

**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

Internal Examiner Signature Date

Temtim Assefa (Ph.D.)

Advisor Signature Date

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# List of Acronyms

**AI Artificial Intelligence**

**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**

**IQ Information Quality**

**LMS Learning Management System**

**Moodle Modular Object Oriented Dynamic Learning Environment**

**NGO Non-Governmental Organization**

**PU Perceived Usefulness**

**PI Perceived Involvement**

**SQ Service Quality**

**SYQ System Quality**

**TAM Technology Acceptance Model**

**TV Television**

**VR Virtual Reality**

**WWW World Wide Web**

**WBT web-Based Training**

# 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 2019,2020)

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 2019,2020)

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 2019,202)

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 2019.2020)

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 2019,2020)

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, 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 (Kizilcec, 2012). Technology can be used to enhance this approach by providing trainees 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 (Kizilcec, 2012) 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 (Schack Noesgaard & Ørngreen, n.d, 2019.) found that e-learning systems can be effective in improving trainees 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 (Schack Noesgaard & Ørngreen, n.d, 202) 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 participants 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 participants 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, the focus will be on identifying and analyzing those specific challenges that have yet to be adequately addressed by prior researchers. Below are some selected 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 in-depth evaluation of the e-learning system integrated into the business skill training package offered by the DOT Training Center in Ethiopia. the evaluation approach distinguishes itself by its holistic consideration of factors that have traditionally received limited attention in existing research. While prior studies have made valuable contributions, the study addresses a critical gap by delving into aspects often overlooked. the goal is to provide a comprehensive assessment of the e-learning platform. the research endeavors to offer a nuanced and context-sensitive perspective, potentially serving as a blueprint for enhancing e-learning not only within DOT Ethiopia but also for organizations operating in diverse global contexts, seeking to optimize their training and educational initiatives.

The e-learning system within DOT Ethiopia has thus far remained unexamined in the realm of formal evaluation. This paper's primary objective is to fill this critical gap by undertaking a systematic and comprehensive assessment of the e-learning platform. By conducting this evaluation, the researcher aims to shed light on the system's effectiveness, identify strengths and weaknesses, and ultimately provide valuable insights and recommendations to enhance the quality and impact of the e-learning experience for DOT Ethiopia's business skill training participants.

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?
3. What are the technological factors that contribute to the success of implementation of the E-learning system at DOT Ethiopia?
4. What are the individual factors that contribute to the success of implementation of the E-learning system at DOT Ethiopia?
5. How can we improve the quality of e-learning system at DOT Ethiopia?

## Objective

### General Objective

The general objective of this paper is to conduct a comprehensive evaluation of the e-learning system integrated into the business skill training package provided by the DOT Training Center in Ethiopia.

### Specific Objective

The specific objectives of this study are:

* To identify the challenges and problems associated with the current implementation of the e-learning system for business skill training at DOT Ethiopia.
* To conduct an extensive review of existing research papers, examining methodologies and findings related to e-learning content course evaluation.
* To develop a modified evaluation model tailored to the unique needs of DOT Ethiopia's e-learning system.
* To create a structured questionnaire designed for DOT Ethiopia's trainees.
* To analyze the gathered data using different techniques and different data analysis tools.
* To draw meaningful conclusions based on the analyzed data.
* To assess the user-friendliness and accessibility of the e-learning system by measuring user satisfaction with its ease of use.
* To determine the relevance of training content by measuring its alignment with DOT Ethiopia's business skill training objectives.
* To evaluate the availability and effectiveness of user training and support resources.
* To measure overall user satisfaction with the e-learning system.
* To analyze the individual impact of the e-learning system on skill development and job performance among the trainees.

## 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. 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.

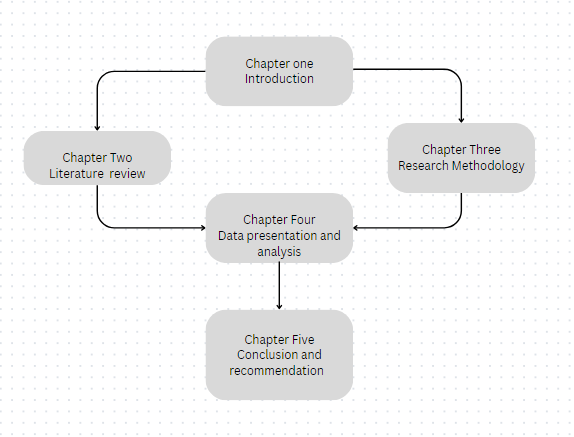


Figure 1 Organization of the Thesis

# Chapter Two

# Literature Review

## 2.1. Introduction

A literature review, according to (Zawacki-Richter et al., n.d.) 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. (Goldberg et al., n.d.-a)

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. (Goldberg et al., n.d.-a)

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, n.d.). 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, n.d.). 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, n.d.) 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, n.d.; Bernacki et al., n.d.; Garrison & Kanuka, 2004).

## 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, n.d.; 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.-b)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 (Alqurashi and Alshumaimeri, 2021).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 (E. T. Chen, 2008; Creswell, 2014a).

Synchronous training is training in which learners complete online training from different locations at the same time (Creswell, 2014a) 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. (Creswell, 2014a) 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 . 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, 2004), 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.

### 2.4.1 Blended learning

Blended learning, an instructional approach integrating traditional face-to-face learning with technology and distance learning, has witnessed a substantial rise in prominence within the education landscape in recent years (Attwell, 2006a). In this research the paper seeks to delve into the significance of blended learning in pedagogical practices. The primary aim of this article is to elucidate the rationale behind the adoption of blended learning in educational settings, elucidating the fundamental components that underpin a successful blended course. Blended learning, at its core, amalgamates the advantages of both online and in-person learning modalities, ultimately contributing to an enriched learning experience (Garrison & Kanuka, 2004). Furthermore, this article expounds upon additional factors pivotal for the effective design of a productive blended course. In essence, blended learning emerges as an efficacious pedagogical approach that is marked by its flexibility, accessibility, and the potential to augment student motivation and academic achievement (B. , B. M. , & M. R. Means, 2014).

### 2.4.2 Adaptive learning

Adaptive learning in e-learning is an educational approach that leverages technology and data-driven methodologies to tailor the learning experience to the unique needs and progress of individual learners (Fengying Li, n.d.). It's a dynamic system that continuously assesses a student's performance, adapts the content and delivery in real-time, and provides personalized learning paths, resources, and activities to optimize learning outcomes (Brusilovsky, 2006; Elomaa, 2007).

Adaptive learning systems utilize learner data, such as previous performance, learning preferences, and real-time interactions, to make informed decisions on what content to present next. These systems can adjust the difficulty level of questions, suggest supplementary materials, or even modify the instructional approach based on the learner's progress and demonstrated knowledge (Murray, 2003).

By tailoring the learning experience to the individual, adaptive learning aims to improve engagement, motivation, and learning efficiency, ultimately leading to better educational outcomes (Bequette, 2014; Graf, 2009). Adaptive learning systems have gained traction in online education due to their potential to address the diverse needs and learning paces of a broad spectrum of students (Cook, 2015; Vytasek, 2013).

### \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

### 2.4.3 Asynchronous Learning

Asynchronous Learning is a flexible mode of online education that empowers learners to access course materials and engage in learning activities at their own pace and convenience. In this approach, there is no real-time interaction between learners, instructors, or peers. Instead, learners are provided with a repository of pre-recorded lectures, readings, videos, quizzes, discussion boards, and other educational resources that they can access and complete independently. This format offers several key advantages, including the flexibility to tailor study schedules to individual needs, making it particularly appealing to those with busy lifestyles or varying time zones.

One of the defining characteristics of asynchronous e-learning is the absence of live interaction. Learners typically communicate with instructors or peers through discussion forums, email, or other asynchronous communication tools, allowing them to collaborate and seek clarification on their own timelines. The 24/7 availability of course materials ensures accessibility for learners from diverse backgrounds and locations. Additionally, asynchronous e-learning can accommodate a large number of learners, making it a scalable option for educational institutions and organizations. It promotes self-directed learning, as learners take on the responsibility of managing their learning process, setting goals, and progressing through the course materials according to their individual preferences and learning objectives. This mode is highly adaptable to various content formats, making it suitable for a wide range of educational and training purposes, from higher education to professional development and corporate training.

### 2.4.4 Synchronous learning

Synchronous learning is a dynamic mode of online education where learners and instructors engage in real-time interactions through live webinars, video conferences, or virtual classrooms. In this format, learners come together at scheduled times to participate in discussions, activities, and lectures, fostering immediate feedback and collaboration. Synchronous learning promotes active engagement and a sense of community among learners, akin to traditional classroom experiences. It is well-suited for scenarios where real-time interaction, live demonstrations, and instant communication with instructors and peers are essential components of the learning process.

it is an engaging and interactive mode of online education that brings learners and instructors together in real-time virtual environments. During scheduled sessions, participants can engage in live discussions, ask questions, collaborate on group projects, and receive immediate feedback from instructors. This approach fosters a sense of community and active participation, closely resembling traditional classroom experiences. Synchronous learning is particularly beneficial for subjects or topics that require in-depth discussions, hands-on demonstrations, or collaborative problem-solving. It also allows learners to build relationships with their peers and instructors, enhancing the overall learning experience. While it offers the advantages of immediate interaction, it may require learners to adhere to specific schedules, which can be a consideration for individuals with busy agendas.

## 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 (Anthonysamy, 2012; Kalliatakis, 2014; Rashaath, 2012)

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 (Alzaza, 2014). 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 (Al-Qahtani, 2015).

Some studies give advantage of e-learning as its ability to focus on the needs of individual learners. For example, (Graham, 2006) reviewed 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.

A common benefit found in online courses is that students learn more than just course content. (Weiner, 2003) found that online learning significantly improved writing and computer skills in Cyber Schools in America. This study revealed that the key to successful online learning for adolescent students lies within motivational issues and highly structured courses. Additionally, the results of this research indicate that adolescent students are ready to learn in cyberspace if they are able to commit to their education and if the appropriate support and guidance is available to them, especially from their teachers.

Another benefit of the online delivery method is that the associated anonymity can result in greater participation from all students, including “shy” ones. The lack of visual cues allows the instructor to treat all students in the same manner. Learner identity has emerged as a new strategic learning variable within online learning environments. Learner identity can be used as a deliberate learning strategy as in online role-plays or discussion forums with pseudonym postings. At other times students may use online learning as an opportunity to reconfigure their learner identity (Freeman, 2004) .

Freeman and Bamford (2004) provided a case study of altered learning identity in a professional higher education context where the blend of resources included online asynchronous discussion forums. Interesting cross-sectional and longitudinal data of anonymous postings revealed 1% of students posting 50% of such messages, students responding to their own posts and cases of peer impersonation. Anonymity appears popular for clarifying expectations, particularly when courses are new.

Numerous studies, such as those by (Anthonysamy, 2012; Hwang, 2014; Rashaath, 2012), 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 (Arbaugh, 2009; Pappas, 2015; Yoon, 2006) 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 (Harrell, 2014).

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, n.d.). 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 (B. , et al. Chen, 2017). E-learning can be personalized to meet the individual needs and learning styles of learners, which can improve engagement and retention (Almaqadma, 2018). 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, n.d.). 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 (B. , et al. Chen, 2017).

## 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, 2006)

### 2.5.1 Behaviorism

Several psychologists in the early twentieth century, including (Morrison, 2008; Pritchard, 2009; Siemens, 2005a), 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 (Schunk, 2012a).

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 (B. , et al. Means, 2010). According to behaviorists, learning is only successful when the learner exhibits compliance in connecting stimuli and desired responses via conditioning. According to (Lowenthal, 2009), 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 (West, 2016). 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. (Hannafin, 1997)

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 (Schunk, 2012b).

Cognitivists study how the mind stores, analyzes, and retrieves information (Huang, 2012; Ross, 2005). "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" (Prinsloo, n.d.). 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" . Cognitivism is concerned with "what learners know and how they grow to know it rather than what they do" (Huang, 2012).

### 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 (Schunk, 2012).

Constructivists think that creating knowledge requires both mental work and social engagement (Jonassen, 1991). Constructivism is the belief that instruction should enable students to construct meaning, resulting in improved learning (Dabbagh, 2005; Duffy, 1992; C. N. and M. M. S. Gunawardena, 2004)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, often attributed to Malcolm Knowles and his colleagues (2014), is a concept widely regarded for its contribution to educators and trainers in understanding adult learning processes. However, it's important to note that it doesn't entirely fit the criteria for classification as a full-fledged theory. Instead, it can be seen as a model rooted in humanism theory, as defined by (Knowles et al., 2005). This model encapsulates a set of principles that are highly applicable to a broad spectrum of adult learning contexts.

At its core, andragogy emphasizes the importance of creating an environment where adult learners feel not only welcomed but also appreciated and supported. (Knowles et al., 2005) underscores the idea of fostering a spirit of mutuality between educators and adult learners, treating them as fellow inquirers on a shared learning journey. It recognizes that adults, as learners, often transition from being dependent on instructors to becoming self-directed and independent learners as they progress in their studies.

During this educational journey, it's acknowledged that learners may still require assistance and guidance, a role that educators can effectively fulfill (Merriam, 2007). This support is essential in facilitating the adult learners' transition towards greater self-directedness and autonomy in their learning endeavors.

### 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, 2005) 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, 2005). 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. (Schunk, 2012b)

Table 1 Comparison of learning methods

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Aspect | Behaviorism | Constructivism | Cognitivism | Connectivism | Andragogy |
| Founding Theorists | Watson, Skinner | Piaget, Vygotsky | Piaget, Bruner, Ausubel | Siemens, Downes | Knowles |
| Learning Focus | Observable behaviors | Building knowledge | Mental processes and thinking skills | Networked learning and information flow | Self-directed adult learning |
| Role of Instructor | Direct instruction, reinforcement | Facilitator, guiding | Facilitator, guiding | Curator, network organizer | Facilitator, supporting independence |
| Learner's Role | Passive receiver of knowledge | Active constructor of knowledge | Active processor of information | Networked learner, information seeker | Self-directed, responsible learner |
| Knowledge Transfer | Stimulus-response, repetition | Building on prior knowledge | Cognitive restructuring, assimilation | Network connections, distributed learning | Applying knowledge to real-world tasks |
| Adaptability | Limited adaptability, uniform content | Customized learning experiences | Adaptation to cognitive development | Dynamic adaptability, learning networks | Tailored to adult learners' needs |
| Applicability | Skill-based training, rote learning | Complex problem-solving, inquiry | Cognitive development, critical thinking | Information age, networked society | Adult education, workplace learning |

## 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 (Siemens, 2005a).

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. (Siemens, 2005a)

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 (Siemens, 2005a).

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. (Siemens, 2005a)

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 (Siemens, 2005a). 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. (Siemens, 2005a)

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, 2005a).

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, 2005a)

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. (Merriam, 2007)

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 et al., 2005)

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. (Knowles et al., 2005)

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. (Merriam, 2007)

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, the researcher has chosen to utilize the theory of planned behavior and the expectation-confirmation theory to investigate this adoption phenomenon. The researcher has 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 (Almaqadma, 2018; Schunk, 2012b). 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

E-learning evaluation is a systematic and ongoing process of assessing the effectiveness, quality, and impact of online learning experiences and resources (Assiri et al., 2012) . It involves the collection and analysis of data to gauge how well e-learning programs, courses, or platforms meet their intended objectives and serve the needs of learners. E-learning evaluation encompasses various dimensions, including learner satisfaction, content relevance, instructional design effectiveness, technological functionality, and overall educational outcomes. This process aims to identify strengths and weaknesses, inform improvements, and ensure that e-learning initiatives align with educational goals. Through evaluation, educators, institutions, and organizations can refine their e-learning offerings, optimize the learning experience, and ultimately enhance the value and impact of online education (Attwell, 2006b).

### 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., 2010) .

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., 2009). 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 (Seddon, 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 (Kasiri, 2008) 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.

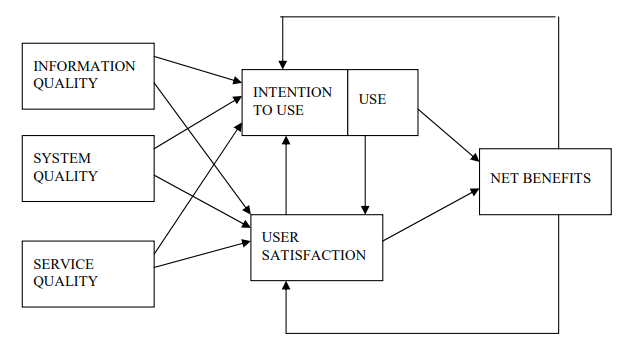


Figure 2 Updated DeLone & McLean (2003) Model of Information Systems Success

The DeLone and McLean Information Systems Success Model holds significant implications for e-learning. It provides a valuable framework for assessing the effectiveness of e-learning systems, guiding educators and institutions in evaluating the quality and impact of their online educational offerings. By examining dimensions such as system quality, information quality, service quality, user satisfaction, and net benefits, educators can gain insights into how well their e-learning initiatives meet the needs of learners and contribute to their educational goals. This model not only aids in identifying areas for improvement but also underscores the importance of a holistic approach to e-learning, emphasizing not only the technical aspects but also the content, support services, user experiences, and overall outcomes.(Seddon, 1997).

### 2.7.2 Theory of Planned Behavior

The Theory of Planned Behavior (TPB) model is a well-established psychological framework that holds particular relevance in the field of e-learning. It provides a comprehensive understanding of the factors that influence learners' intentions and behaviors when engaging in online educational activities (Mona T. Rajeha, 2021) . The TPB model consists of three primary variables (Ajzen, 1991) .

1. Attitude Toward Behavior: This variable encompasses learners' perceptions of e-learning. It includes their assessment of the benefits and drawbacks associated with online education. In the context of e-learning, it means evaluating whether learners view online courses and resources positively or negatively.
2. Subjective Norms: This variable reflects the social aspect of learning. It considers the influence of social pressure, norms, and the perceived expectations of significant individuals in a learner's life, such as peers, instructors, or colleagues. In e-learning, it assesses whether learners feel compelled or encouraged to participate based on the opinions of these influential figures.
3. Perceived Behavioral Control: This variable measures the learner's perceived ability to effectively engage with e-learning. It takes into account factors like self-efficacy, which refers to the learner's confidence in their capability to use e-learning tools and platforms successfully.

In the context of e-learning, the TPB model has several implications. Firstly, it aids educators and instructional designers in understanding the factors that drive or hinder learners' engagement with online courses and resources. By identifying these factors, they can tailor e-learning experiences to align with learners' attitudes, social influences, and perceived control. For example, recognizing that learners value the convenience of online learning may lead to the creation of more user-friendly platforms and accessible resources.(Mona T. Rajeha, 2021)

Additionally, the TPB model offers insights into how to influence learners' intentions positively. By emphasizing the advantages of e-learning, fostering a supportive learning community, and enhancing the ease of use of online tools, educators and organizations can encourage greater participation and commitment to e-learning initiatives. In summary, the TPB model serves as a valuable framework for understanding and enhancing the effectiveness of e-learning experiences by addressing the key factors that shape learners' behavior and intentions in digital education settings.(Ajzen, 1991)

## 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 adaption of variables 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 the 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 (Seddon, 2014) 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 (Landrum et al., 2009) 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. (Fathur Rokhman, n.d.) adapt D&M ISS's model by incorporating students' learning orientation as a parameter in the evaluation system. To assess e-learning success, (Fathur Rokhman, n.d.) employ the net benefit technique. (Fathur Rokhman, n.d.) 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, the researcher has used information quality, service quality, system quality, e-learning system use, and individual impact as the main variables. Specifically, I 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, the researcher 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 (Abdullah Al Balushi, 2018; Noradila Nordin, 2013). Instead, the researcher 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 (Abdullah Al Balushi, 2018; Noradila Nordin, 2013). 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, 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.

(Abbad & Jaber, 2014) 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 2016), 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 (Kasiri, 2008) .

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.

the paper by (C. N. Gunawardena et al., n.d.) discuss the landscape of online learning is characterized by its intricate and multifaceted nature, necessitating a diverse array of methodologies for a comprehensive evaluation of the learning experience. Over time, the adoption of a single analytical technique has proven insufficient in providing satisfactory insights. The conventional quantitative analysis, encompassing the examination of interaction patterns and learner satisfaction, has undoubtedly yielded valuable information regarding the overall dynamics of online learning and the factors influencing its success. However, this approach has inherent limitations, notably concerning sample size and selection. While quantitative data can detect significant differences, it often falls short in elucidating the underlying reasons behind these disparities. To address these complexities, the integration of a naturalistic paradigm is crucial, employing qualitative data derived from in-depth interviews, observations, and computer transcript analysis. Qualitative methodologies can effectively provide the context and depth required to understand the nuances of online learning experiences and explain observed differences. Consequently, a compelling recommendation emerges: the adoption of a mixed-methodology approach to explore the intricate realm of online learning networks, one that marries quantitative and qualitative methodologies, thus offering a more holistic perspective on this evolving educational landscape.

The author of (Al-Alwani, 2014) suggests in the realm of e-learning content course evaluation, a pressing challenge is the need to account for multiple variables that influence course quality and effectiveness within digital learning environments. Existing approaches often fall short of addressing this complexity, with a predominant focus on technology and learner engagement, neglecting factors such as socio-cultural influences, content quality, and user-machine interaction. For instance, compliance with technical standards, as seen in the SCORM model, often overshadows the assessment of content performance in e-learning settings. This research introduces an alternative evaluation criterion that shifts the focus to assess the inherent potential of digital content to perform effectively in e-learning environments. Rather than conforming content to predefined standards, it emphasizes the quality of instructional design within digital courses. This approach employs a structured framework of comprehensive questions, categorized under various criteria, to standardize and classify digital content based on its performance, thereby promoting more effective instructional design in the digital learning landscape.

# 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 (Earl R. 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 The Research Model

This paper introduces an innovative adaptation of the DeLone and McLean model, customized to serve as a powerful tool for evaluating the e-learning system implemented at DOT Ethiopia. This modified model has been meticulously tailored to meet the specific requirements and objectives of assessing the effectiveness and success of the e-learning platform. By integrating additional dimensions and refinements, it offers a comprehensive framework that precisely aligns with the unique context of DOT Ethiopia's business skill training program. This adaptation facilitates a thorough evaluation of the e-learning system's quality, service, user satisfaction, and overall impact, enabling a more precise and contextually relevant assessment..

In order to adapt the DeLone and McLean (D&M) model for the evaluation of the e-learning system at DOT Ethiopia, several modifications were introduced to align the model with the specific context and objectives of this study. The original D&M model primarily focused on evaluating information system success, but the adaptation aimed to address the distinct nuances of e-learning systems tailored for enhancing business skills. These modifications included the addition of dimensions such as "Ease of Use," "Response Time," "Security," "Relevance," "Personalization," and "User Satisfaction" to comprehensively assess the quality and usability of the e-learning platform. Furthermore, the model was expanded to encompass "Service Quality," considering aspects like technical support and user training, which are pivotal in ensuring a positive learning experience. The adaptation also integrated dimensions to evaluate the perceived usefulness and ease of use of the e-learning system, as well as its overall impact on individuals and the organization. These adjustments were made with the aim of creating a holistic and contextually relevant framework that would effectively gauge the success and impact of the e-learning system in DOT Ethiopia.

The modified DeLone and McLean model, tailored for the evaluation of the e-learning system at DOT Ethiopia, leverages a diverse set of variables that have been thoughtfully adapted to the existing e-learning infrastructure. These variables encompass a wide spectrum of dimensions, including system quality, information quality, service quality, user satisfaction, and net benefits. By incorporating these variables, the model provides a nuanced and holistic view of the e-learning system's performance and its impact on DOT Ethiopia's business skill training program. Each variable is meticulously calibrated to align with the organization's unique context, ensuring that the evaluation process yields highly relevant and actionable insights. This tailored approach empowers DOT Ethiopia to comprehensively assess and enhance its e-learning system, ultimately contributing to the advancement of business skills among its workforce and the achievement of its educational objectives.

### 3.2.1 Variables used for evaluation

1. System Quality: In the adapted model, "System Quality" plays a pivotal role in evaluating the e-learning system at DOT Ethiopia. This dimension assesses aspects such as the ease of use, response time, reliability, availability, flexibility, and security of the e-learning platform. By examining these facets, it ensures that the system is user-friendly, dependable, and secure. For DOT Ethiopia, this means that employees can access training materials effortlessly, experience minimal downtime, and trust that their data is protected. An emphasis on system quality ensures that the e-learning system effectively supports the organization's business skill training program.
2. Information Quality: "Information Quality" is another integral dimension within the adapted model. It focuses on the relevance, timeliness, completeness, credibility, interactivity, and personalization of training content. By evaluating these factors, the model ensures that the e-learning materials align with DOT Ethiopia's training objectives, remain current, cover all necessary topics, and provide trustworthy information sources. Additionally, it assesses the system's ability to engage learners and tailor content to their individual needs. Information quality guarantees that DOT Ethiopia's e-learning system delivers content that is not only informative but also highly effective in enhancing the business skills of its employees.
3. Service Quality: "Service Quality" is a dimension that emphasizes the importance of support services in the e-learning system evaluation. It considers aspects like technical support, user training, and overall user satisfaction with the services provided. In the context of DOT Ethiopia, this dimension ensures that employees receive prompt and efficient technical assistance, have access to effective training resources, and are satisfied with the level of support offered. Service quality contributes significantly to a positive learning experience, enhancing the effectiveness of the e-learning system in meeting the organization's training goals.
4. User Satisfaction: "User Satisfaction" is a critical dimension in evaluating the e-learning system's effectiveness. It encompasses user perceptions of the system's usefulness and ease of use, as well as overall satisfaction with the platform. For DOT Ethiopia, this means that employees find the e-learning system valuable in improving their business skills, perceive it as easy to navigate, and express high levels of satisfaction with their overall learning experiences. User satisfaction is a key indicator of the e-learning system's success and its ability to engage and meet the needs of DOT Ethiopia's workforce.
5. Net Benefits: Finally, "Net Benefits" represents the overarching dimension that evaluates the overall impact of the e-learning system on both individuals and the organization. It assesses the individual skill development and job performance improvements among employees and examines the broader organizational benefits resulting from the e-learning initiative. Furthermore, it includes a cost-benefit analysis to determine the financial implications and returns on investment. By assessing net benefits, the adapted model ensures that DOT Ethiopia can not only measure the effectiveness of its e-learning system but also understand its value in terms of both individual and organizational growth.

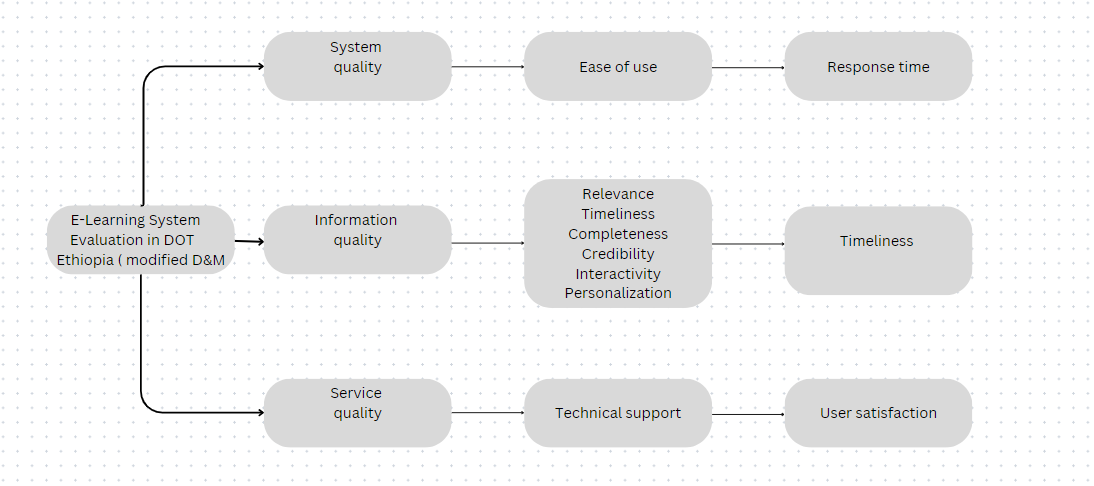


Figure 5 The proposed model

### 3.2.2 Hypothesis design

**Technical System Quality Hypotheses**

H1: Trainees strongly agree or agree that the DOT E-learning system is reliable and efficient.

H2: Trainees strongly agree or agree that the DOT E-learning system is easy to use.

H3: Trainees strongly agree or agree that the DOT E-learning system is visually appealing.

H4: Trainees strongly agree or agree that the DOT E-learning system is responsive. technical System Quality

**Service Quality Hypotheses**

H5: Trainees strongly agree or agree that the DOT E-learning system provides timely and helpful support.

H6: Trainees strongly agree or agree that the DOT E-learning system provides clear and helpful support.

H7: Trainees strongly agree or agree that the DOT E-learning system provides relevant and up-to-date information.

H8: Trainees strongly agree or agree that the DOT E-learning system provides a user-friendly interface

**Content and information quality**

H9: Trainees strongly agree or agree that the DOT E-learning system provides high-quality and engaging content.

H10: Trainees strongly agree or agree that the DOT E-learning system provides accurate and reliable information.

H11: Trainees strongly agree or agree that the DOT E-learning system provides relevant and useful resources.

H12: Trainees strongly agree or agree that the DOT E-learning system provides interactive and multimedia elements.

**Use**

H13: Trainees frequently use the DOT E-learning system.

H14: Trainees find the DOT E-learning system easy to navigate

**User perceived satisfaction**

H15: Trainees are satisfied with the overall DOT E-learning system.

H16: Trainees are satisfied with the technical performance of the DOT E-learning system.

H17: Trainees are satisfied with the service provided by the DOT E-learning system.

**Individual impact**

H18: The DOT E-learning system has improved trainees' knowledge and skills.

H19: The DOT E-learning system has increased trainees' motivation to learn

## 3.3 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.

### 3.2.1 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, 2014b), 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) .

## 3.4 Method of Data Collection

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

### 3.4.1 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.

### 3.4.2 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 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.

## 3.5 Ethical Considerations

Ethical considerations are paramount in the research. The researcher 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. The researcher is committed to treating all participants fairly and equitably, regardless of their background or role. The researcher 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, the researcher will provide debriefing sessions to address participant concerns, and I will maintain vigilant ethical monitoring throughout the research to address any unexpected ethical issues that may arise. These ethical principles will underpin the 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."