic Questions

Q1. What gender are you?

Table 4.1 below shows the frequency and percentage of male and female respondents. There was a total of 147 respondents, with 59 (40.1%) being male and 88 (59.9%) being female. This means that the majority of the respondents were female.

Criteria	Frequency	Percent
Male	59	40.1%
Female	88	59.9%
Total	147	100%

Table 4.1: Distribution of respondents by gender.

Q2. Could you please tell me your age?

Figure 4.1 below shows the frequency and percentage of respondents in different age groups. There was a total of 147 respondents, with 30 (20.4%) being in the age group of 13-17, 84 (57.1%) being in the age group of 18-25, and 33 (22.4%) being in the age group of 26-35. This means that the majority of the respondents were in the age group of 18-25.
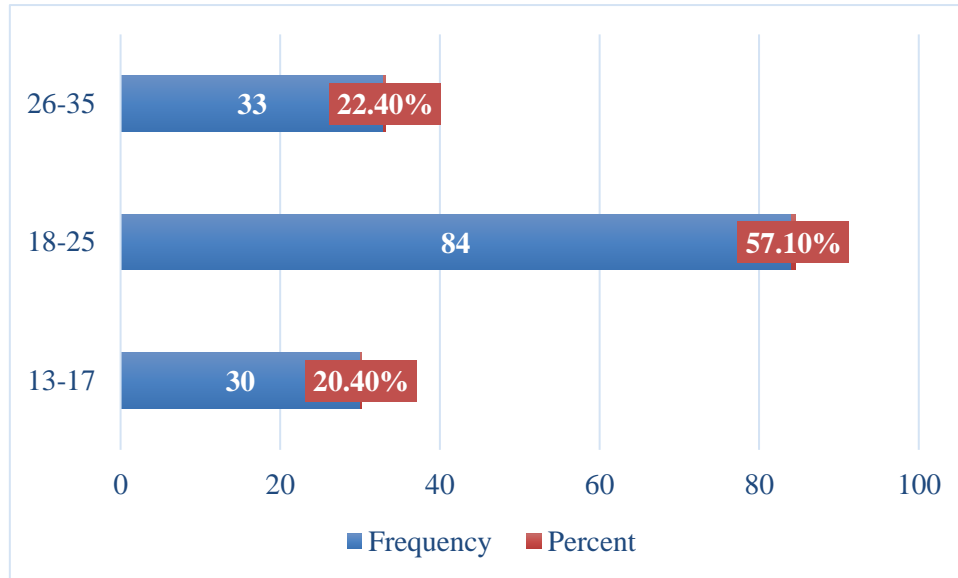

Figure 4.1: Distribution of respondents by Age.

Q3. Can you tell me about your highest level of education?

Table 4.2 below shows the frequency and percentage of respondents of different education levels. There was a total of 147 respondents, with 49 (33.3%) having a school or college education, 64 (43.5%) being undergraduate students, and 34 (23.1%) having a postgraduate education. This means that the majority of the respondents were either in school or college or were undergraduate students.

Education level	Frequency	Percent
School/College	49	33.3%
Undergraduate	64	43.5%
Postgraduate	34	23.1%
Total	**147**	**100%**

Table 4.2: Distribution of respondents by Education level.

4.1.2 Internet questions

Q4. Do you have a good internet connection for studying?

Figure 4.2 below shows the frequency and percentage of respondents who answered "yes" and "no" to this question. There was a total of 147 respondents, with 87 (59.2%) having access to the internet and 60 (40.8%) not having access. This means that the majority of the respondents had access to good internet.
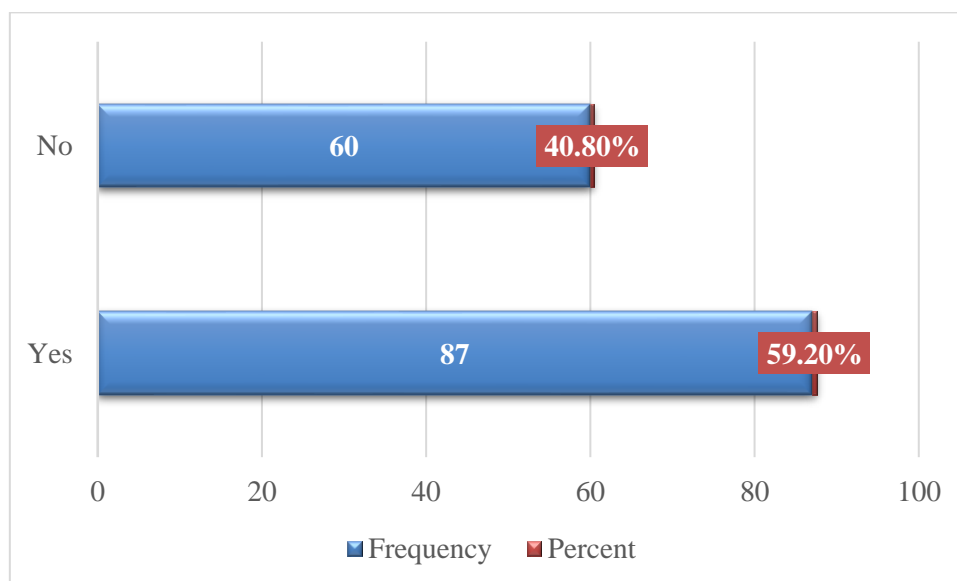

Figure 4.2: Distribution of respondents by internet.

Q5. Do you have proper Internet access at home?

Table 4.3 shows the frequency and percentage of respondents who answered "yes," "limited," and "no" to this question. There was a total of 147 respondents, with 76 (51.7%) having proper internet access at home, 44 (29.9%) having limited internet access, and 27 (18.4%) not having any internet access at home. This means that the majority of the respondents either had proper or limited internet access at home.

Criteria	Frequency	Percent
Yes	76	51.7%
Limited	44	29.9%
No	27	18.4%
Total	**147**	**100%**

Table 4.3: Distribution of respondents by limited internet.

Q6. Why do you have limited access to the Internet?

Figure 4.3 shows the frequency and percentage of respondents who selected "cost/too expensive," "signals availability," and "others" as the main reason. There was a total of 147 respondents, with 77 (52.4%) selecting "cost/too expensive" as the main reason, 34 (23.1%) selecting "signals availability," and 36 (24.5%) selecting "others." This means that the majority of the respondents who have limited internet access cited cost as the main reason.
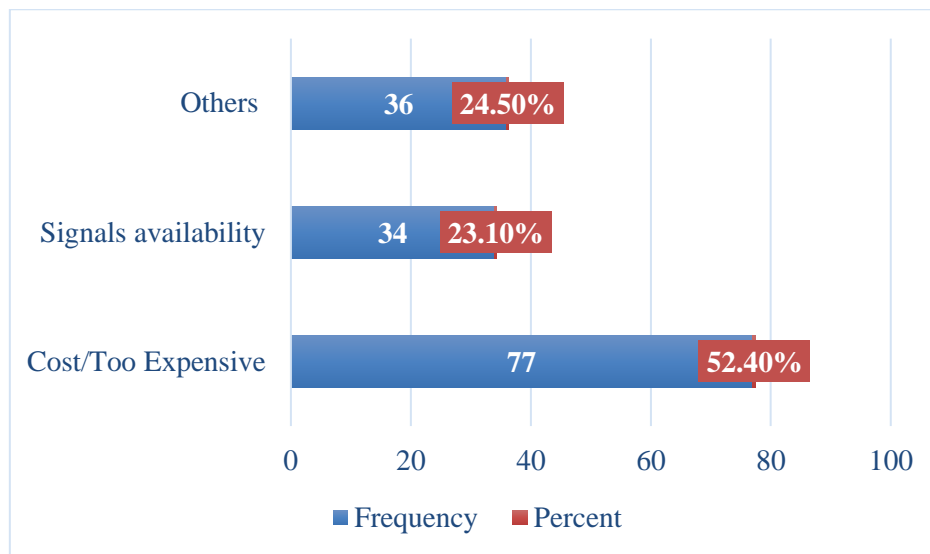

Figure 4.3: Distribution of respondents by main reason you have limited Internet access.

4.1.3 Computer questions

Q7. For distance learning, what kind of device do you use?

Table 4.4 shows the frequency and percentage of respondents who selected "laptop," "desktop," "tablet," and "smartphone" as the device used for distance learning. There was a total of 147 respondents, with 14 (9.5%) using a laptop, 26 (17.7%) using a desktop, 22 (15.0%) using a tablet, and 85 (57.8%) using a smartphone. This means that the majority of the respondents used a smartphone for distance learning.

Criteria	Frequency	Percent
Laptop	14	9.5%
Desktop	26	17.7%
Tablet	22	15.0%
Smartphone	85	57.8%
Total	**147**	**100%**

Table 4.4: Distribution of respondents by devices you use for e-learning.

Q8. Computers are pretty easy for me to use?

Figure 4.4 shows the frequency and percentage of respondents who selected "strongly disagree," "disagree," "neutral," "agree," and "strongly agree" to the statement "I am pretty good at using the computer." There was a total of 147 respondents, with 3 (2.0%) selecting "strongly disagree," 12 (8.2%) selecting "disagreement," 29 (19.7%) selecting "neutral," 90 (61.2%) selecting "agree," and 13 (8.8%) selecting "strongly agree." This means that the majority of the respondents either agreed or strongly agreed that they are good at using the computer.
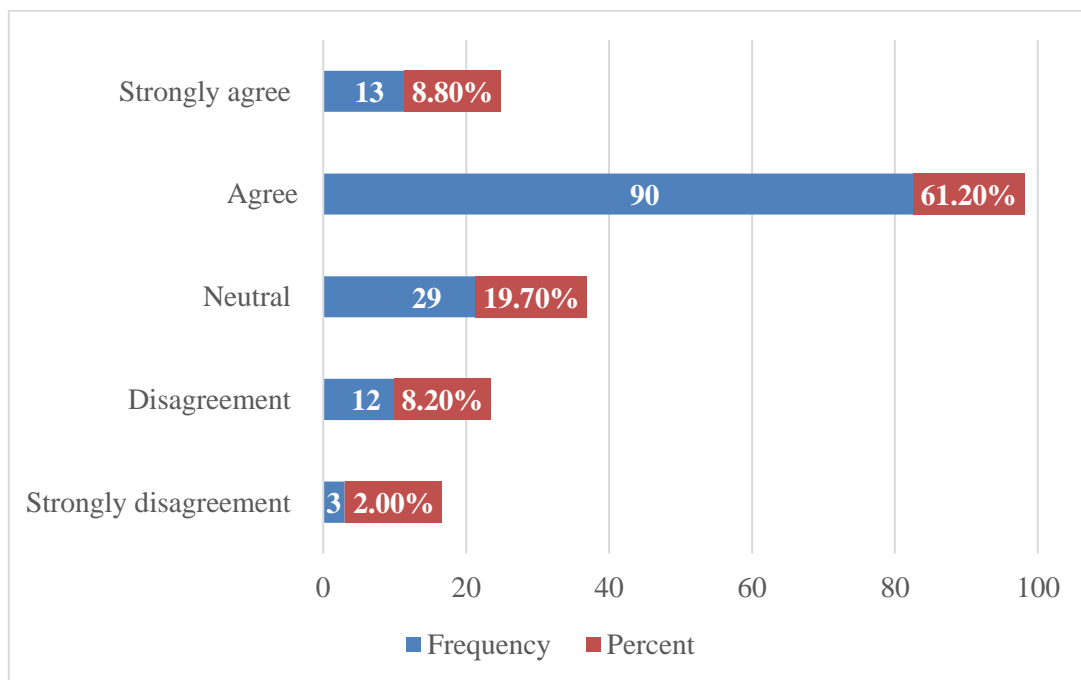

Figure 4.4: Distribution of respondents by computer.

Q9. It is easy for me to communicate electronically.

Table 4.5 shows the frequency and percentage of respondents who selected "strongly disagree," "disagreement," "neutral," "agree," and "strongly agree" to the statement "I am comfortable communicating electronically." There was a total of 147 respondents, with 3 (2.0%) selecting "strongly disagree," 9 (6.1%) selecting "disagreement," 16 (10.9%) selecting "neutral," 95 (64.6%) selecting "agree," and 24 (16.3%) selecting "strongly agree." This means that the majority of the respondents either agreed or strongly agreed that they are comfortable communicating electronically.

Criteria	Frequency	Percent
Strongly disagreement	3	2.0%
Disagreement	9	6.1%
Neutral	16	10.9%
Agree	95	64.6%
Strongly agree	24	16.3%
Total	**147**	**100%**

Table 4.5: Distribution of respondents by comfortable communicating electronically.

4.1.4 E-learning questions

Q10. What is the number of years you have used e-learning?

There are a total of 147 respondents, and figure 4.5 shows the number and percentage of respondents who fall into each of the categories listed in the first column: "less than a year," "1-2 years," "3-5 years," "5-10 years," and "more than 10 years." The percentage in the "Percent" column represents the proportion of respondents in each category as a percentage of the total number of respondents. This means that the majority of the respondents are either 5 – 10 years or 3 – 5 years that they are using e-learning.
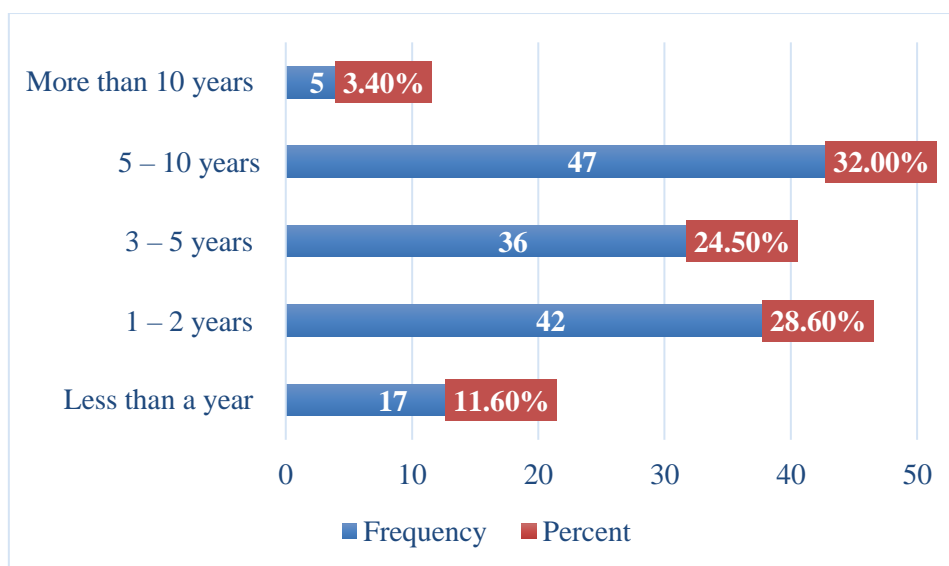

Figure 4.5: Distribution of respondents by years you have been using e-learning.

Q11. How many e-learning courses have you participated in?

Table 4.6 shows the frequency and percentage of respondents who participate in e-learning courses, according to the data, 13 respondents (8.8% of the total) have taken one e-learning course, 18 respondents (12.2% of the total) have taken two e-learning courses, 10 respondents (6.8% of the total) have taken three e-learning courses, 20 respondents (13.6% of the total) have taken four e-learning courses, and 86 respondents (58.5% of the total) have taken 5 or more e-learning courses. The total number of respondents is 147. This means that the majority of the respondents are 5 or more courses that they participate in more than 5 courses.

Criteria	Frequency	Percent
One course	13	8.8%
Two courses	18	12.2%
Three courses	10	6.8%
Four courses	20	13.6%
5 or more courses	86	58.5%
Total	**147**	**100%**

Table 4.6: Distribution of respondents by courses participated.

Q12. Learning is the same in class and at home on the Internet?

Figure 4.6 shows the frequency and percentage of respondents who selected "strongly disagree," "disagree," "neutral," "agree," and "strongly agree" to the statement "learning is the same at home and in class." There was a total of 147 respondents, with 5 (3.40%) selecting "strongly disagree," 26 (17.70%) selecting "disagreement," 20 (13.60%) selecting "neutral," 89 (60.50%) selecting "agree," and 7 (4.80%) selecting "strongly agree." This means that the majority of the respondents are agreed the statement of learning is same in class and at home on the internet.
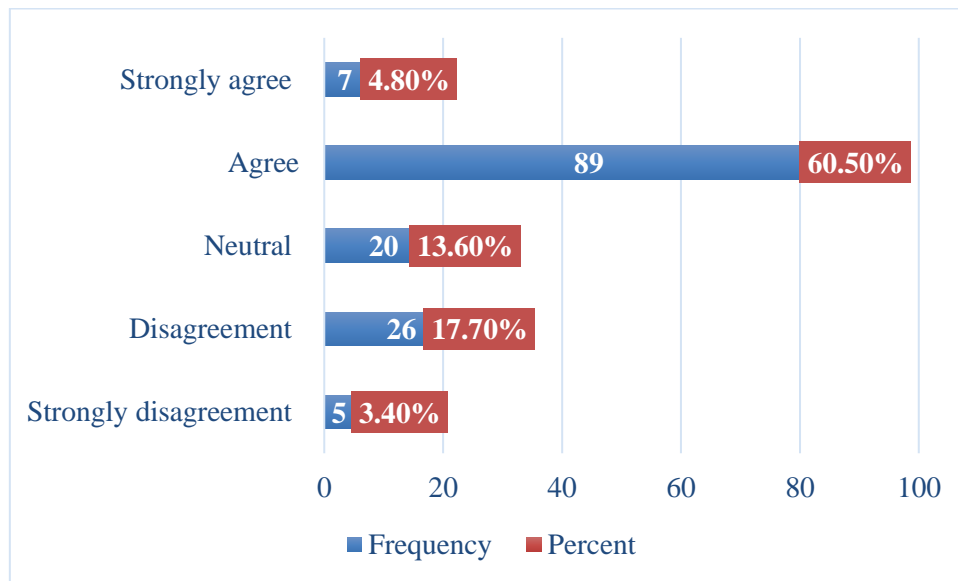

Figure 4.6: The distribution of respondents by learning is the same at home and in class.

Q13. Is learning remotely enjoyable for you?

Table 4.7 shows the results of a survey asking respondents to rate their agreement with a certain statement about learning remotely on a five-point scale. According to the data, 7 respondents (4.8% of the total) strongly disagreed with the statement, 18 respondents (12.2% of the total) disagreed with the statement, 15 respondents (10.2% of the total) were neutral, 84 respondents (57.1% of the total) agreed with the statement, and 23 respondents (15.6% of the total) strongly agreed with the statement. The total number of respondents is 147. It looks like the majority of respondents (57.1%) agreed with the statement about learning remotely, while a smaller percentage (17.4%) either disagreed with the statement or were neutral. A relatively small percentage of respondents (8.2%) either strongly disagreed or strongly agreed with the statement.

Criteria	Frequency	Percent
Strongly disagreement	7	4.8%
Disagreement	18	12.2%
Neutral	15	10.2%
Agree	84	57.1%
Strongly agree	23	15.6%
Total	**147**	**100%**

Table 4.7: Distribution of respondents by enjoying learning remotely.

Q14. I believe a complete course can be given via the Internet without difficulty.

Figure 4.7 shows the frequency and percentage of respondents who selected "strongly disagree," "disagree," "neutral," "agree," and "strongly agree" to the statement "learning is the same at home and in class." There was a total of 147 respondents, with 5 (3.40%) selecting "strongly disagree," 28 (19.00%) selecting "disagreement," 14 (9.50%) selecting "neutral," 88 (59.90%) selecting "agree," and 12 (8.20%) selecting "strongly agree." This means that the majority of the respondents are agreed the statement of I believe a compete course can be given via the internet without difficulty.
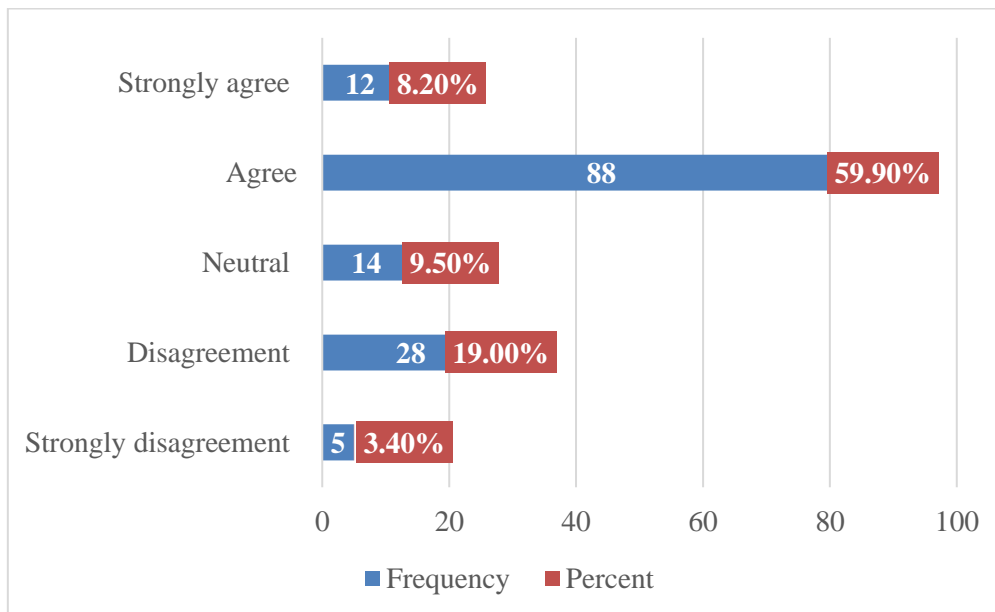
Figure 4.7: A complete course can be given via the Internet without difficulty.

Q15. Are you satisfied with the technology and software you are using for online learning?
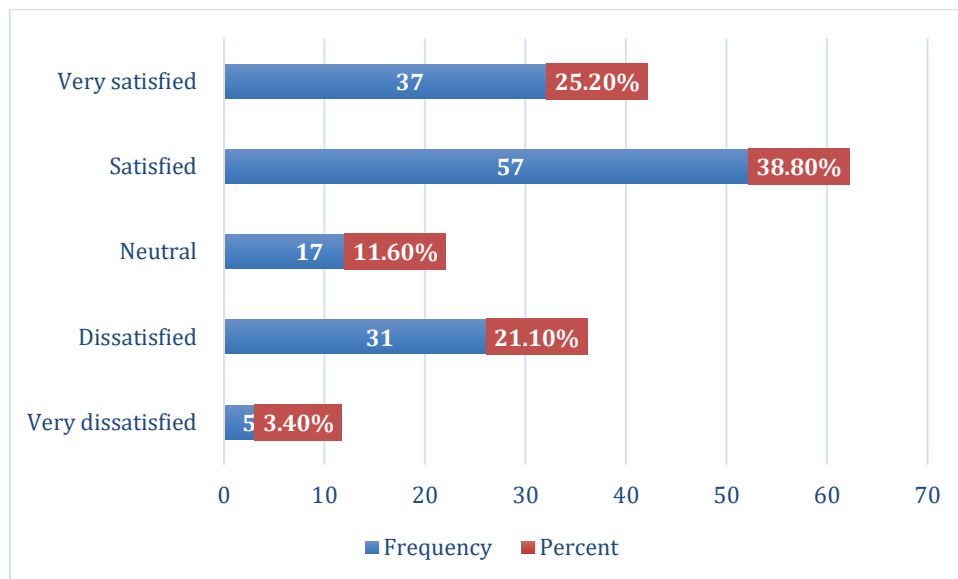
Table 4.8 shows the results of a survey asking respondents to rate their satisfaction with the technology and software they are using for online learning on a five-point scale. According to the data, 8 respondents (5.4% of the total) are very dissatisfied with the technology and software they are using, 31 respondents (21.1% of the total) are dissatisfied, 25 respondents (17.0% of the total) are neutral, 70 respondents (47.6% of the total) are satisfied, and 13 respondents (8.8% of the total) are very satisfied. The total number of respondents is 147. It looks like the majority of respondents (47.6%) are satisfied with the technology and software they are using for online learning, while a smaller percentage (28.2%) either expressed dissatisfaction or were neutral. A relatively small percentage of respondents (14.3%) either expressed very high or very low satisfaction with the technology and software they are using.

Criteria	Frequency	Percent
Very dissatisfied	8	5.4%
Dissatisfied	31	21.1%
Neutral	25	17.0%
Satisfied	70	47.6%
Very satisfied	13	8.8%
Total	**147**	**100%**

Table 4.8: Technology and software you are using for online learning.

Q16. Overall, how satisfied or dissatisfied were you with the online courses?

Figure 4.8 shows the results of a survey asking respondents to rate their satisfaction with the online courses they took on a five-point scale. According to the data, 5 respondents (3.4% of the total) were very dissatisfied with the online courses, 31 respondents (21.1% of the total) were dissatisfied, 17 respondents (11.6% of the total) were neutral, 57 respondents (38.8% of the total) were satisfied, and 37 respondents (25.2% of the total) were very satisfied. The total number of respondents is 147. It looks like a significant portion of respondents (63.9%) were satisfied or very satisfied with the online courses they took, while a smaller percentage (32.7%) either expressed dissatisfaction or were neutral. A relatively small percentage of respondents (3.4%) were very frustrated with the online courses they took.

Figure 4.8: how satisfied or dissatisfied were you with the online courses?

Q17. Do you plan to participate in another e-learning course within the next year?

Table 4.9 shows the results of a survey asking whether respondents plan to participate in another e-learning course within the next year. According to the data, 113 respondents (76.9% of the total) plan to participate in another e-learning course within the next year, while 34 respondents (23.1% of the total) do not plan to do so. The total number of respondents is 147. It looks like the majority of respondents (76.9%) plan to participate in another e-learning course within the next year, while a smaller percentage (23.1%) do not have this plan.

Criteria	Frequency	Percent
Yes	113	76.9%
No	34	23.1%
Total	**147**	**100%**

Table 4.9: Participate in another e-learning course within the next year.

4.2 Central tendencies measurement of constructs

In statistics, central tendency refers to the way in which a set of numbers is clustered around a single value or a small group of values. There are several measures of central tendency, including the mean, median, and mode. But in this research, the mean was used to measure central tendency and the variance was described using the standard deviation.

4.10 Distribution of respondents On Statistical Summary

Variable	Statement	Mean	Std. Deviation	N
Internet access	Do you have a good internet connection for studying?	1.41	.493	147
	Do you have proper Internet access at home?	1.67	.770	147
	Why do you have limited access to the Internet?	1.72	.834	147
Computer or Electronic Experience	For distance learning, what kind of device do you use?	3.21	1.048	147
	Computers are pretty easy for me to use, right?	3.67	.830	147
	It is easy for me to communicate electronically.	3.87	.830	147
Using Electronic Learning	What is the number of years you have used e-learning?	2.87	1.093	147
	How many e-learning courses have you participated in?	4.01	1.397	147
	Learning is the same in class and at home on the Internet.	3.46	.953	147
	Do you enjoy learning remotely?	3.67	1.036	147
	I believe a complete course can be given via the Internet without difficulty.	3.50	1.003	147

	Are you satisfied with the technology and software you are using for online learning?	3.33	1.075	147
	Overall, how satisfied or dissatisfied were you with the online courses?	3.61	1.173	147
	Do you plan to participate in another e-learning course within the next year?	1.23	.423	147

4.3 Scale Measurement

4.3.1 Reliability Test

In general, reliability refers to the consistency or dependability of something. In the context of research, reliability refers to the consistency of the results obtained through measurement or evaluation. A reliable measurement or evaluation is one that produces similar results when it is repeated multiple times or when it is administered by different people. Reliability is an important characteristic of any measurement or evaluation tool, as it helps to ensure that the results obtained are accurate and trustworthy. There are many factors that can affect the reliability of a measurement or evaluation, such as the quality of the tool or test, the conditions under which it is administered, and the characteristics of the people being tested.

Table 4.11 Result of Reliability Test

Variable	Statement	No of items	Cronbach's Alpha
Internet access	Do you have a good internet connection for studying?	3	.844
	Do you have proper Internet access at home?		

	Why do you have limited access to the Internet?		
Computer or Electronic Experience	For distance learning, what kind of device do you use?	3	.731
	Computers are pretty easy for me to use, right?		
	It is easy for me to communicate electronically.		
E-Learning Experience and Feeling of Electronic Learning	What is the number of years you have used e-learning?	8	.846
	How many e-learning courses have you participated?		
	Learning is the same in class and at home on the Internet.		
	Do you enjoy learning remotely?		
	I believe a complete course can be given via the Internet without difficulty.		
	Are you satisfied with the technology and software you are using for online learning?		

	Overall, how satisfied or dissatisfied were you with the online courses?		
	Do you plan to participate in another e-learning course within the next year?		

4.4 Summary

In conclusion, this section served to display the outcomes and conclusions drawn from the data collection for this study. To further verify the reliability of every configuration, internal reliability tests are conducted. In this study, the number of variables, Internet access, Computer or Electronic Experience, E-Learning Experience and Feeling of Electronic Learning check the student in Somalia are they happy with the e-learning systems.

CHAPTER 5

DISCUSSION AND CONCLUSION

5.0 Introduction

This chapter is the final chapter of this study and discusses the statistical results of Chapter 4. We summarize the survey and discuss the main results in later sections. The significance and challenges of research can be mentioned, and research concepts are emphasized for future research.

5.1 Discussion

Discussions surrounding e-learning in Somalia are likely to focus on its potential as a solution to the challenges the country faces with regards to traditional education. These challenges include a lack of funding, ongoing conflict, and limited access to educational infrastructure in certain areas. Proponents of e-learning in Somalia may argue that it has the potential to provide greater access to education for individuals who would otherwise not have it, and to help address the country's shortage of qualified teachers. Critics, on the other hand, may raise concerns about the availability of technology and internet connectivity, as well as the need for training and support for both students and teachers in the use of e-learning platforms. The use of e-learning systems based on cloud computing has increased in recent years due to the flexibility and scalability they offer. These systems allow for easy access and collaboration, making them suitable for both students and teachers. By utilizing cloud-based technology, e-learning systems can handle large numbers of users and offer a cost-effective solution for large-scale education programs. However, there are also some challenges associated with e-learning systems based on cloud computing. One of the main concerns is the security of sensitive data stored on the cloud. This can include student information, test scores, and other personal data. It's important to ensure that these systems are properly secured and that the provider has appropriate security measures in place to protect data from unauthorized access or breaches. Another concern is the availability of internet access. In some areas, internet access may be limited or unreliable, making it difficult for students to access the system. This can be especially problematic in rural or underdeveloped areas. In addition, not all teachers have the same level of technical expertise, and some may require additional training to effectively use and manage an

e-learning system based on cloud computing. Despite these challenges, e-learning systems based on cloud computing have the potential to revolutionize the way education is delivered and managed. With the right support and resources, they can provide students and teachers with a flexible and efficient way to access and share educational content and resources.

5.2 Study limitations

Several factors must be considered as study limitations. Collecting data using a single survey can lead to systematic biases in the method. The initial study design for data collection for this study was to conduct an online survey. Because the study was conducted in Bangladesh and the participants were in Somalia, the distance to the site was limited. Ultimately, this study used a single survey to collect a series of quantitative and qualitative data. Further studies could improve research depth by conducting studies with longer time frames, including interviews to relax time constraints.

Another factor that may have limited the results of this study was the small sample size of 147 respondents, which, when generalized, was not sufficient to be considered representative of the real population of Somali scholars. It may not be big. However, the survey was designed to include many open-ended questions so that respondents could fully describe their thoughts. Therefore, the results may reflect a wider population of Somali scholars.

5.3 Recommendation of the study

- To lower the cost of the internet and make it affordable for students to make it easier for them to study online.
- To make the fee of online classes different from the fee of offline classes.
- To train teachers and students about online learning.

5.4 Future work

The work shows that a small dataset and a simple data SPSS make the data more natural for the human mind to comprehend and therefore make it easier to identify trends, patterns, and outliers within data sets. In the future, I will develop my work for better accuracy. I will try to apply machine learning to make it more natural than this and I will increase the data.

5.5 Conclusion

In conclusion, while e-learning has the potential to provide greater access to education for individuals in Somalia, there are still significant challenges that need to be addressed, such as the availability of technology and internet connectivity, and the need for teacher training and support. Despite these challenges, e-learning has the potential to play an important role in improving access to education in Somalia and helping to address the shortage of qualified teachers. It is important for government, non-profit organizations, and other stakeholders to work together to support the development and implementation of e-learning initiatives in the country. These systems allow for easy access and collaboration, making them suitable for both students and teachers. By utilizing cloud-based technology, these systems can handle large numbers of users and offer a cost-effective solution for large-scale education programs. They also provide the ability to access the system from anywhere with an internet connection, and the ability to share resources and communicate in real time. E-learning systems based on cloud computing have the potential to revolutionize the way education is delivered and managed.

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APPENDIX

This survey is designed to meet the needs of my corporate research. The questionnaire is intended to investigate the intent of a study on e-learning infrastructures in Somalia.

Section A: Demographic Profile

The following questions are related to the respondents' demographic profiles. Please use (/) in parentheses to enter the appropriate information to represent your answer.

1. What gender are you?
   o Male
   o Female

2. Could you please tell me your age?
   o 13-17
   o 18-25
   o 26-35

3. Can you tell me about your highest level of education?
   o School/College
   o Undergraduate
   o Postgraduate

Section B: Internet access

4. Do you have a good internet connection for studying?
   o Yes
   o No

5. Do you have proper Internet access at home?
   o Yes
   o Limited (Access through mobile phone or hand-held device)
   o No

6. Why do you have limited access to the Internet?
   o Cost/Too Expensive
   o Signals availability/ Strength problems
   o Others

Section C: Computer or Electronic Experience

7. For distance learning, what kind of device do you use?
    - o   Laptop
    - o   Desktop
    - o   Tablet
    - o   Smartphone

8. Computers are pretty easy for me to use.
    - o   Strongly disagree
    - o   Disagree
    - o   Neutral
    - o   Agree
    - o   Strongly Agree

9. It is easy for me to communicate electronically.
    - o   Strongly disagree
    - o   Disagree
    - o   Neutral
    - o   Agree
    - o   Strongly agree

Section D: Using Electronic Learning

10. What is the number of years you have used e-learning?
    - o   Less than a year
    - o   1 - 2 years
    - o   3 - 5 years
    - o   5 - 10 years
    - o   More than 10 years

11. How many e-learning courses have you participated in?
    - o   1
    - o   2
    - o   3
    - o   4
    - o   5 or more

12. Learning is the same in class and at home on the Internet?

- o Strongly disagree
- o Disagree
- o Neutral
- o Agree
- o Strongly agree

13. Is learning remotely enjoyable for you?

- o Strongly disagree
- o Disagree
- o Neutral
- o Agree
- o Strongly agree

14. I believe a complete course can be given via the Internet without difficulty.

- o Strongly disagree
- o Disagree
- o Neutral
- o Agree
- o Strongly agree

15. Are you satisfied with the technology and software you are using for online learning?

- o Very satisfied
- o Satisfied
- o Neutral
- o Dissatisfied
- o Very dissatisfied

16. Overall, how satisfied or dissatisfied were you with the online courses?

- o Very satisfied
- o Satisfied
- o Neutral
- o Dissatisfied
- o Very dissatisfied

17. Do you plan to participate in another e-learning course within the next year?

- o Yes
- o No