

**ADDIS ABABA UNIVERSITY**

**COLLEGE OF NATURAL AND COMPUTATIONAL SCIENCES**

**SCHOOL OF INFORMATION SCIENCE**

**Evaluating an E-Learning System for Business Skill Training of Digital Opportunity Trust (DOT) Ethiopia**

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**Evaluating an E-Learning System for Business Skill Training of Digital Opportunity Trust (DOT Ethiopia)**

A Thesis Submitted to the School of Graduate Studies of Addis Ababa University in Partial Fulfilment of the Requirements for the Degree of Master of Science in Information Systems

**BY: Henok Tamrat**

**ID: GSE/9983/13**

**ADVISOR: Temtim Assefa (Ph.D.)**

# Declaration

I hereby declare that the thesis entitled: **Evaluating an E-Learning System for Business Skill Training of Digital Opportunity Trust (DOT Ethiopia)** is my own original work and has not been submitted for any other award degree in any University. It is offered for the award of the degree of Master of Information Systems from Addis Ababa University. Whenever other authors' works are used, they have been properly acknowledged and cited. All data and information used in this thesis are accurate and have been obtained through ethical means. I take full responsibility for any errors or omissions in this thesis.

Name: Henok Tamrat Advisor: Temtim Assefa (Ph.D.)

Signature: Signature:

# Statement of Certification

This is to certify that the thesis prepared by Henok Tamrat entitled **Evaluating an E-Learning System for Business Skill Training of Digital Opportunity Trust (DOT Ethiopia)** and submitted in partial fulfillment of the requirements for the degree of Master of Science in Information Systems complies with the regulations of the university and meets the accepted standards with respect to originality and quality.

**Approved by:**

Internal Examiner Signature Date

External Examiner Signature Date

Temtim Assefa (Ph.D.)

Advisor Signature Date

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# List of Acronyms

**CAI Computer Assisted Instruction**

**CD-ROM Compact Disc Read-Only Memory**

**DIY Do it Yourself**

**DOT Digital Opportunity Trust**

**DOTE Digital Opportunity Trust Ethiopia**

**ECAR Eligibility and Certification Approval Report**

**E-coaching**  **Electronic Coaching**

**E-evaluation Electronic Evaluation**

**E-follow up Electronic Follow up**

**ELC Experiential Learning Cycle**

**E-learning Electronic Learning**

**E-mentoring Electronic Mentoring**

**E-monitoring Electronic Monitoring**

**FM Frequency Modulation**

**HEI Higher Education Institute**

**ICT Information Communication Technology**

**LMS Learning Management System**

**Moodle Modular Object Oriented Dynamic Learning Environment**

**NGO Non-Governmental Organization**

**TAM Technology Acceptance Model**

**WWW World Wide Web**

# Abstract

# Chapter One

# Introduction

## Background

Globalization of knowledge and alternative ways of acquiring knowledge have provided a system of filters that determines the validity, reliability, meanings and implications of what is learned, how it is learned and subsequently reconstructed. Knowledge based on scientific advancement, environmental maintenance, a healthy lifestyle and social responsibilities, for instance, are universally agreed, as worthwhile, they can be harnessed and made available to all through E-learning. Many strategic developments in business and industry point towards growth as virtual teams work together in a global network to establish common knowledge. (Agbenyegah, n.d.)

E-learning is commonly referred to the intentional use of networked information and communication technology in teaching and learning. A number of other terms are also used to describe this mode of teaching and learning. They include; Online learning, Virtual learning, distributed learning, Network and web based learning. The term e learning comprises a lot more than online learning, virtual learning, distributed learning, networked or web-based learning. As the letter “e” in e learning stands for the word “electronic”, it would incorporate all educational activities that are carried out by individuals or groups working online or offline, and synchronously or asynchronously via networked or standalone computers and other electronic devices. (Chitra & Raj, 2018)

Several scientific evidences exist for decades on E-learning challenges in developing countries in Africa such as Egypt, Tanzania, Nigeria, and Uganda. Throughout these studies, it emerged that the ICT sector experienced countless impediments as a result of infrastructure, discrepancies in cultural needs as well as lack of knowledge transfer across ICT demonstrated that it is difficult to acquire infrastructure components such as computers and internet access in most developing countries. Another area of concern is the growing lack of qualified employees to perform installation tasks on the limited technology equipment, technological challenges include high costs of resources and the increasing of insufficient telecommunication infrastructure. This implies therefore, that numerous challenges, especially inadequate infrastructure components hamper EL in the higher education sector. (Agbenyegah, n.d.)

In developing countries like Ethiopia where the availability of skilled manpower, classroom facilities, and printed materials are so scarce and costly, the application of e-learning in the teaching and process plays a significant role in reducing costs and improving quality of education. However, as with any information system, E-learning should be evaluated periodically by identifying determinant factors that affect its successful implementations and sustained usages in order to realize its potential benefits. (Hagos Tesfaselassie, 2019)

DOT Ethiopia is a registered non-profit corporation in Canada, with charitable status under the Canadian Revenue Agency and a Certified Public Charity via NGO source. Digital opportunity Trust-Ethiopia is a youth –led movement daring social innovators who have the tools, knowledge, and networks to create opportunities and transform their own community. DOT Ethiopia believes in the power of youth-led innovation, community can be shaped by empowering youth to create sustainable initiatives inspired by community needs and also social innovation is accelerated by digital technology. (DOTE Internal Report)

DOT has championed digital inclusion for more than 9 years through empowerment in technology for livelihoods, reaching millions of youth in sub- Saharan Africa and the Middle East. DOT Ethiopia trains youth to become digital ambassadors, social innovators, and community leaders who provide digital skills programming that covers digital jobs and digital business training to their peers through youth learning hubs and directly in their communities. (DOTE Internal Report)

DOT Ethiopia has tried to develop and implement an E-learning platform for the training package, an entrepreneurship course based on the organization called Start-Up! The pilot project was implemented to test and check the acceptance level of E-learning in our countries even if the project was not successful, due to several reasons such as lack of access, network connectivity, less technological awareness and other reasons that the researcher will try to address. (DOTE Internal Report)

The major achievement of the E-learning training on the online business startup training were the trainees get high knowledge and skill on business and Entrepreneurship. It was crucial in understanding the business model canvas, know and customize their customer, estimate their annual sales income, customer interview, outperform their competition, test their product with their customer, develop their revenue model, picking their pricing strategy, acquiring customers, making their business work, simple business finance, moreover, tell their business story. (DOTE Internal Report)

Aside from the achievements obtained through the e-learning platform, the system must be evaluated in order to consolidate the good aspects and also offer or recommend further insights toward reaching the organization's aim.

## Motivation

More than 100,000 people in various fields have benefited from DOT Ethiopia's various training programs. These training programs benefit the participants' working career and their ability to grow and run a profitable business. DOT Ethiopia offers a variety of training programs with various objectives, including Reach Up, a life skill, Start-Up, which focuses on business or entrepreneurship, and Scale Up, which is created based on the needs of business owners. All of these programs are participant-centered, and DOT Ethiopia utilizes an experiential learning cycle (ELC). (DOTE annual report)

DOT Ethiopia is a training organization with the goal of reaching more people with its various training programs. However, the organization has a number of difficulties, including a lack of facilities, a lack of trainee commitment and motivation, and excessive budget consumption for trainee expenses including training hall rent and stationary costs. So far DOT Ethiopia having a strong partnership is an excellent method to overcome them. Even though addressing more participants at one time is an issue. (DOTE annual report)

On other hand, due to the COVID-19 Pandemic, it was not possible to provide training in person; instead, DOT Ethiopia delivered the training virtually, using TV and radio programs to highlight high accomplishments and address multiple organizations at once. Having learned from this lesson, DOT has designed and implemented an e-learning platform to address the difficulties associated with in-person training as well as to address other issues. (DOTE Internal Report)

The importance of evaluating the e-learning system for business skill training of DOT Ethiopia lies in the fact that digital skills are becoming increasingly important in today's job market. According to a report by the World Economic Forum, digital skills are among the top skills required for the jobs of the future (World Economic Forum, 2016). E-learning systems can provide an effective way to deliver training to a large number of people, and can help to bridge the digital skills gap in developing countries like Ethiopia. By evaluating the e-learning system for business skill training of DOT Ethiopia, we can identify the strengths and weaknesses of the system, and make recommendations for improvement.

There is a lack of research on the effectiveness of e-learning systems for business skill training in Ethiopia. While there are studies on the effectiveness of e-learning systems in other contexts, such as higher education and corporate training, there is a need for research on the effectiveness of e-learning systems for business skill training in Ethiopia. By filling this research gap, we can contribute to the development of effective training programs that can help to improve the digital skills of young people in the country.

The potential impact of evaluating the e-learning system for business skill training of DOT Ethiopia is significant. By identifying the strengths and weaknesses of the system, we can make recommendations for improvement that can help to improve the effectiveness of their training programs.

The researcher is motivated to study the efficiency of the e-learning system created for start-ups and business owners in assisting them in building successful firms. The researcher is curious about how the system might be modified to better suit the demands of its users and to provide the most effective learning experience possible.

The researcher's aim for doing this research is to evaluate the efficiency of the e-learning system built by DOT Ethiopia in terms of user engagement, knowledge generation, user satisfaction, and module customization. The researcher will evaluate the scalability of the e-learning system and suggest possible areas for extension. In addition will also identify areas for improvement in the e-learning system and develop ways to improve user experience.

## Statement of the Problem

As education serves as a foundation to global stability, globalization and education then come to affect one another through the mutual goals of preparing young people for successful futures. To achieve this, the ever-increasing use of technology and demanding forces of globalization have introduced curriculum reform, a worldwide-practiced marvel that is involved in striving for the best educational practices, primarily with the demands of the twenty-first-century knowledge economy (Ruth & Ramadas,2019).

E-Learning systems are an evolving concept, rooted in the concept of Computer-Assisted Instruction (CAI). The concept of CAI first appeared in 1955 as a means of teaching problem-solving. Computer assisted learning definitions have been studied in various ways. Some studies stress the technology while others have focused on communication. (Manuela, 2015)

Technology-enhanced competency-based learning and training is an approach to education and training that combines the use of technology with a focus on developing specific competencies or skills. Competency-based learning and training is an approach that emphasizes the development of specific skills or competencies, rather than the completion of a set curriculum or number of hours of instruction (Klein-Collins, 2012). Technology can be used to enhance this approach by providing learners with access to a wide range of resources and tools, and by enabling personalized and adaptive learning experiences.

There are several reasons why technology-enhanced competency-based learning and training is an important area of research. First, the growth of ICT has made it possible to deliver education and training to a wider audience than ever before. This is particularly important in developing countries, where access to education and training is often limited (UNESCO, 2017). Second, the high demand for education globally has led to a need for more efficient and effective ways of delivering education and training. Technology-enhanced competency-based learning and training can help to meet this need by providing learners with personalized and adaptive learning experiences that are tailored to their individual needs and goals (Bingham et al., 2021).

There is a growing body of research on technology-enhanced competency-based learning and training. For example, a study by Means et al. (2014) found that technology-enhanced competency-based learning can lead to improved student outcomes, including higher achievement and greater engagement. Another study by (Maldonado, 2019) found that personalized and adaptive learning experiences can lead to improved learning outcomes, particularly for students who are at risk of dropping out.

According to the ECAR (2013) survey, almost all institutions in the world are involved in some forms of e-learning. However, a study across HEIs in most developing countries have established that the implementation and growth of e-learning has not been successful due to several challenges. These challenges include course development, learner support, assessment, institutional factors, user characteristics, and overall performance.

These challenges highlight the need for further research and development in the area of e-learning in developing countries. By addressing these challenges, we can help to improve the effectiveness of e-learning programs and increase access to education and training in these countries.

The use of e-learning systems has become increasingly popular in recent years, with many organizations implementing them to provide training and education to their employees and stakeholders. However, the effectiveness of e-learning systems in achieving their intended goals and objectives is still a topic of debate. Several studies have evaluated the effectiveness of e-learning systems in various contexts, including business skill training. For example, a study by Alzahrani and Al-Shehri (2019) found that e-learning systems can be effective in improving learners' knowledge and skills, but the quality of the content and the delivery methods are critical factors that can impact the effectiveness of the system. Similarly, a study by Alzahrani and Al-Shehri (2020) found that the user experience is an essential factor that can affect the effectiveness of e-learning systems.

DOT Ethiopia has implemented an e-learning system for their Business Skill training package, which presents an opportunity to evaluate the effectiveness of the system. Evaluating the e-learning system can help determine whether it is achieving its intended goals and objectives, identify areas for improvement, measure learner satisfaction, and ensure accountability. By conducting an evaluation, this study aims to contribute to the existing literature on e-learning systems by assessing the effectiveness of the system in improving learners' knowledge and skills, identifying areas where the system can be improved, measuring learner satisfaction, and ensuring that the resources invested in the system are being used effectively and efficiently. The findings of this study can help improve the e-learning system and provide insights for other organizations that are considering implementing e-learning systems for their training and education programs.

In summary, while e-learning systems have the potential to be effective in improving learners' knowledge and skills, several factors can impact their effectiveness. Therefore, it is essential to evaluate the effectiveness of e-learning systems in specific contexts to identify areas for improvement and ensure that they are achieving their intended goals and objectives.

While numerous scholars have made significant strides in advancing e-learning methodologies, our focus will be on identifying and analyzing those specific challenges that have yet to be adequately addressed by prior researchers. Below I will list some papers

The Paper (Buendia et al., 2006) has a lack of real-world context in its presentation. While it describes the development of a framework for evaluating e-learning platforms based on SCORM specifications and a Learning Platform Evaluation Model, it does not provide any concrete examples or case studies of how this framework has been applied in actual educational settings. Without real-world context and practical applications, it becomes challenging to assess the relevance and effectiveness of the proposed framework. Real-world case studies and examples would not only demonstrate the applicability of the framework but also help readers understand how it can address the complex challenges and nuances faced by educators and institutions when evaluating e-learning platforms in diverse educational environments.

Notable drawback of the paper by (Rawashdeh, 2021) is its limited scope and potential sampling bias. The study focuses on a specific university, Ajman University, and its findings may not be fully representative of the broader landscape of higher education in the United Arab Emirates. By solely examining the perspectives of students from a single institution, there is a risk of overlooking the diversity of experiences and challenges that can exist across different universities or educational contexts within the country. This limited scope not only hinders the generalizability of the study's findings but also may fail to capture the nuances and variations that can exist in e-learning environments across various institutions.

One significant downside of this paper by (Hadullo et al., 2017) is its limited generalizability. The study primarily focuses on e-learning practices in developing countries, with a specific case study conducted at JKUAT university in Kenya. While the insights gained from this context are undoubtedly valuable, they may not necessarily apply to a broader global context. Educational environments, technological infrastructure, and student populations vary significantly between countries and institutions, and what works in one setting may not be directly transferrable to another. Therefore, the study's findings may lack the generalizability needed to inform e-learning practices in a wider range of higher education institutions worldwide.

In this paper, we embark on an evaluation journey of the e-learning platform at DOT Ethiopia, utilizing established e-learning system evaluation models. Our unique approach lies in our comprehensive consideration of factors that have hitherto remained underexplored in existing research. While previous studies have made valuable contributions, we strive to fill a critical gap by examining aspects such as the cultural relevance of content, accessibility for learners with disabilities, and the alignment of the e-learning system with DOT Ethiopia's specific educational objectives and socio-economic context. By addressing these often-overlooked factors, we aim to provide a holistic assessment of the e-learning platform while also proposing innovative design solutions tailored to the unique needs and challenges faced by DOT Ethiopia. Our research seeks to offer a more nuanced and context-sensitive perspective that can potentially serve as a blueprint for e-learning improvement not only within DOT Ethiopia but also for similar organizations operating in diverse global contexts.

The goals of this study are to identify an appropriate conceptual model for evaluating e-learning effectiveness and essential dimensions of e-learning effectiveness. In view of the research problem,

This study will address the organizational, technological, and individual factors that affect E-learning implementation.

1. What are the problems in the current e-learning system implementation at DOT Ethiopia?
2. What are the organizational factors that contribute to the success of implementation of the E-learning system at DOT Ethiopia? These factors include the existing culture within the organization and Effective change management strategies.
3. What are the technological factors that contribute to the success of implementation of the E-learning system at DOT Ethiopia? Those factors include Ensuring the security of sensitive data and compatibility with various devices and browsers for accessibility.
4. What are the individual factors that contribute to the success of implementation of the E-learning system at DOT Ethiopia? These factors include different learning styles and preferences and adequate training and support.
5. How can we improve the quality of e-learning system at DOT Ethiopia?

………………………………………………………………………………………..

## Objective

### General Objective

The general objective of this study is Evaluating an E-Learning System for Business Skill Training of DOT Ethiopia.

### Specific Objective

The specific objectives include:

* To identify the challenges and problems associated with the current implementation of the e-learning system for business skill training at DOT Ethiopia.
* To implement effective change management strategies that address user resistance, enhance acceptance, and encourage active participation in e-learning initiatives.
* To increase access to e-learning resources for all employees at DOT Ethiopia, ensuring that technological limitations or infrastructure issues do not hinder participation
* To enhance data security and privacy measures to protect sensitive learner information and build trust in the e-learning system.
* to promote a culture within DOT Ethiopia that values continuous learning and embraces technology as a means of professional development*.*
* To evaluate the quality of the e-learning system for business skill training at DOT Ethiopia using an evaluation model.
* To offer comprehensive training and ongoing support to empower learners with the necessary digital skills and confidence to engage with the e-learning system effectively.
* To propose recommendations for improving the quality and effectiveness of the e-learning system for business skill training at DOT Ethiopia.

## Significance of the Study

The unquestionable importance of e-learning in training has resulted in a significant increase in the number of e-learning courses and systems providing various sorts of services. As a result, evaluating e-learning systems is critical to ensuring successful delivery, effective use, and positive outcomes for participants.

Assessing DOT Ethiopia's business skill training e-learning system is advantageous since it allows the company to review the effectiveness of the training programs and identify areas for improvement. The company can ensure that its trainees are receiving the most effective and up-to-date instruction by measuring the impact of the training. Furthermore, by minimizing the requirement for costly in-person training sessions, organizations can save money by analyzing the system.

This research will be significantly important to DOT Ethiopia by exploring problems in the current e-learning system. Provides and recommend improvement ideas for the existing e-learning system.

The study result will suggest the delivery, composition, performance, practicability, and accessibility of DOT’s E-learning training system. Moreover, the findings of this research will boost the accessibility and availability of recent information on E-learning for training hence so many studies currently present on Education no more studies related to training. Therefore, this study will be an input for researchers and training providers as a reference.

The significance of this research paper for DOT Ethiopia is that it will provide valuable insights into the effectiveness of their e-learning system for business skill training. The evaluation will help identify areas where the system can be improved, measure trainee’s satisfaction, and ensure that the resources invested in the system are being used effectively and efficiently. This information can be used to make informed decisions about the future of the e-learning system and to improve the quality of training provided to their trainees.

For other researchers, this study can contribute to the existing literature on e-learning systems by providing insights into the effectiveness of such systems in a specific context. The findings of this study can be used to inform future research on e-learning systems and to identify areas where further research is needed. Additionally, the methodology used in this study can serve as a model for evaluating e-learning systems in other contexts, providing a framework for future research in this area.

Overall, this research paper has the potential to benefit both DOT Ethiopia and other researchers by providing valuable insights into the effectiveness of e-learning systems for business skill training and contributing to the existing literature on this topic.

## Scope of the Study

The scope of this thesis is to evaluate the e-learning system for business skill training of DOT Ethiopia. The study will focus on assessing the system's impact on trainees’ knowledge and skills, as well as their satisfaction with the system. The evaluation will be conducted using a mixed-methods approach, including surveys and interviews. The study will be limited to trainees of DOT Ethiopia who have participated in a pilot project of the DOTE e-learning system. The data collected will be analyzed using descriptive statistics. The findings of this study will provide insights into the effectiveness of the e-learning system for business skill training and identify areas for improvement. The study will contribute to the existing literature on e-learning systems and provide a model for evaluating such systems in other contexts.

The objective of this study is to evaluate current e-learning platform of DOT Ethiopia using current evaluation models those have been tested. Due to time limits, other processes like implementation and content modification for the platform will not be carried out in this research study, instead, it will be only concentrate on evaluating an e-learning system. This model can then be used to evaluate existing platform of DOT Ethiopia using evaluating model that was tested in the literature. Further studies will use existing, best evaluation results and compare them to alternative approaches to this e-learning platform.

## Organization of the Thesis

The study will be organized into six chapters. The first chapter will be the introduction part, which includes background of the study, statement of the problem, research questions, objectives, Motivation, significance and scope of the study. The second chapter will be literature review which covers literature from different sources that support the work of the researcher. In it, it mainly discusses concepts of E-Learning, E-Learning system success factors, E-learning evaluation. The third chapter will discuss the research methodology like research design, sampling technique, data collection instruments, procedures etc. The fourth chapter will discuss data presentation and analysis which discusses the analyzed data that were collected through semi structured interviews, questioners and document analysis. Based on the analysis and findings of the study an E-Learning framework is proposed in chapter five, evaluation of the proposed E-Learning framework will also be discussed under this chapter. Finally, the last chapter will cover conclusions and recommendations. At last list of reference materials and appendixes are included at the end of this thesis.

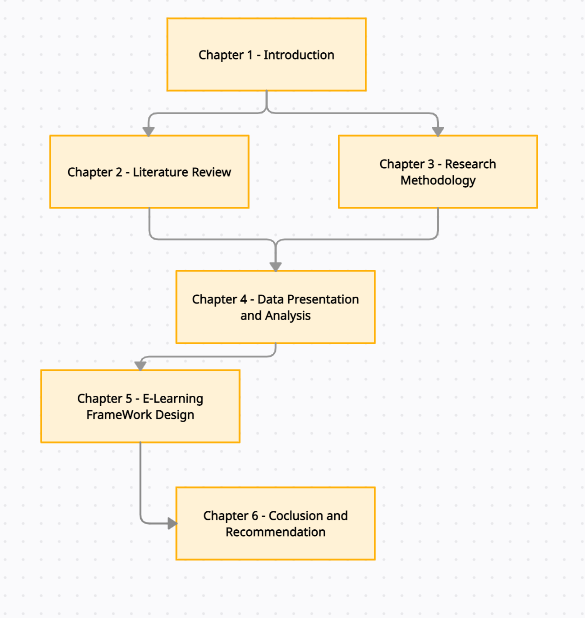


Figure 1.1 Organization of the Thesis

# Chapter Two

# Literature Review

## 2.1. Introduction

A literature review, according to Smith and Johnson (2018), is "a comprehensive analysis of the existing literature on a particular topic or research question." They discovered in their study that literature reviews are an important component of research because they provide an overview of the current state of knowledge on a topic and aid in identifying gaps in the literature that can be addressed through more research.

The researcher first examined the evolution and definition of e-learning and its benefits to individuals and organizations in this chapter. The following step is a review of the general theoretical literature of IS success models, followed by an examination of e-learning evaluation models. Finally, a model for evaluating DOT Ethiopia's e-learning system was presented. This model was developed based on a review of the available literature and the inclusion of the identified gaps.

## 2.2. Evolution of E-learning

In recent years, there has been a significant increase in the use of computers and the Internet as teaching aids. This is only one illustration of how the Internet's influence in our lives is rising. Not long ago, it was normal practice in education to sit in a classroom and listen to the teacher's presentation while taking notes on paper. Then, as computers became more advanced, tactics switched towards more technological methods, such as using PowerPoint slides in the classroom or pdf files to share notes with classmates. (Williams, Jeremy 2005)

When computers were uncommon in the early 1980s, the only way to learn about or from computers was through instructor-led training (ILT). Computers were only for official usage, and employees could only learn from computers during office hours. Using office hours to train resulted in considerable delays in official activity and was hence detrimental for the offices. (Williams, Jeremy 2005)

Over the last few decades, e-learning has evolved tremendously. Initially, text-based materials and rudimentary computer programs were used to deliver e-learning (Ally, 2004). E-learning, on the other hand, has grown more dynamic and engaging with the advent of the internet and multimedia technology (Garrison & Kanuka, 2004).

The development of learning management systems (LMS) in the 1990s enabled the distribution of e-learning courses via the internet (Ally, 2004). Learners could access course materials from anywhere with an internet connection, making e-learning more accessible and convenient.

The rise of social media and mobile technologies in the early 2000s resulted in the establishment of mobile learning (m-learning) and social learning (s-learning) (Garrison & Kanuka, 2004). M-learning involves the use of mobile devices to access course materials and participate in learning activities, whereas s-learning involves the use of social media platforms for collaborative learning and knowledge sharing.

E-learning is evolving today with the use of artificial intelligence (AI) and virtual reality (VR) technology (Ally, 2019). Individual learners' learning experiences can be personalized using AI, while immersive and interactive learning environments can be provided using VR.

Overall, technological improvements have spurred the growth of e-learning, making it more accessible, engaging, and personalized for learners (Ally, 2004; Garrison & Kanuka, 2004; Ally, 2019).

## 2.3. Definitions of E-Learning

In comparison to the history of paper-based distance education, e-learning is a relatively new phenomenon. While electronic-mediated learning has existed for decades, it was not until the advent of the World Wide Web (WWW) that it gained prominence (Kirkwood, 2009; Lin, 2007).

Kirkwood (2009) dates the origins of e-learning back to the 1960s, when computer-based training (CBT) programs were first presented. These programs were largely utilized in corporate and military training situations, and their breadth and interactivity were limited.

In the 1990s, the development of the internet and multimedia technologies led to the emergence of web-based training (WBT) and the first learning management systems (LMS) (Lin, 2007). This allowed for the delivery of e-learning courses through the internet, making it more accessible and convenient for learners.

Since then, e-learning has continued to evolve with the integration of social media, mobile technologies, and artificial intelligence (AI) (Ally, 2019; Garrison & Kanuka, 2004). These advancements have made e-learning more interactive, engaging, and personalized for learners.

Overall, the history of e-learning is a relatively short one, but it has seen significant advancements in technology and pedagogy that have transformed the way we think about teaching and learning (Kirkwood, 2009; Lin, 2007). Web technology integrates text, audio, and video data and offers e-learning services via synchronous and asynchronous interaction modes (Mason, 1998). Before delving into the determinants of e-learning system success, it is necessary to advance the study's operational definitions by simplifying e-learning and e-learning systems.

E-learning is commonly referred to the intentional use of networked information and communication technology in teaching and learning. A number of other terms are also used to describe this mode of teaching and learning. They include; Online learning, Virtual learning, Distributed learning, Network and web-based learning. (Chitra & Raj, 2018)

The term e-learning comprises a lot more than online learning, virtual learning, distributed learning, networked or web-based learning. As the letter “e” in e-learning stands for the word “electronic”, it would incorporate all educational activities that are carried out by individuals or groups working online or offline, and synchronously or asynchronously via networked or standalone computers and other electronic devices. (Chitra & Raj, 2018)

E-learning is the transfer of skills and knowledge via computers and networks. Virtual learning opportunities, digital collaboration, web-based learning in applications and processes, and computer-based learning were all part of e-learning. (Goldberg et al., n.d.)The internet can be used to distribute content such as satellite TV, CD-ROM, audio-video tape, internet, and intranet. It can be guided by an instructor or self-paced. It includes images, animations, streaming videos, audio, and text. E-learnings that are appropriate for tailored flexible and distance listening. However, it is also frequently used for face-to-face learning. It is also referred to as mixed education. (Hitesh Kumar 2022).E-learning is the use of electronic media for learning purposes ranging from traditional classroom add-on functions to online replacement for face-to-face meetings with online encounters. (Sarah Guri-Rosentblit 2005).

## 2.4 Mode of E-learning delivery

E-learning can be fully online, blended/hybrid, synchronous, or asynchronous, according to Chen (2008). A synchronous method of instruction means that students receive information in real time and can communicate directly with other students and the instructor (Chen, 2008, Carswell 2002)

Synchronous training is training in which learners complete online training from different locations at the same time (Carswell 2002) According to Carswell, synchronous distance education entails real-time interaction between student and teacher, despite the fact that they may be in different locations and use various technological tools for communication such as videoconferencing, teleconferencing, and internet chat rooms.

Asynchronous training, on the other hand, refers to self-paced training that allows learners to complete the training at their own pace, anytime, anywhere, with no real-time interactions between themselves and the instructor. (Carswell, 2002) defines asynchronous distance education as a learning model in which student and teacher are not in the same classroom at the same time. Students can achieve asynchronous teaching and learning by self-learning and taking responsibility for reading and obtaining information via the e-learning platform (Ruiz et al. 2006). Asynchronous materials may be provided so that students can access the website of their e-learning course and listen to lectures or complete assignments on their own timetable.

According to (Ong 2003), asynchronous e-learning overcomes time and space constraints while also providing numerous benefits such as cost savings, regulatory compliance, meeting business needs, employee retention, low recruiting costs, and customer support.

Based on a review of existing definitions, this study defines e-learning as a method of delivering interactive learning content supported by audio, animations, and text via learning management system (LMS). Moodle (Modular Object-Oriented Dynamic Learning Environment) is an open source and a popular learning management system.

## 2.5. Benefits of E-learning

Adoption of E-learning in education, particularly for higher educational institutions, has several advantages and benefits, and e-learning is regarded as one of the best methods of education. Several studies and authors have discussed the benefits and advantages of incorporating e-learning technologies into schools (Klein and Ware, 2003; Algahtani, 2011; Hameed et al, 2008; Marc, 2002; Wentling et al. 2000; Nichols, 2003).

The use of e-learning in education has been beneficial in a variety of contexts. Previous research has identified several benefits associated with the incorporation of e-learning technologies into university education (Raspopovic et al., 2017). E-learning has been defined as the ability to tailor instruction to the needs of individual students. Focusing on the needs of individual learners, for example, can deliver knowledge more effectively in the digital age than focusing on the needs of educational institutions or instructors (Huang and Chiu, 2015).

Some studies give advantage of e-learning as its ability to focus on the needs of individual learners. For example, Marc (2000) in his book review on e-learning strategies for delivering knowledge in digital age noted that one of the advantages of e-learning in education is its focus on the needs of individual learners as an important factor in the process of education rather than on the instructors’, or educational institutions’ needs.

According to Al-Handhali, Al-Rasbi, & Sherimon (2020), Learning Management Systems (LMS) offer a range of valuable benefits. They are known for their user-friendliness and efficiency in time management, simplifying course and teacher management, and generating useful reports. Additionally, LMS systems provide timely reminders to users, such as assignment due dates, response deadlines, and test schedules.

In a study conducted by Aydin & Tirkes (2010), the usefulness of LMS, particularly Moodle, was analyzed. The findings of this study highlighted Moodle as an effective LMS tool. It stands out for its flexibility, adaptability to various teaching styles and environments, and ease of use due to its modular design and user-friendly interface. Compared to its competitors, Moodle demonstrated a superior rate of usability. Furthermore, Moodle's increased options for user authentication, straightforward installation process, and maintenance capabilities contribute to its higher frequency of usage (Aydin & Tirkes, 2010).

Numerous studies, such as those by Gautam and Tiwari (2016), Martínez-Caro, Cegarra-Navarro, and Cepeda-Carrión (2015), and Chang (2016), have highlighted the positive impacts of e-learning as perceived by learners. One key advantage of e-learning is its provision of flexible learning opportunities, reducing the necessity for extensive travel to physical classrooms. E-learners have the privilege of delving deeper into course material through interactive video resources (as mentioned by Gautam and Tiwari, 2016; Martínez-Caro, Cegarra-Navarro, and Cepeda-Carrión, 2015), enabling them to actively engage with the learning activities and promptly respond to them.

Traditionally e-learning has been asynchronous, which means there is no predetermined time for the learning to take place. Everyone can go at their own pace, and take their time to learn what they need to know, when they need to know it. However, more synchronous e-learning is now being offered through web conferencing and chat options. E-learning can simply be placed online and easily accessed by people around the world. There is no need for expensive travel or meetings across multiple time zones. (Vaishali, Suryawanshi)

E-learning has become an increasingly popular method for delivering business skill training due to its numerous benefits. E-learning provides learners with the flexibility to learn at their own pace and convenience, regardless of their location or time zone (Ally, 2004). This is particularly beneficial for working professionals who may have limited time for training. E-learning can be more cost-effective than traditional classroom-based training, as it eliminates the need for travel, accommodation, and other associated costs (Bates, 2015). E-learning can be personalized to meet the individual needs and learning styles of learners, which can improve engagement and retention (Khan, 2005). E-learning has been shown to improve learning outcomes, as learners can revisit and review content as many times as needed to fully understand the material (Ally, 2004). In Conclusion, e-learning can be easily scaled to accommodate large numbers of learners, which can be particularly beneficial for organizations with a geographically dispersed workforce (Bates, 2015).

## 2.5. Learning Theories

A set of principles and concepts that describe how humans learn is known as learning theory. It is predicated on the notion that learning is an active process in which learners generate new information and abilities by building on prior knowledge and skills (Agbenyegah, n.d.).Learning theories give a framework for comprehending how people learn and designing effective learning settings. Behaviorism, constructivism, connectivism, humanism, and cognitive theory are examples of learning theories. Each of these ideas is based on a different set of assumptions and concepts that explain how individuals learn. (Kirschner, P. A 2006)

### 2.5.1 Behaviorism

Several psychologists in the early twentieth century, including Watson (1913), Thorndike (1898), and Skinner (1953), theorized that learning happens through interaction with the environment. As a result, observable behaviors arising from a stimulus response followed by a reward or punishment depending on the behavior is how a behaviorist would condition learners to elicit the intended outcome. If the stimulus is removed, the behavior will eventually cease. This is referred to as extinction.

Behaviorism is a learning theory that focuses on the study of observable behaviors. It is founded on the premise that all behaviors are taught through conditioning, either through reinforcement or punishment. According to this theory, conduct can be changed by using rewards and punishments. Positive reinforcement to encourage desired actions and negative reinforcement to discourage undesired behaviors are two examples of behaviorism in the classroom (Gredler, 2020).

One of the most significant learning theories has been behaviorism. Behaviorism is distinguished by its belief in how learning occurs as a result of environmental stimuli and subsequent responses (Boghossian, 2006). According to behaviorists, learning is only successful when the learner exhibits compliance in connecting stimuli and desired responses via conditioning. According to Francis (2003), unlike constructivism, which focuses on knowledge construction, behaviorism focuses on knowledge acquisition. Because behaviorists place emphasis on observable behavior, they are unconcerned about knowledge conceptualization (Foxall, 2008). Online learning can induce behavior that can be compared to stimuli and responses offered. If online educators can develop activities that condition a response cycle in learners, behaviorism concepts are put to good use.

### 2.5.2 Cognitivism

The intrinsic nature of cognitivism learning theory contrasts with the exterior character of behaviorism. Cognitivism is concerned with how the brain processes, retains, and recalls information based on how the learner organizes information into existing knowledge schemas. Schemas are existing information structures in the learner's mind. Instruction can be planned to increase the likelihood that new knowledge will be incorporated to the learner's existing schema in order to ensure that new information is maintained for recall. For example, if the desired learning objective is to describe the water cycle, the teacher may utilize questions to elicit knowledge from learners' current schemas about water and weather by having them recount tales about storms, clouds, lakes, and seas. Once those schemas have been triggered, the instructor can then tie the new information about the water cycle to the tales they recounted, assisting learners in integrating this new information into their existing understanding of water. (Beth Oyarzun & Sheri Conklin)

Cognitivism is a learning philosophy that focuses on the mental processes that occur during the learning process. It is predicated on the notion that learning is a dynamic process of constructing knowledge and understanding. According to this theory, learners are actively engaged in the learning process and use existing information and experiences to develop new knowledge. Using problem-solving exercises to assist students construct new information and metacognitive tactics to help students become more aware of their own learning processes are two examples of cognitivism in the classroom (Gredler, 2020).

Cognitivists study how the mind stores, analyzes, and retrieves information (Biniecki and Conceigao, 2016; Merriam et al., 2007; Rutherford-Hemming, 2012). "A cognitivist views learning as an internal and active mental process that builds enhanced mental capacity and skills within a learner in order to learn better" (McLeod, 2003). Engaging instruction is intended to pique students' interest and encourage active involvement. "Cognitivists argue that learning opportunities should include possibilities for learners to actively participate in the process, including the development of their own goals and activities" (Allen, 2007). Cognitivism is concerned with "what learners know and how they grow to know it rather than what they do" (Yilmaz, 2011).

### 2.5.3 Constructivism

Constructivism is a learning theory that focuses on the idea that learners construct their own knowledge and understanding. It is based on the idea that learners are actively engaged in the process of constructing meaning from their experiences. This theory suggests that learners are actively engaged in the learning process and that they use their prior knowledge and experiences to construct new knowledge. Examples of constructivism in the classroom include using inquiry-based learning activities to help students construct new knowledge and using collaborative learning activities to help students construct meaning from their experiences (Gredler, 2020).

Constructivists think that creating knowledge requires both mental work and social engagement (Altman, 2009; Merriam et al., 2007). Constructivism is the belief that instruction should enable students to construct meaning, resulting in improved learning (Altman, 2009; Biniecki and Conceigao, 2016; Jackson, 2009). According to Ertmer and Newby (1993), the focus of constructivism is clearly on producing cognitive tools that reflect the wisdom of the culture in which they are utilized, as well as the insights and experiences of individuals.

### 2.5.4 Andragogy

Andragogy is credited with assisting educators and trainers in understanding adult learning (Knowles et al., 2014), however it does not meet the criteria for classification as a theory. Rather, it is a model based on humanism theory, which Knowles (1980) defines as a set of principles applicable to most adult learning contexts. Adults should feel "welcome, appreciated, and supported" because "a spirit of mutuality exists between teachers and students as fellow inquirers" (Knowles, 1980). Learners gradually shift from dependent to independent learners as they study. Learners require assistance during this educational journey, which teachers can supply (Henschke, 2011).

### 2.5.5 Connectivism

A new learning theory emerged from the digital environment early in the twenty-first century: connectivism. Connectivism, which is founded on Siemens' (2004) work, is the first philosophy to characterize learning as more than an internal and individual process.

According to the connectivist theory, learning occurs when learners develop connections between concepts dispersed throughout personal learning networks (e.g., other people, databases, social media, the Internet, and learning management systems). Connecting the appropriate people with the right resources can improve learning for everyone in the network.

Technology expands learners' access to information and their ability to participate in a larger learning community (Siemens, 2004). There are some premises behind connectivism. Because there is a constant influx of fresh information, one premise is that learners must discern between significant and unimportant information, as well as correct information. Returning to the house example, suppose you are building a house and want to put a fireplace. You can use the Internet to join a YouTube builder's community or a Do-It-Yourself (DIY) forum. You may also be able to find reviews for various types of fireplaces, as well as information on what has worked and what has not. Once you've built the fireplace, you may share your experience with these communities to help others. (Beth Oyarzun & Sheri Conklin)

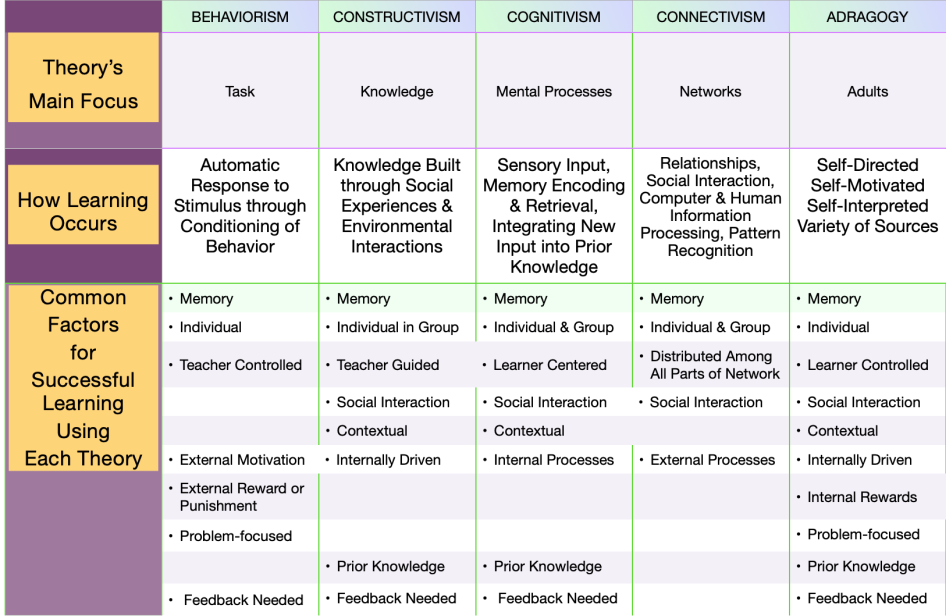


Figure 2.1 Summarized learning theories comparison (https://lorraineledger.com/)

## 2.6. Learning Theories for E-learning Design

Learning theories provide a framework for understanding how people learn and how learning can be facilitated.

Behaviorism is a learning theory that emphasizes the role of the environment in shaping behavior. According to behaviorism, learning occurs when a stimulus is presented, and the learner responds with a behavior that is reinforced or punished. In e-learning design, behaviorism can be applied by providing clear objectives, breaking down complex tasks into smaller steps, and providing immediate feedback (Ertmer & Newby, 2013).

Behaviorism is based on the idea that learning is a change in behavior that results from the interaction between a learner and the environment. This theory emphasizes the importance of reinforcement and punishment in shaping behavior. E-learning designers who use behaviorism may incorporate features such as immediate feedback, progress tracking, and rewards to reinforce desired behaviors. (Ertmer & Newby, 2013)

Cognitivism is a learning theory that emphasizes the role of mental processes in learning. According to cognitivism, learning occurs when learners actively process information, organize it into meaningful patterns, and integrate it with their existing knowledge. In e-learning design, cognitivism can be applied by providing opportunities for learners to engage in active processing, such as through problem-solving activities, simulations, and case studies (Ertmer & Newby, 2013).

Cognitivism is based on the idea that learning is an active process that involves the learner's mental processes, such as attention, memory, and problem-solving. This theory emphasizes the importance of learners' prior knowledge and experiences in shaping their understanding of new information. E-learning designers who use cognitivism may incorporate features such as interactive simulations, case studies, or problem-based learning activities to engage learners in active processing. (Ertmer & Newby, 2013)

Constructivism is an educational theory that places significant importance on the learners themselves as active participants in the process of acquiring knowledge. According to this theory, learning happens when individuals actively interact with their surroundings, carefully consider their experiences, and independently develop their own comprehension of the world around them. In the context of designing e-learning experiences, constructivism can be effectively applied by creating situations where learners can immerse themselves in authentic, real-life tasks, collaborate with fellow learners, and take time to contemplate and analyze their own learning journey (Ertmer & Newby, 2013). Essentially, it's about enabling learners to actively build their knowledge by engaging with meaningful activities and reflecting on their learning process.

Constructivism is based on the idea that learning is a process of constructing meaning from experiences. This theory emphasizes the importance of learners' active engagement with the material and their ability to build their own mental models of the concepts being taught. E-learning designers who use constructivism may incorporate features such as collaborative learning activities, discussion forums, or project-based learning to encourage learners to construct their own understanding of the material. (Ertmer & Newby, 2013)

Connectivism is a learning theory that emphasizes the role of networks and connections in learning. According to connectivism, learning occurs when learners connect with others, access and share information, and participate in diverse communities of practice. In e-learning design, connectivism can be applied by providing opportunities for learners to connect with others, participate in online communities, and access a wide range of resources (Siemens, 2005).

Connectivism is based on the idea that learning is a process of connecting information sources and networks. This theory emphasizes the importance of learners' ability to access and share information through a variety of digital tools and networks, and to use these connections to build their own knowledge and understanding. E-learning designers who use connectivism may incorporate features such as social media, blogs, or wikis to facilitate connections and collaboration among learners. (Siemens, 2005)

Andragogy is a learning theory that focuses on the unique characteristics of adult learners. According to this theory, adult learners are self-directed, have a wealth of life experience to draw upon, and are motivated by practical applications of learning. E-learning designers who use andragogy may incorporate features such as self-paced learning modules, real-world case studies, or opportunities for learners to apply their learning in their own work contexts. (Knowles, Holton, & Swanson, 2015)

Andragogy is based on the idea that adult learners have unique characteristics and needs that differ from those of children. This theory emphasizes the importance of learners' self-direction, life experience, and motivation in shaping their learning. E-learning designers who use andragogy may incorporate features such as self-paced learning modules, real-world case studies, or opportunities for learners to apply their learning in their own work contexts. (Knowles, Holton, & Swanson, 2015)

Based on the target audience of youth and the focus on business skill training, the most appropriate learning theory to use as a lens for e-learning design would be andragogy. Andragogy is a learning theory that emphasizes the unique characteristics and needs of adult learners, including their self-direction, life experience, and motivation. (Knwles, Holton, & Swanson, 2015)

Youth learners are typically considered to be in the age range of 18-24, which falls within the adult learner category. Andragogy suggests that adult learners are more motivated to learn when they see the practical applications of what they are learning, and when they have opportunities to apply their learning in real-world contexts. This is particularly relevant for business skill training, where learners need to be able to apply their knowledge and skills in the workplace. (Knowles, Holton, & Swanson, 2015)

E-learning designers who use andragogy may incorporate features such as self-paced learning modules, real-world case studies, or opportunities for learners to apply their learning in their own work contexts. They may also provide learners with opportunities for self-assessment and reflection, as well as opportunities for collaboration and peer feedback.

Overall, using andragogy as a lens for e-learning design for business skill training for youth learners can help ensure that the training is relevant, engaging, and effective in meeting the unique needs and characteristics of this target audience.

Researchers have employed various frameworks to gain insights into the adoption and diffusion of technologies like the ones under study. Among these frameworks are the technology acceptance model, the theory of reasoned action, the theory of planned behavior, and the expectation-confirmation theory, among others.(Ngafeeson & Gautam, 2021)

In this research, I have chosen to utilize the theory of planned behavior and the expectation-confirmation theory to investigate this adoption phenomenon. I have opted for these two theories for two primary reasons. First, the theory of planned behavior is well-regarded for its adaptability in accommodating change interventions within the realm of behavioral research (Steinmetz, Knappstein, Ajzen, Schmidt, & Kabst, 2016). Given that the adoption of E-Learning Systems is fundamentally a behavioral process, and institutions are seeking effective interventions to promote its usage, the theory of planned behavior appeared to be a highly suitable choice.

## 2.7. E-Learning Evaluation Models

Models of e-learning describe where technology plays a specific role in supporting learning. They can be described both at the level of pedagogical principles and at the level of the detailed practice of implementing those principles. Thus, the models can be used to develop new methods and to study improved learning through that method. (Vaishali, Suryawanshi)

### 2.7.1 DeLone and McLean Information Systems Success Model

The DeLone and McLean Information Systems Success Model is a theoretical framework that explains the factors that contribute to the success of information systems. The model was first introduced by DeLone and McLean in 1992 and has since been widely used in research on information systems and technology adoption.

The DeLone and McLean model proposes that information system success can be evaluated based on six dimensions: system quality, information quality, service quality, use, user satisfaction, and net benefits. System quality refers to the technical quality of the system, including factors such as reliability, usability, and functionality. Information quality refers to the quality of the information provided by the system, including factors such as accuracy, relevance, and completeness. Service quality refers to the quality of the support provided by the system, including factors such as technical support and training.(Halonen et al., n.d.)

End-users' perception of service quality plays a vital role in the adoption of e-learning within a company. To gauge how service quality influences system success, IT experts have developed the SERVQUAL scale for evaluating the quality of information system services. SERVQUAL is grounded in the 2003 revised Information System Success (ISS) model by DeLone and McKean, as noted by Landrum et al. in 2008. By blending these two approaches, Landrum et al. aimed to strengthen measurement capabilities. The constructs can be categorized into the following dimensions:

* Service Quality (SQ): The extent of quality in information system services.
* Information Quality (IQ): The attributes of information system outputs, encompassing accuracy, currency, relevance, and completeness.
* System Quality (SyQ): Performance characteristics, such as response time and user-friendliness.
* Perceived Usefulness (PU): The degree to which users' satisfaction and information system usage reflect their feelings toward the system.
* Perceived Involvement (PI): The impact of the information system on users and organizational performance.(Wong & Norman Huang, 2011)

Use refers to the extent to which the system is used by its intended users. User satisfaction refers to the degree to which users are satisfied with the system and its performance. Net benefits refer to the overall impact of the system on the organization, including factors such as improved productivity, cost savings, and increased revenue.

The DeLone and McLean model proposes that these six dimensions are interrelated and that improvements in one dimension can lead to improvements in other dimensions. For example, improvements in system quality can lead to increased use and user satisfaction, which in turn can lead to increased net benefits for the organization.

The DeLone and McLean model has been used in a wide range of research studies, including studies on the adoption of new technologies in healthcare, education, and business settings. For example, a study by Sedera et al. (2014) used the DeLone and McLean model to evaluate the success of electronic health record systems in hospitals. The study found that system quality, information quality, and service quality were all important factors in determining user satisfaction and system use.

Another study by Wu and Wang (2015) used the DeLone and McLean model to evaluate the success of e-commerce websites. The study found that system quality, information quality, and service quality were all important factors in determining user satisfaction and website use.

Overall, the DeLone and McLean model provides a useful framework for understanding the factors that contribute to the success of information systems. By evaluating these six dimensions, organizations can make more informed decisions about which technologies to adopt and how to design systems that better support user needs.

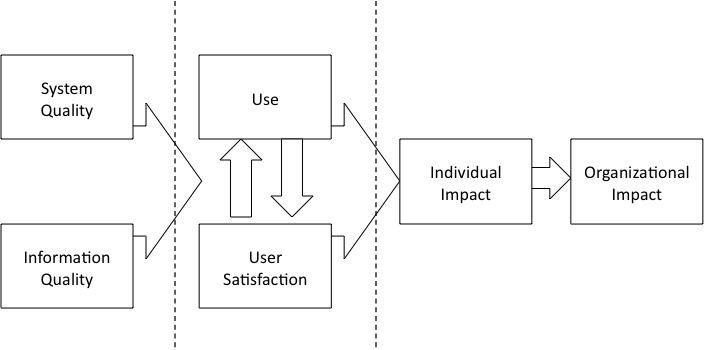


Figure 2.2 DeLone & McLean (1992) Model of Information Systems Success

### 2.7.2 Task Technology Fit Model (TTF Model)

The Task Technology Fit (TTF) model is a theoretical framework that explains how the fit between a task and the technology used to complete that task affects user performance and satisfaction. The model was first introduced by Goodhue and Thompson in 1995 and has since been widely used in research on information systems and technology adoption.

The TTF model proposes that the fit between a task and the technology used to complete that task is a key determinant of user performance and satisfaction. The model suggests that the fit between a task and technology can be evaluated based on three dimensions: task characteristics, technology characteristics, and the fit between the two.

Task characteristics refer to the nature of the task being performed, including its complexity, structure, and interdependence with other tasks. Technology characteristics refer to the features of the technology being used, including its ease of use, flexibility, and compatibility with other systems. The fit between the two dimensions is evaluated based on how well the technology supports the task being performed.

The TTF model proposes that when there is a good fit between the task and technology, users are more likely to perform well and be satisfied with the technology. Conversely, when there is a poor fit between the task and technology, users are more likely to experience difficulties and be dissatisfied with the technology.

The TTF model has been used in a wide range of research studies, including studies on the adoption of new technologies in healthcare, education, and business settings. For example, a study by Holden and Karsh (2009) used the TTF model to evaluate the fit between electronic health record systems and the tasks performed by healthcare providers. The study found that a good fit between the technology and the tasks was associated with higher levels of user satisfaction and better performance.

Another study by Chen and Hwang (2014) used the TTF model to evaluate e-learning systems for business skill training. The study found that system quality, information quality, and service quality were all important factors in determining user satisfaction and skill acquisition. The study also found that use, user satisfaction, skill acquisition, transfer of learning, and business impact were all important outcomes of e-learning systems for business skill training.

Overall, the TTF model provides a useful framework for understanding how the fit between a task and technology affects user performance and satisfaction. By evaluating the fit between task and technology, organizations can make more informed decisions about which technologies to adopt and how to design systems that better support user tasks.

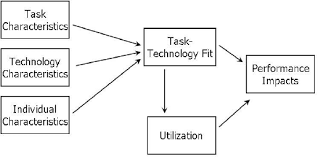


Figure 2.3 Task-Technology-Fit (TTF) Model (Goodhue & Thompson, 1995)

### 2.7.3 Technology Organization and Environment Model (TOE Model)

The Technology-Organization-Environment (TOE) framework is a theoretical model that explains the factors that influence the adoption and implementation of new technologies in organizations. The model was first introduced by Tornatzky and Fleischer in 1990 and has since been widely used in research on technology adoption and innovation.

The TOE framework proposes that technology adoption and implementation are influenced by three main factors: technology characteristics, organizational characteristics, and environmental characteristics. Technology characteristics refer to the features of the technology being adopted, including factors such as complexity, compatibility, and observability. Organizational characteristics refer to the characteristics of the organization adopting the technology, including factors such as size, structure, and culture. Environmental characteristics refer to the external factors that influence technology adoption, including factors such as market competition, regulatory requirements, and social norms.

The TOE framework proposes that the interaction between these three factors determines the likelihood of technology adoption and implementation. For example, a technology that is highly compatible with an organization's existing systems and processes may be more likely to be adopted, while a technology that is highly complex may be less likely to be adopted.

The TOE framework has been used in a wide range of research studies, including studies on the adoption of new technologies in healthcare, education, and business settings. For example, a study by Hsiao et al. (2016) used the TOE framework to evaluate the factors that influence the adoption of electronic health record systems in hospitals. The study found that organizational factors such as size, culture, and leadership were important predictors of adoption, as were environmental factors such as regulatory requirements and financial incentives.

Another study by Chen et al. (2015) used the TOE framework to evaluate the factors that influence the adoption of cloud computing in small and medium-sized enterprises. The study found that technology characteristics such as compatibility and complexity were important predictors of adoption, as were organizational factors such as size and IT expertise.

Overall, the TOE framework provides a useful framework for understanding the factors that influence technology adoption and implementation in organizations. By evaluating technology, organizational, and environmental factors, organizations can make more informed decisions about which technologies to adopt and how to design systems that better support user needs.

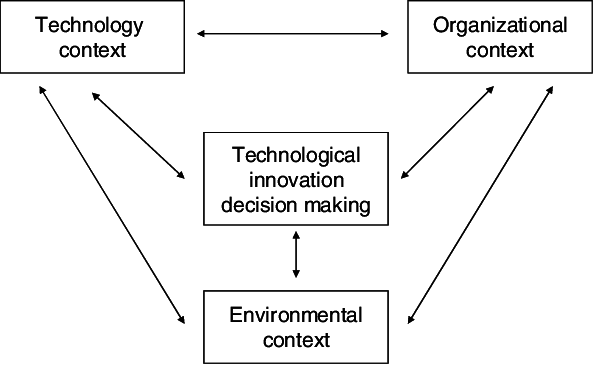


Figure 2.4 The Technology-Organization-Environment model

## 2.8. Conceptual Framework

This section explores the research model, studies that support the development of it, the selection of model constructs, and the formulation of hypotheses based on the model constructs' relationships.

Based on a review of the literature, an evaluation of e-learning success measurement model is developed to answer the research questions. Several techniques to measuring e-learning system success have been developed in earlier studies, as mentioned in this paper's literature review.

The D&M model has been widely used in research to evaluate the success of information systems in various contexts, including e-commerce, healthcare, and education. It has also been used to guide the development and implementation of information systems. For example, a study by Al-Qirim (2010) used the D&M model to evaluate the success of e-commerce websites in Jordan. The study found that system quality, information quality, and service quality were the most important factors influencing user satisfaction and use. Another study by Kim and Lee (2012) used the D&M model to evaluate the success of a healthcare information system in Korea. The study found that system quality, information quality, and service quality were important factors influencing user satisfaction and net benefits.

Using the D&M ISS model, Ouajdouni et al. (2021) assess the success of e-learning for college students in Morocco. They discover that success is determined by use, perception, and student pleasure. W. W. Cidral et al. (2020) adapt D&M ISS's model by incorporating students' learning orientation as a parameter in the evaluation system. To assess e-learning success, W. W. Cidral et al. (2020) employ the net benefit technique. W. W. Cidral et al. (2020) discover in their study that the success of e-learning is dependent on student use and satisfaction.

The main variables in the model are information quality, service quality, system quality, use, user satisfaction, and individual impact. In this study, we have used information quality, service quality, system quality, e-learning system use, and individual impact as the main variables. Specifically, we have operationalized information quality as learning content, service quality as support quality, and individual impact as the impact of the e-learning system on the individual user, including factors such as job performance and satisfaction.

In addition to these main variables, this study also includes pedagogical features and self-efficacy as additional variables. Pedagogical features refer to the educational features of the e-learning system, such as the provision of feedback and guidance. Self-efficacy refers to the user's belief in their ability to use the e-learning system effectively.

E-learning system use is used as a mediator variable in this study. This allows us to examine the relationship between the main variables and individual impact more closely. Specifically, we will examine the extent to which e-learning system use mediates the relationship between information quality, service quality, system quality, pedagogical features, self-efficacy, and individual impact.

The only variable not used from the original model is user satisfaction. This decision was based on previous research that has found mixed results regarding the relationship between user satisfaction and the success of information systems (e.g., Sedera and Gable, 2014; Wang and Liao, 2008). Instead, we will focus on individual impact as the outcome variable in this study.

This research model is based on previous studies that have used the Delone and McLeane model to evaluate the success of information systems (e.g., Sedera and Gable, 2014; Wang and Liao, 2008). By including additional variables such as pedagogical features and self-efficacy, this study aims to provide a more comprehensive understanding of the factors that contribute to the success of e-learning systems in an educational context.

## 2.9 Comprehensive model

The e-learning success model described in (Freeze et al., n.d.) constitutes a comprehensive multidimensional framework that draws inspiration from various established models, notably integrating dimensions from the DeLone and McLean (D&M) model, the Task-Technology Fit (TTF) model, and the Technology-Organization-Environment (TOE) model. In this amalgamation, the D&M model's dimensions, such as Information Quality, System Quality, and Service Quality, are adapted to the e-learning context, encompassing elements like course design quality, instructor quality, and interaction quality (student-student and student-instructor dialog). The TTF model's concept of aligning technology with tasks is subtly reflected in the assessment of self-regulated learning, evaluating how effectively the technology supports learners' specific educational objectives. By incorporating these main dimensions and sub-dimensions from these prominent models, this e-learning success model offers a comprehensive framework to assess and understand the factors contributing to the success of e-learning initiatives within a university setting.

Their proposed model consists of seven distinct independent constructs, each evaluating specific aspects of e-learning: technical system quality, information quality, service quality, educational system quality, support system quality, learner quality, and instructor quality. These components collectively assess the robustness and effectiveness of the e-learning environment. Additionally, the model incorporates four dependent constructs, which rely on the independent ones: perceived satisfaction, measuring user contentment; perceived usefulness, gauging the system's utility for educational goals; system use, evaluating the extent of user engagement; and benefits, encompassing the positive outcomes derived from the e-learning experience. In essence, this model offers a comprehensive framework for comprehensively assessing e-learning systems and their impact on learners and instructors alike.(Freeze et al., n.d.)

## 2.10 Review of Related Literature

Al-Samarraie and Al-Emran (2015) conducted a study in Bahrain to assess students' perceptions of the e-learning system and make recommendations to increase students' use of e-learning. Students had positive opinions of the e-learning system, according to the survey, but there were some areas for development, such as the need for more interactive and interesting content, better communication channels, and more support for students who struggle with technology.

Alqurashi and Alshumaimeri (2021) investigated the e-learning experience of health and medical students and discovered that e-learning content design should be in sync with instructional pedagogy and learning outcomes. The study also emphasised the importance of evaluating the e-learning environment as a whole, rather than just the technology that contribute to design. The researchers proposed that in order to be responsive to students' demands, e-learning systems should be monitored on a frequent basis.

Alwamleh, Al-Samarraie, and Al-Emran (2022) investigated the impact of e-learning systems on student motivation, but encountered difficulties due to a lack of social connection and expectations mismatch. Future research should focus on the benefits and credibility of e-learning in higher education, as well as the usefulness of e-learning systems in enhancing student motivation and outcomes, according to the researchers.

Alzahrani and Al-Shehri (2019) used four distinct ways to evaluate e-learning systems in a UK institution. Earlier studies were more concerned with the technology itself, but as technology has gotten more dependable and available, more recent research have focused on the overall success of e-learning and how students' attributes affect e-learning. To comprehend the synergistic impacts of variables interacting together, the researchers proposed a more holistic method to evaluate e-learning systems.

The authors of (Eom & Ashill, 2018) describe the process of survey instrument development and measurement. A significant portion of the survey questionnaire was adapted from prior research efforts, notably drawing from the work of Eom et al. (2006), which itself incorporated elements from the Individual Development & Educational Assessment student rating system developed by Kansas State University. Furthermore, the survey included questions related to motivation.

Moreover, the questionnaire incorporated questions pertaining to the course design quality construct, which were formulated based on categories 1–4 of the Quality Matters (QM) standards. All multi-item constructs in the survey were assessed using a five-point Likert scale. Notably, the authors adopted reflective measurement for all model constructs since they sought to measure the same underlying phenomenon, adhering to the fundamental principle of reflective measures (Chin, 1998).

To ensure the rigor of their study and to test the hypothesized theoretical associations comprehensively, the authors also considered various control variables, including age, gender, and study year. This comprehensive methodology allowed for a structured and systematic approach to data collection and analysis, aligning with the research objectives of the study.

# Chapter Three

# Research Methodology

## 3.1 Research Methodology and Approach

The research is mainly quantitative, and the data collection method employed in this research is the survey method. Quantitative research often employs surveys as a data collection method due to their ability to collect a large amount of data from a sizable population in an economical way (Saunders et al., 2009). Surveys are popular because they can collect a wide range of data about different variables in a relatively short timeframe (Stangor, 2011).

The main techniques used in survey research are questionnaires, interviews, and observation. Questionnaires are the most commonly used technique in survey research, as they are easy to administer and can be completed by respondents at their own pace (Babbie, 2016). Interviews are another technique used in survey research, and they allow for more in-depth data collection and clarification of responses (Bryman, 2016). Observation is a less commonly used technique in survey research, but it can provide valuable data on behavior and interactions (Bryman, 2016).

Oppenheim (1992) identified two types of survey research: descriptive survey and analytical survey. For this study, the analytical survey method is used. Analytical survey research is used to explain the causal relationships between variables and constructs (Oppenheim, 1992). The analytical survey method is appropriate for this study as it fits with the research approach to be adopted. The research aims to investigate the relationship between the independent variable (X) and the dependent variable (Y) and to determine the extent to which X Influences Y. The analytical survey method will allow for the collection of data on both X and Y, and the use of statistical analysis to determine the strength and direction of the relationship between the two variables (Bryman, 2016).

Google Forms was used to collect survey data via the internet a link to the survey questions was issued to the participants with valid emails, and they were asked to respond within 2 days. The respondents were contacted by management team to ensure that they completed the survey within the time frame specified.

### 3.2.2 The Research Model

This research paper uses the DeLone and McLean model is a widely used model for evaluating information systems, including e-learning systems (DeLone & McLean, 1992; DeLone & McLean, 2003; DeLone & McLean, 2016). The model consists of six dimensions that are used to evaluate the success of an information system: system quality, information quality, service quality, use, user satisfaction, and net benefits. These dimensions provide a comprehensive framework for evaluating the effectiveness of e-learning systems, including their technical quality, the quality of the information provided, the quality of the service provided, the extent to which the system is used, user satisfaction, and overall benefits.

The DeLone and McLean model provides a useful framework for evaluating e-learning systems because it takes into account multiple dimensions of success, including technical quality, information quality, and user satisfaction. By using this model to evaluate e-learning systems, researchers and practitioners can gain a better understanding of how to improve the effectiveness of these systems and ensure that they are meeting the needs of their users. (DeLone & McLean, 1992; DeLone & McLean, 2003; DeLone & McLean, 2016).

In 2003, DeLone and McLean made significant updates to their Information Systems (IS) success model, refining the framework to better capture the complexities of IS success. These changes were made to provide a more comprehensive view of what contributes to the success of information systems within organizations.(Halonen et al., n.d.)

1. Inclusion of Service Quality: One of the key modifications introduced in the updated model was the inclusion of "Service Quality" as a central dimension of quality alongside "Information Quality" and "System Quality." Service Quality pertains to the support and services provided by the IS department or team responsible for the system. This addition recognized the crucial role that the quality of support services plays in determining the overall success of an information system.
2. Addition of 'Intention to Use': Another significant enhancement was the addition of "Intention to Use" as a variable in the model. This dimension reflects users' willingness and intention to continue using the information system in the future. It considers user attitudes and expectations regarding the system's utility and usability, acknowledging that user acceptance and intention to continue using the system are essential indicators of success.
3. Replacement of 'Individual Impact' and 'Organizational Impact' with 'Net Benefits': DeLone and McLean replaced the separate dimensions of "Individual Impact" and "Organizational Impact" with a more holistic concept called "Net Benefits." This change aimed to provide a clearer and more comprehensive measure of the overall positive outcomes and benefits derived from using the information system. Net Benefits encompass both individual and organizational impacts, streamlining the model.
4. Introduction of Feedback Loops: The updated model introduced feedback loops to "Intention to Use" and "User Satisfaction." These feedback loops recognize the dynamic nature of IS success. For instance, high user satisfaction can positively influence users' intentions to continue using the system, which, in turn, can lead to increased system success.

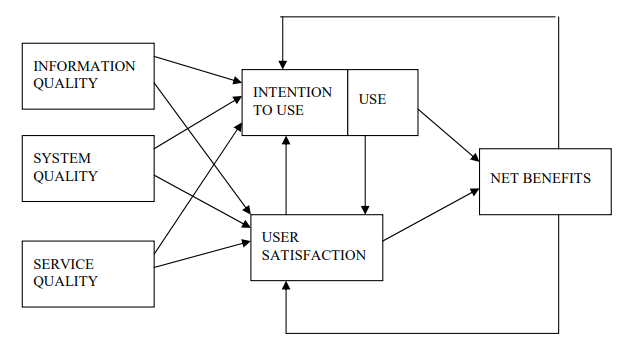


Figure 3Updated D&M IS success model (DeLone & McLean, 2003, 24).

it's essential to select and highlight specific variables from the DeLone and McLean IS Success Model that are most pertinent to our evaluation of the e-learning in DOT Ethiopia. These chosen variables will serve as crucial indicators to assess the performance and achievement of the information systems utilized within DOT Ethiopia.

I have curated a set of key variables that will serve as valuable metrics for assessing the effectiveness and efficiency of the current e-learning system implemented within DOT Ethiopia.

1. **System Quality Evaluation:** refers to the assessment of the technical aspects of the information systems deployed within DOT Ethiopia. It involves examining factors such as the user-friendliness, speed, reliability, availability, flexibility, and accuracy of these systems. This evaluation aims to determine how well the systems operate and perform from a technical standpoint, ensuring that they meet the needs of DOT Trainees.
2. **Information Quality Analysis**: involves evaluating the quality of data and information generated by the information systems used within DOT Ethiopia. This assessment considers factors such as the relevance, timeliness, completeness, credibility, and understandability of the information. The goal is to determine whether the information produced by the systems is accurate, up-to-date, comprehensive, trustworthy, and easily comprehensible for decision-making and operational purposes.
3. **Service Quality Appraisal**: pertains to the evaluation of the support and services provided by the Information Systems (IS) department or support team within DOT Ethiopia. This assessment covers dimensions such as responsiveness (timely support), reliability (consistent service), assurance (competence and credibility of support staff), empathy (willingness to understand and address user issues), and tangibles (physical aspects of support services). It aims to gauge the quality of the assistance and support DOT employees receive in using the information systems effectively.
4. **User Satisfaction**: measures the level of contentment and fulfillment experienced by DOT Ethiopia trainees when using the information systems and the support services provided. It reflects their overall positive or negative perceptions and attitudes towards the systems and support. Higher user satisfaction indicates that the information systems and support services are meeting or exceeding user expectations and needs.
5. **Net Benefit Evaluation**: assesses the overall positive outcomes and benefits realized by DOT Ethiopia as a result of implementing and utilizing the information systems. It encompasses improvements in efficiency, effectiveness, decision-making, and other tangible and intangible benefits. This evaluation provides a holistic view of how the information systems contribute to the organization's success and performance, considering both individual and organizational impacts.

### 3.2.3 Research Population

The research population under investigation in this study consists of individuals who actively engaged in a pilot project aimed at improving their business skills. This initiative was orchestrated at DOT Ethiopia and involved a total of 100 carefully selected participants. These individuals were chosen based on their strong interest in enhancing their business acumen and their ability to fully commit to the training program. What makes this population particularly intriguing is its diverse composition. The 100 participants were drawn from various regions across Ethiopia, representing a wide spectrum of backgrounds and life experiences. This diversity not only enriches the study but also underscores the significance of examining how a diverse group of participants benefits from and contributes to the DOT Ethiopia pilot project for business skill enhancement.

This study's focus narrows down to two key groups within the context of the DOT Ethiopia pilot project: the staff members responsible for the development of the e-learning system used in the project and the participants who actively underwent the business skill training through this e-learning platform.

To gain comprehensive insights into the e-learning system's creation, design, and developmental journey, interviews will be conducted with the staff members responsible for its development. These interviews will serve as a valuable means to gather firsthand information about the planning process, design strategies, technological aspects, as well as any challenges and notable successes encountered during the system's development. The knowledge and experiences shared by the development team will offer invaluable perspectives on the behind-the-scenes efforts that contributed to the e-learning system's formation.

In parallel, the study extends to the participants who actively engaged with the e-learning system to acquire business skills. These participants will be invited to partake in a survey, specifically designed to capture their feedback and assessments regarding the e-learning system's effectiveness in enhancing their business skills. Their responses will provide critical insights into the practical impact and user experience of the e-learning platform from the perspective of those who directly benefited from it. By gathering feedback from this group, the study aims to gain a holistic understanding of how the e-learning system influenced their skill development, thus enriching the overall evaluation of the DOT Ethiopia pilot project's success.

It is important to note that the research population for this study is limited to the participants of the pilot project conducted by DOT Ethiopia. Therefore, the findings of this study may not be generalizable to other populations or contexts. However, the results of this study can provide valuable insights into the effectiveness of e-learning systems for business skill training in Ethiopia and can inform future research and practice in this area.

### 3.2.4 Sample and Sampling techniques

The sample for this study will include all 100 participants who took part in the pilot project for business skill training conducted by the DOT Ethiopia. As the sample size is small and the entire population is accessible, a census sampling technique will be used to include all participants in the study (Babbie, 2016).

According to Creswell (2014), a census sampling technique is appropriate when the population size is small and the entire population is accessible. This technique ensures that all members of the population have an equal chance of being included in the study, which can increase the representativeness of the sample.

As the study is limited to a specific population and context, the findings may not be generalizable to other populations or contexts. However, the use of a census sampling technique ensures that all participants have an equal chance of being included in the study, which can increase the validity and reliability of the findings (Babbie, 2016).

## 3.3 Method of Data Collection

To achieve its objectives, the researcher used both primary and secondary data collection.

### 3.3.1 Source of data

This study will use both primary and secondary data sources to evaluate the effectiveness of the e-learning system for business skill training in DOT Ethiopia and select the best and appropriate tool for evaluating the system. The study will also collect feedback from the end-users to identify areas for improvement.

Primary data for this study will be gathered through the administration of questionnaires using online Google Forms, specifically tailored for the participants undergoing business skill training at DOT Ethiopia. This approach holds significant promise in enhancing the evaluation process. By leveraging the convenience and accessibility of online forms, we can efficiently reach a broader spectrum of trainees, allowing for a more inclusive and representative dataset. Moreover, the structured and standardized format of the questionnaires, administered through Google Forms, ensures consistency in data collection, minimizing potential errors and biases. This method's digital nature also facilitates real-time data capture and analysis, contributing to the production of accurate and timely results. Ultimately, the utilization of online Google Forms questionnaires streamlines the evaluation process, enabling us to acquire comprehensive and dependable feedback from trainees regarding the effectiveness of the business skill training program within DOT Ethiopia.

In addition, the study will use a tool for evaluating the e-learning system. The tool will be selected based on a review of relevant literature and expert opinions. The tool will be used to assess the effectiveness of the e-learning system in terms of its usability, accessibility, and overall user experience.

Secondary data will be collected through a review of relevant literature, including academic journals, articles, and reports. The literature review will provide a comprehensive understanding of the current state of e-learning for business skill training in Ethiopia and globally. It will also help to identify best practices and potential areas for improvement in e-learning design and implementation (Mayer, 2014).

The use of both primary and secondary data sources will provide a more comprehensive understanding of the effectiveness of the e-learning system for business skill training in DOT Ethiopia. The primary data will provide insights into the experiences and perceptions of the staff and participants, while the secondary data will provide a broader context and help to identify best practices and potential areas for improvement.

The use of both primary and secondary data sources will provide a more comprehensive understanding of the effectiveness of the e-learning system for business skill training in DOT Ethiopia. The primary data will provide insights into the experiences and perceptions of the staff and participants, while the secondary data will provide a broader context and help to identify best practices and potential areas for improvement.

### 3.3.2 Method of Data Analysis

Data analysis is a multifaceted process in this study. Initially, data preparation is conducted to ensure the dataset's accuracy and consistency, addressing any discrepancies or missing information. Subsequently, quantitative analysis techniques are employed to explore numerical relationships and patterns within the data, encompassing methods like correlation, regression, and hypothesis testing. Concurrently, qualitative analysis approaches are utilized to uncover nuanced themes and narratives in open-ended responses or interviews. The integration of both quantitative and qualitative findings offers a holistic perspective on the research questions. Finally, the analysis results are interpreted within the study's context to draw informed conclusions and provide valuable insights that can guide decision-making within DOT Ethiopia, ultimately enhancing our understanding of the business skill training program's impact.

SPSS software version 20 was used to analyze the collected data and descriptive analysis was presented. Factor analysis is used to verify the descriptive findings. Moreover, data gathered through interview was analyzed qualitatively to strengthen the study.

## 3.4 Ethical Considerations

Ethical considerations are paramount in our research. We will begin by obtaining informed consent from all participants, including all trainees, ensuring they fully understand the study's purpose, procedures, potential risks, and benefits. Preserving confidentiality is pivotal, necessitating the careful handling of personal and sensitive information, and anonymizing data when reporting findings. Robust data security measures will be implemented to safeguard against unauthorized access or breaches. Beneficence guides our efforts, seeking to maximize benefits while minimizing any potential harm or discomfort to participants. I am committed to treating all participants fairly and equitably, regardless of their background or role. I will declare any conflicts of interest that might influence the research process. Ethical review and approval, when required, will be sought from the relevant ethics committee. Post-data collection, I will provide debriefing sessions to address participant concerns, and we will maintain vigilant ethical monitoring throughout the research to address any unexpected ethical issues that may arise. These ethical principles will underpin our study, ensuring that it aligns with the highest standards of integrity, respect, and fairness.

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# Appendixes

## Appendix A: Survey Questionnaire

I am conducting research that aims to Evaluating an E-learning System for Business Skill Training of Digital Opportunity Trust (DOT Ethiopia), as part of the partial fulfillment of the Master’s Degree in Information Systems, at Addis Ababa University. This survey is completely confidential and anonymous. No personally identifiable information will be collected and all information will be analyzed and reported in aggregate. None of the information requested will identify you or your unit. Your data will be treated with strictest confidentiality and will only be used for the purpose of this study. I kindly request you to carefully and attentively read all the questions and give your genuine answers to the best of your knowledge by selecting the response that best represents your view. Please make it circle your choice. If you have any questions you may ask me.

Email: [henoktamrat2018@gmail.com](mailto:henoktamrat2018@gmail.com)

**Section One: Demographic Section**

“Please provide us with some basic demographic information to help us better understand our audience. Your response will be kept confidential and will only be used for research purposes.”

1. Gender
   1. Male
   2. Female
2. Age
   1. 18-25
   2. 26-35
   3. 36-45
   4. Above 45
3. Level of Education
   1. PHD
   2. Masters
   3. Degree
   4. Diploma
   5. Below Diploma

**Section Two: Technical System Quality**

“This section focuses on the technical quality of the e-learning system used for business skill training by DOT Ethiopia. Please rate the system based on efficiency, ease of use, and overall performance. Your feedback will help us to evaluate the effectiveness of the e-learning system and identify areas for improvement to enhance the learning experience for future learners.”

1. DOTE-learning system is reliable and efficient?
2. Strongly agreed
3. Agreed
4. Neutral
5. Disagree
6. Strongly disagree
7. DOT E-learning is easy to use?
8. Strongly agree
9. Agree
10. Neutral
11. Disagree
12. Strongly disagree
13. DOT E-learning system is visually appealing?
14. Strongly agree
15. Agree
16. Neutral
17. Disagree
18. Strongly disagree
19. DOT E-learning system is responsive?
20. Strongly agree
21. Agree
22. Neutral
23. Disagree
24. Strongly disagree

**Section Three: Service Quality**

"This section focuses on the service quality of the e-learning system used for business skill training by DOT Ethiopia. Please rate the system based on the quality of support provided, responsiveness to learner needs, and overall satisfaction with the learning experience. Your feedback will help us evaluate the effectiveness of the e-learning system and identify areas for improvement to enhance the learning experience for future learners."

1. DOT E-learning system provides timely and helpful support?
2. Strongly agree
3. Agree
4. Neutral
5. Disagree
6. Strongly disagree
7. DOT E-learning system provides clear and helpful support?
8. Strongly agree
9. Agree
10. Neutral
11. Disagree
12. Strongly disagree
13. DOT E-learning system provides relevant and up-to-date information?
14. Strongly agree
15. Agree
16. Neutral
17. Disagree
18. Strongly disagree
19. DOT E-learning system provides a user-friendly interface?
20. Strongly agree
21. Agree
22. Neutral
23. Disagree
24. Strongly disagree

**Section Four: Content and Information Quality**

"This section focuses on the content and information quality of the e-learning system used for business skill training by DOT Ethiopia. Please rate the system based on the relevance, accuracy, and completeness of the course content, as well as the quality of the learning materials provided. Your feedback will help us evaluate the effectiveness of the e-learning system and identify areas for improvement to enhance the learning experience for future learners."

1. DOT E-learning system provides high-quality and engaging content?
2. Strongly agree
3. Agree
4. Neutral
5. Disagree
6. Strongly disagree
7. DOT E-learning system provides accurate and reliable information?
8. Strongly agree
9. Agree
10. Neutral
11. Disagree
12. Strongly disagree
13. DOT E-learning system provides relevant and useful resources?
14. Strongly agree
15. Agree
16. Neutral
17. Disagree
18. Strongly disagree
19. DOT E-learning system provides interactive and multimedia elements.
20. Strongly agree
21. Agree
22. Neutral
23. Disagree
24. Strongly disagree

**Section Five: Use**

"This section focuses on the use of the e-learning system used for business skill training by DOT Ethiopia. Please rate the ease of use of the system, including navigation, accessibility, and user-friendliness. Additionally, please rate the effectiveness of the system in facilitating learning and achieving the intended learning outcomes. Your feedback will help us evaluate the effectiveness of the e-learning system and identify areas for improvement to enhance the learning experience for future learners."

1. I use DOT E-learning system frequently
2. Strongly agree
3. Agree
4. Neutral
5. Disagree
6. Strongly disagree
7. I find DOT E-learning system easy to navigate
8. Strongly agree
9. Agree
10. Neutral
11. Disagree
12. Strongly disagree
13. I find DOT E-learning system helpful in achieving my learning goals
14. Strongly agree
15. Agree
16. Neutral
17. Disagree
18. Strongly disagree
19. I find DOT E-learning system engaging and enjoyable
20. Strongly agree
21. Agree
22. Neutral
23. Disagree
24. Strongly disagree

**Section Six: User perceived satisfaction**

"This section focuses on your overall satisfaction with the e-learning system used for business skill training by DOT Ethiopia. Please rate your satisfaction with the system based on factors such as the quality of instruction, the relevance of the course content, the effectiveness of the learning materials, and the overall learning experience. Additionally, please provide any comments or suggestions you may have for improving the e-learning system. Your feedback will help us evaluate the effectiveness of the e-learning system and identify areas for improvement to enhance the learning experience for future learners."

1. I am satisfied with DOT E-learning system overall
2. Strongly agree
3. Agree
4. Neutral
5. Disagree
6. Strongly disagree
7. I am satisfied with the technical performance of the DOT E-learning system
8. Strongly agree
9. Agree
10. Neutral
11. Disagree
12. Strongly disagree
13. I am satisfied with the service provided by DOT E-learning system
14. Strongly agree
15. Agree
16. Neutral
17. Disagree
18. Strongly disagree
19. I am satisfied with the content and information provided by DOT E-learning system
20. Strongly agree
21. Agree
22. Neutral
23. Disagree
24. Strongly disagree

**Section Seven: Individual impact**

"This section focuses on the individual impact of the e-learning system used for business skill training by DOT Ethiopia. Please rate the extent to which the e-learning system has helped you develop new skills, improve existing skills, and enhance your overall knowledge in the field of business. Additionally, please rate the extent to which the e-learning system has helped you achieve your personal and professional goals. Your feedback will help us evaluate the effectiveness of the e-learning system and identify areas for improvement to enhance the learning experience for future learners."

1. DOT E-learning system has improved my knowledge and skills
2. Strongly agree
3. Agree
4. Neutral
5. Disagree
6. Strongly disagree
7. DOT E-learning system has increase my motivation to learn
8. Strongly agree
9. Agree
10. Neutral
11. Disagree
12. Strongly disagree
13. DOT E-learning system has positively impacted my academic performance
14. Strongly agree
15. Agree
16. Neutral
17. Disagree
18. Strongly disagree
19. DOT E-learning system has provided me with a positive learning experience
20. Strongly agree
21. Agree
22. Neutral
23. Disagree
24. Strongly disagree

"Thank you for taking the time to complete this evaluation of the e-learning system used for business skill training by DOT Ethiopia. Your feedback is valuable to us and will help us improve the effectiveness of the e-learning system and enhance the learning experience for future learners. We appreciate your participation and look forward to implementing your suggestions and feedback. Thank you again for your time and input."

## Appendix B: Interview Questions

* + - 1. Can you describe the features and functionalities of the e-learning system?
      2. How was the e-learning system developed and designed?
      3. What were the goals and objectives of the e-learning system?
      4. How was the e-learning system implemented and integrated into the business skill training program?
      5. How was the e-learning system maintained and updated over time?
      6. What were the challenges and successes of implementing the e-learning system?