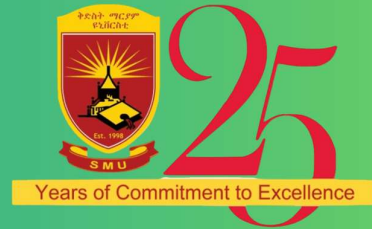


PROCEEDINGS



St. Mary's University

**PROCEEDINGS OF THE
11TH OPEN AND
DISTANCE LEARNING
SEMINAR**

Theme: Re-imagining Open and
Distance Learning in
Developing Countries

August, 2023

Addis Ababa, Ethiopia



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**PROCEEDINGS OF THE 11th OPEN AND DISTANCE
LEARNING SEMINAR (ODLS) 2023**

**Research and Knowledge Management Office of
St. Mary's University**

August, 2023

Addis Ababa, Ethiopia

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Distance Education: Immersive Technology as a Recent Trend

Lamesgne Negalign, St. Mary's University

Abstract

This conference paper explores the evolution of distance education and the potential of immersive technologies to revolutionize it. A systematic review of 29 sources was conducted to identify the different stages or generations of distance education, predict future trends and challenges, and recommend technological and innovative solutions for improving distance education in Ethiopia. The findings suggest that distance education has evolved through four distinct stages: correspondence education, multi-media model, online education, and immersive technology-based education. This paper argues, Immersive technologies such as augmented reality (AR) and virtual reality (VR) have the potential to revolutionize distance education by providing students with immersive learning experiences that were not previously possible. However, there are a number of challenges that need to be addressed before immersive technology-based distance education can be widely adopted, such as the high cost of devices, lack of access, and the need for more high-quality content. In Ethiopia, immersive technologies are unlikely to replace traditional distance education or online education in the near future. However, they may benefit those who can afford them.

Keywords: distance education, immersive technology, augmented reality (AR), virtual reality (VR), evolution of distance education, Ethiopia

Introduction

Distance education has evolved significantly over time, particularly with the advent of computer technologies, the internet, and more recently, immersive technologies such as augmented reality (AR) and virtual reality (VR). This conference paper aims to:

- Identify and analyze the different stages or generations in the evolution of distance education and their features.
- Predict the future trends and challenges of distance education.
- Recommend technological and innovative solutions for improving distance education in Ethiopia.

To investigate the use of immersive technologies in distance education, a systematic review was conducted using a combination of relevant terms on Google Scholar. After screening the sources for quality and relevance, 29 sources were selected for further analysis. Atlas.ti 8 software was used to code the sources according to their main arguments, findings, and implications. A content analysis was then performed.

Defining Distance Education

Simonson and Schlosser (2010), defines distance education as: “institution-based, formal education where the learning group is separated, and where interactive Telecommunications systems are used to connect learners, resources, and instructors.” (Simonson & Schlosser, 2010, p.1).

This definition has 3 dimensions:

- The 1st dimension of the definition identifies the necessity of having institutional bases for distance education. The institutional base can be traditional educational institutions such as schools and colleges or non-traditional institutions such as companies and corporations that provide the education at a distance.
- The 2nd dimension of distance education is the physical separation of teachers and students in distance and time. To qualify as a distance education, the physical separation is necessary. But distance education can take place either in a similar time or different times.
- The third dimension of distance education as identified by the definition is the need of “interactive Telecommunications” which is defined by AECT as “Interactive communication in distance”(Simonson & Schlosser, 2010). Distance education can be classified into two based on the time frame of the interactions between teachers and student or students and other students; Based on the interactions between the teachers and learners, Distance education can be classified into **Asynchronous**-distance learning and **Synchronous**-learning (Garlinska et al., 2023). According to Garlinska et al. (2023), Asynchronous-distance learning is related to a type of learning that takes place where the teaching activities and the learning activities are taking place in a separate time (teaching through text books and prerecorded audio and video materials.), on the other hand, Synchronous-learning involves attending classes online in the same time as they are being delivered (Garlinska et al., 2023). In these interactions, distance education involves the sharing of the instructional materials such as text books, audio files, videos, or other internet-based mechanisms.

Different Phases in the Evolution of Distance Education

The evolution of distance education can be traced back to 300 years ago, when Caleb Phillips advertised a distance shorthand training course in the Boston Gazette (Kentnor, 2015). Since then, distance education has evolved through four distinct phases, each characterized by a different set of technologies:

1. The Correspondence Model
2. The Multi-Media Model
3. The Online-Learning Model
4. Immersive Technologies

1st Generation: The Correspondence Model

The correspondence model of learning emerged in the 18th and 19th centuries, enabled by the expansion of print technology and the postal service. Pioneers such as Caleb Phillips and Isaac Pitman utilized printed texts and postal mail to reach learners who could not attend traditional classrooms. While the correspondence model had limited communication and interaction between teachers and students, it provided a valuable opportunity for learners to access education from afar (Thompson, 2018).

In Ethiopia, the phrase “distance education” is mostly associated with teaching and learning that utilizes printed texts, periodic tutorials, and assignments submitted mostly in hard copies and exams taken by students at the centers physically. Therefore, we can argue that the first-generation correspondence model still exists. Among the possible justifications for the continued existence of the Correspondence Model in Ethiopia are:

- Full-time jobs
- Geographic and family-related constraints.
- Limited access to technology, accessories, and the internet.

The correspondence model offers a number of advantages for learners in Ethiopia. It is flexible and affordable, and it allows learners to study at their own pace. Additionally, the correspondence model can be used to reach learners in remote areas where traditional educational institutions are not available.

2nd Generation: The Multi-Media Model

The second-generation distance education model, also known as the multimedia model, sought to employ various technologies such as print, audio, video, and broadcasting media like radio and television to reach learners. The advent of radio and television opened new opportunities for distance education to cater to a large population, and the potential of television as a medium for distance education was highly anticipated (Viscione & D’Elia, 2019).

However, the multimedia model faced a number of challenges, including technical limitations, regulatory issues, and low quality of production. Additionally, the multimedia model did not improve the interaction between the teacher and the student. The pedagogical approach remained the cognitive-behaviorist model of self-learning, which emphasizes individual mastery of learning objectives (Aoki, 2012).

Despite these challenges, the multimedia model played an important role in the evolution of distance education. It paved the way for the development of more interactive and learner-centered approaches to distance learning (Aoki, 2012).

In Ethiopia, the government has attempted to use radio and television-based educational programs to supplement traditional face-to-face classes in elementary and secondary schools. However, distance education in higher educational institutions remains dominated by the print-based, one-way instructional strategy, with periodic tutorials and assessment-related communications.

3rd Generation: The Online-Learning Model

The third generation of distance education is the online learning model, which uses the internet to deliver most (at least 80%) of the course content. This includes online discussion forums, video conferencing, and multimedia learning materials. Online educational programs emerged in 1989 when the University of Phoenix (in the U.S.) began using CompuServe (Kentnor, 2015).

According to Dimitropoulos et al. (2008), Online education is the most common form of distance education today, and it offers students a number of advantages, including flexibility, convenience, accessibility, intractability and personalized learning (Dimitropoulos et al., 2008).

In Ethiopia, the online education system has not yet come to replace the print-based distance learning system. However, in recent years, a sizable number of colleges and universities have begun to provide distance learning at various levels of higher education. The Covid-19 pandemic has had a huge impact on the growth of online learning by compelling colleges and universities to discontinue face-to-face instruction many universities that used to offer post-graduate education have been compelled to transfer their classes online as a result of the pandemic. However, when everything returned to normal after the lockdown, most institutions and colleges resumed traditional face-to-face classes.

4th Generation: Immersive Technologies

There is a growing trend of educational institutions experimenting with new technologies, from elementary schools to universities, and from distance to face-to-face classes. Immersive technologies are one of such technologies, and many scholars believe they have the potential to revolutionize distance education. This section will discuss the potential benefits of immersive technologies education, including distance learning, and why they may be the future of this field. According to Hamilton et al. (2021), immersive technologies typically involve: multiple modes of interaction that create a sense of being immersed in the environment through 360° visuals through devices worn on the head, sound through earphones, and increasingly more sensations of limbs through controllers and trackers (Hamilton et al., 2021). Although there are numerous types of immersive technologies, this paper focuses on two of them:

- Virtual reality and
- Augmented reality

Virtual reality (VR) is a subset of immersive technology in which the user's cognitive processes create a sense of presence and involvement in the virtual environment, frequently with a diminished awareness of what is happening in the real world around them. The virtual environment should also be interactive, allowing users to change the surroundings and experiment with different variables. One example is interacting with real-world users, virtual avatars, and objects in a computer-generated environment (Yin, 2022).

Augmented reality: is “a system that enhances the real world by superimposing computer-generated information on top of it” (Furht, 2006). It is characterized by blending the real and virtual worlds. This allows users to be aware of the real world while adding layers of virtual information, videos, sounds, and graphics. AR typically utilizes a see-through head-mounted display (HMD) to overlay the virtual content onto the user's view of the real world (Vafa et al., 2018).

Origin of Immersive Technologies

Immersive technologies have a long history, dating back to 1838 when Charles Wheatstone introduced the stereoscope, a device that allowed viewers to see images in 3D. Other early immersive technologies include the Sensorama (1950s), a multisensory theater that stimulated all five senses, and the Link Trainer (1929), the first flight simulator. The first head-mounted VR display with 3D display and stereo sound was launched in 1960, and can be seen as a precursor to modern immersive technologies (“History of Virtual Reality,” n.d.).

Challenges in Distance Education

Distance education offers many advantages, but it also presents a number of challenges. One of the biggest challenges is the lack of socialization and interaction between students and instructors. Distance learners can feel isolated and disconnected from their classmates and teachers, which can lead to a loss of motivation (Ntaba & Jantjies, 2021).

Another challenge of distance education is the "one size fits all" approach. Distance courses are often designed for a wide range of learners, which can make it difficult to meet the individual needs of all students. Additionally, distance courses can be more boring and less engaging than traditional face-to-face courses (Ntaba & Jantjies, 2021).

Another challenge of distance education is the lack of mechanisms to ensure active participation of students. It can be difficult for instructors to keep students engaged in learning activities when they are not physically present in the classroom.

Finally, distance education can be challenging for courses that require laboratories and hands-on activities, such as science, engineering, and technology. It can be difficult to provide students with the same level of hands-on experience in a distance learning environment as they would receive in a traditional classroom setting (Boyles, 2017).

Immersive Technologies as Remedies to Challenges of DE

Immersive technologies can help to address some of the above key challenges of distance education, such as lack of interaction, isolation, and the "one size fits all" approach.

Virtual presence: Immersive technologies such as virtual reality (VR) and augmented reality (AR) can create a virtual presence that can help to reduce the feelings of isolation and lack of interaction that are common among distance learners. In synchronized virtual classrooms, students can participate in discussions, ask questions, and request support from their instructors and classmates in real-time (Yépez et al., 2020).

Reduced number of deterrents: Immersive technologies can also reduce the number of deterrents that can prevent students from accessing distance education. For example, immersive technologies can allow students to learn from anywhere in the world, regardless of their physical location. Additionally, immersive technologies can provide students with a safe and controlled environment to learn, which can be particularly beneficial for students who are learning new skills or who are studying sensitive topics (Boyles, 2017; Garlinska et al., 2023).

Personalized learning: Immersive technologies can also be used to support personalized learning. For example, immersive technologies can be used to create adaptive learning experiences that tailor the learning content and activities to the individual needs of each student. Additionally, immersive technologies can provide students with opportunities to learn using their preferred learning style, whether it be auditory, visual, kinesthetic, or aesthetic (Yin, 2022).

Increased engagement and motivation: Immersive technologies can also be used to increase student engagement and motivation. Immersive learning experiences can be more engaging and motivating than traditional learning experiences because they allow students to learn by doing. Additionally, immersive technologies can help students to focus on their learning by blocking out distractions (Boyles, 2017).

Overall, immersive technologies have the potential to revolutionize distance education by addressing some of the key challenges of this modality and by providing students with more engaging and effective learning experiences.

Immersive technologies are still in their early stages of development, but they are rapidly evolving. As immersive technologies become more affordable and accessible, they are likely to play an increasingly important role in distance education.

Examples of Application of VR/AR in Different Fields of Studies

Here are some examples of how VR/AR are being used in different fields of studies today:

- **Language:** VR/AR can be used to create immersive language learning experiences that allow students to practice speaking and listening to a foreign language in a real-world setting. For example, students can use VR to visit a virtual foreign country and interact with native speakers (Boyles, 2017).
- **History, Geography, and other Social Sciences:** VR/AR can be used to transport students back in time or to different parts of the world. For example, students can use VR to visit historical sites or to explore different cultures (Ibid.).
- **Engineering (Mechanical, Electrical, Architectural, or Civil):** VR/AR can be used to create virtual simulations of engineering projects that allow students to design, build, and test their projects before they are built in the real world. For example, students can use VR to design

a new bridge or to simulate the construction of a new skyscraper (Boyles, 2017; Garlinska et al., 2023; Ntaba & Jantjies, 2021).

- **Natural Sciences:** Chemistry, Physics, Astronomy, etc.: VR/AR can be used to visualize complex scientific concepts and to create interactive learning experiences that allow students to explore natural phenomena in a safe and controlled environment. For example, students can use VR to explore the inside of a cell or to simulate the solar system (Boyles, 2017; Georgiou et al., 2007; Ntaba & Jantjies, 2021).

- **Medicine:** VR/AR can be used to train medical professionals on new procedures and to provide patients with more immersive and informative healthcare experiences. For example, surgeons can use VR to practice performing complex surgeries before they perform them on real patients (Abidi et al., 2012; Boyles, 2017).

- **Distance Education:** VR/AR can be used to create more engaging and interactive distance learning experiences. For example, students can use VR to attend virtual classes or to participate in virtual field trips (Abidi et al., 2012; Boyles, 2017; Garlinska et al., 2023; Georgiou et al., 2007).

These are just a few examples of how VR/AR are being used in different fields of studies today. As VR/AR technologies continue to develop, we can expect to see even more innovative and effective applications of these technologies in education.

Limitations of Immersive Technologies

Despite their many potential benefits, immersive technologies also have some limitations for education. Among them are:

- Its association with games: Even though since the 1920s (the invention of the first flight simulator) immersive technologies were perceived to be important for educational purposes, they are more popular in the gaming industry. Thus, some are afraid that AR/VR might not be taken seriously by students (Yin, 2022).

- The need for skilled teachers that can understand the technology and design their instructions for that purpose (ibid.)

- For the purpose of distance education, access to a stable internet is mandatory for an uninterrupted class (Garlinska et al., 2023).

- Because immersive technologies are just simulations, they can't be replacements for the real hands-on and face to-face experience (Yin, 2022).

- In Ethiopia context, this type of technology is most certainly for the minority, (can't be afforded by most). Because an immersive technology needs access to head Mounted Devices and Smart Mobile Phone/Computer which are expensive for many Ethiopians.

Interests on Immersive Technology

Because of its advantages, many are predicting that immersive technology will be one integral part of education of the future, as a result, many schools are experimenting on it. The biggest technology companies such as Apple (Vision Pro), Facebook (Meta Verse and the Quest series), HP, Sony and the like are some of the examples of companies scrambling to benefit from its market demand.

Immersive Technologies in Ethiopia

Immersive technologies are not new to Ethiopia. They are common in many gaming centers,

and the Ethiopian Airline has been using flying simulation for many years. However, the introduction of immersive technology-based distance education is unlikely to be accessible to most Ethiopian distance learners due to financial and other constraints.

The high cost of the necessary equipment and internet access would prevent many people from getting access to immersive technologies. The most likely target population for this type of education would be technologically active youth with a relatively better economic status who have reliable internet access.

It is important to note that the cost of immersive technologies is decreasing rapidly, and internet access is becoming more widespread in Ethiopia. As a result, immersive technology-based distance education may become more accessible to Ethiopian distance learners in the future.

However, there are other challenges that need to be addressed before immersive technology-based distance education can be widely adopted in Ethiopia. For example, there is a need to develop immersive learning content that is tailored to the needs of Ethiopian students. Additionally, there is a need to train teachers on how to use immersive technologies effectively in the classroom.

Overall, immersive technologies have the potential to revolutionize distance education in Ethiopia. However, there are a number of challenges that need to be addressed before immersive technology-based distance education can be widely adopted.

Conclusion and Recommendations

At least in Western Countries, Immersive technologies are entering the educational market, including distance learning. Even with their limitations, immersive technologies have the potential to revolutionize distance education all over the world. However, there are a number of challenges that need to be addressed before immersive technology-based distance education can be widely adopted.

In Ethiopia, in the near future, immersive technologies are unlikely to replace the traditional hardcopy-based distance education or the recently growing online education. However, those who can afford the accessories will benefit from them. The youth group with a better access to these facilities might be an attractive market for educational institutions that are willing to invest on immersive technologies.

Ethiopian educational institutions (conventional or distance education providers) should start thinking about the benefits of immersive technologies in bringing a better learning opportunity for students. Colleges and universities should encourage their students to engage in app development activities targeting immersive technologies. Additionally, awareness about the existence of these technologies should be created.

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Assessment of Students' Opinion on the Modules Used in Modularized Open and Distance Learning: A Case Study of St. Mary's University,

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Abstract

Modular distance learning is learning in the form of individualized instruction that allows learners to use self-learning modules (SLM) in print or digital format. As a result, more attention must be paid when creating the course materials to meet academic standards. The main objective of this study is to analyze the opinion of CODL students on the learning modules/textbooks used at St. Mary's University. Questionnaire based on Lemmer et al. (2008) and Devetak & Vogrinc (2013) was developed and used for the data collection. To understand the opinion of the respondents on the four different attributes of modules, namely content, instruction, technicality, and ethical and moral considerations, a five scale Likert scale is used. The view of the students on the overall quality of the modules used as textbooks at St. Mary's University, College of Open and Distance Learning, is generally classified as "Good" using Likert scale criteria. The modules fell short of the excellent aspiration that the University set to meet in all aspects of its operations. Particularly, one of the attributes, namely Instructions failed to meet the expectations of the students. The student's opinion on the way the modularized instruction is crafted is classified as "Fair" unlike the other three attributes. In addition, almost all of the respondents criticized the bulkiness and redundancy viewed in the modules and recommend preparation of summarized and updated modules. Visual design and page structure are also fundamental in ODL textbooks. According to the results of the study, the design should have better integrity and clarity.

Keywords: *Distance learning, self-learning materials, content, instruction, technicality, ethical and moral consideration*

1 Introduction

1.1 Background

1.1.1 Background of the Study

As an alternative method to meet the educational needs of society, the history of Open and Distance Learning (ODL) dates back more than a century. With the general definition of ODL, the instructor and the learner are in separate places, and the time limit disappears, printed materials, or a system in which learning and teaching activities are carried out using electronic tools in ODL systems (Moore, 2013). The interaction factor is also significant because learners and instructors are far from each other regarding time and space (Kaysi & Aydemir, 2017; Mutlu et al., 2005).

The mainstay of instruction through the distance education system is printed course material. Printed course material is still the most effective way to deliver instruction to thousands of learners remotely, even in developed nations where open universities are present and mass communication media and information technologies have revolutionized educational systems. As a result, more attention must be paid when creating the course materials to meet academic standards. All key terminology related to the process of ODL should be understood by everyone who works in or plans to work in the distance education system, as well as anyone who wants to learn how to create SLM for distance learners and how to update such materials on a regular basis.

According to Jayaram and Dorababu (2015), the success and efficiency of the distance education system "depend heavily on the study material, particularly in the form of printed course material". As a result of the fact that "student learning is at the center of the ODL experience" (Kirkpatrick, 2005), quality in Open and Distance Learning (ODL) institutions and their programs are frequently assessed in connection to the study material. The entire learning philosophy relies on these pivots.

1.1.2 Background of the organization

St. Mary's University is one of the Private Higher Education Institutions (PHEIs) which emerged as a result of the privatization of higher education institutions in Ethiopia. It is an outgrowth of St. Mary's Language Center, which was established in 1991 in Addis Ababa. The University was established in 1998 as St. Mary's General Education Development PLC with its head office in Hawassa and a branch in Addis Ababa. It launched its training in the same year with 33 students in Hawassa and 37 students in Addis Ababa, studying in three departments (Accounting, Marketing, and Law).

In the last quarter of 1998, the University admitted more than 300 students in Addis Ababa (Lideta Campus) and shifted its head office from Hawassa to Lideta Campus. In 1999, the departments of Secretarial Science and Office Management were added. In September 2000, the Departments of Computer Science (diploma) and Law (degree) were started. In preparation for the September 2002 registration, new staff members were employed and a new building besides the Wabe Shebelle Hotels, was rented.

In 2003, in addition to Law, degree programs in Marketing, Management, and Accounting were introduced. After a year, a degree program in Computer Science started. In the same year, Natural Science stream, which offers diploma level training, was opened under Teacher Education. In July 2006, a Master's Program in various fields of studies was embarked in collaboration with Indra Gandhi National Open University (IGNOU). At that moment the University was hosting hundreds of workers and thousands of students on its different campuses in Addis Ababa. It has recently been granted the status of university by the then HERQA.

Since its inception, St. Mary's University has made a tremendous effort toward meeting the growing demand for trained manpower in the country. Today, it offers an extensive range of undergraduate programs, in conventional and distance modes of delivery in different faculties.

1.2 Statement of the Problem

Based on (Manlangit, Paglumotan, & Sapera) Modular learning is a form of distance learning that uses self-learning modules (SLM) based on the most essential learning competencies. According to Mark Antony Llego (2020), modular distance learning is learning in the form of individualized instruction that allows learners to use self-learning modules (SLM) in print or digital format/electronic copy whichever is applicable in the context of the learner, and other learning resources like learners' materials, textbook, activity sheets, study guides and other study materials.

The teacher serves as the primary resource in classroom-based instruction. Although he or she may also employ textbooks or audio-visual aids, the teacher still occupies a central position in the system. He or she carries out a variety of tasks. He or she: defines what is to be learnt, provides information, gives examples, explains, questions, sets learning tasks, both for individuals and groups, marks work, answers learners' questions, checks what learners have learnt, provides feedback to individual learners on their progress, provides other resources (e.g., textbooks), gives advice on how to use those resources, gives study advice, and helps with individual problems.

There is no teacher involved in distance learning. Instead of a teacher, students are given access to tutors and learning resources. Tutors only work with students for brief durations because they are pricey and since most distance learners study at home. The 14 activities listed above must therefore be completed by the learning materials, with the exception of the marking process. In other words, the instructional materials themselves will outline the content to be covered, offer data, and provide examples, and so on.

One of the essential components of ODL systems established with extraordinary financial expenditures is textbooks. Considering that it is also a mediator of learning content interaction, the importance of analyzing the quality of these books through the eyes of the end users becomes clear. To ensure the suitability of textbooks for individual learning in terms of content, instruction, technicality, and moral and ethical consideration, it is necessary to examine the reflections of scientific principles such as more practical design, content, and language expression in practice.

The College of Open and Distance Education (CODL) is one of the colleges of the University mandated to provide an undergraduate distance education program. This modularized distance program functions in a way that students will get a course module/textbook at the time of their registration. The University has a well-organized system and structure to execute the task of producing modules of standard quality. Since getting feedback from the end users is a way of evaluating to assure product quality, this research intends to assess the opinion of the college of open and distance students on the modules/textbooks produced and used by St. Mary's University.

1.3 Objective of the Study

1.3.1 General Objective

The main objective of this study is to analyze the opinion of CODL students' on the learning modules/textbooks used at St. Mary's University.

1.3.2 Specific Objectives

- To assess opinion of students on the content of textbooks used in ODL, St. Mary's University;
- To examine the view of students on technical features of modules used in ODL in the University;
- To assess the perception of students on the instructional features of modules used in CODL, St. Mary's University; and
- To evaluate the textbooks used from ethical and moral perspective.

1.4 Significance of the Study

Assessing the quality of modules and collecting feedback from the end users/students will help the CODL, St. Mary's University to know the feeling of its customers so that it can survive and thrive by getting a competitive advantage via satisfying its customers. In addition to that, the study has the following importance:

- This study will help the management and staff of CODL, St. Mary's University in identifying areas in which they need to improve in order to advance the quality of modules.
- It assists them to know where to put more resources in order to improve the text books.
- It also helps to point out areas of weakness and improve on them so as to offer quality Service.

1.5 Scope of the Study

The scope of this study is to assess the opinion of students on the quality level of learning textbooks/ modules used by students of CODL, St. Mary's University and measure the level of significance that each quality dimension has on the end users/ students. The study focuses on assessing the quality and customer opinion of the modules used as a text book in the open and distance education program of St. Mary University from students' perspective.

2 Literature Review

2.1 Theoretical Literature Review

2.1.1 Features of Self Learning Modules (SLMs)

Over the years, personalized learning tools that allow users to study whenever and wherever they want have proliferated. The course books are among the crucial assets for independent learning that ODL offers its students. Information in ODL is shared, transferred, and stored via textbooks (Bozkurt, 2013). The process of creating a textbook is extensive, and the material must meet certain requirements (Bodur, 2016). Students can learn more effectively and productively thanks to the way textbooks are designed, particularly for private study. The notable aspects of individual textbooks (individual pace, repetition, etc.) are based on learning. The employment of numerous activities to improve and increase learning is one of these. These exercises are an area of study for students. Encouraging students to respond to the material rather than be passive while working on it; to think independently; to discover answers to the problems posed, and, therefore, to understand what they have learned permits them to apply (Bullen, 2007). This will engage students with the topic.

When compared to other publications and formal education textbooks, broadcast quality, writing, content, and expressive features, as well as inner and exterior aesthetic design, should differ (Bodur, 2010). Additionally, according to Aydın (2006) and Jacobs (2015), the textbook should assist students in achieving their objectives and meeting their needs as quickly and effectively as possible. Determining if the textbooks in OLS systems possess these qualities and outlining the study's justification are crucial for this reason.

It might be challenging to create student learning modules and other teaching and learning resources (Campbell, 1999). Their applicability may have an impact on the caliber of education, which in turn has an impact on how well children learn and perform in school (Tety, 2016). Additionally, because they clarify concepts that teachers were unable to, instructional materials serve as teachers' strategic components in preparing and delivering instruction. To increase the quality, effectiveness, and productivity of education, improved learning materials and services are required (Likoko et al., 2013). Given the importance of instructional and learning materials like self-learning modules in the teaching-learning process, their quality is further questioned.

2.1.2 Characteristics of SLMs

- 1. Self-motivating:** The study materials like a live teacher should be highly encouraging for the learners. The materials should arouse curiosity, raise problems, relate knowledge to familiar situations and make the entire learning meaningful for them. It is not easy to create these situations, without extra effort from the course writer. The sense of reinforcement should be strengthened at every stage of learning and retention.
- 2. Self-learning:** A unit, besides information, provides the learners' study guide - directions, hints, references etc., - to facilitate their independent learning. To make the content comprehensible, it is supported by simple explanations, examples, illustrations, activities etc.

3. **Self-explanatory:** The learner can go through the material without much external support. The content should be self-explanatory and conceptually clear. For this, the content is analyzed logically before it is presented. This order maintains the continuity and consistency of the content.

4. **Self-contained:** Not that distance learners should not seek external support, or meet a teacher, but many of them are not in a position to receive support due to their geographical, physical and psychological isolation. Considering this factor, to the possible extent material should be self-sufficient so that he/she would not be at a disadvantage to those learners who are having accessibility to additional sources and teachers. For this, the scope of the content of the unit should be visualized in detail.

5. **Self-directed:** The study material should aim at providing necessary guidance, hints and suggestions to the learners at each stage of learning. The self-directed material is in the form of easy explanations, sequential development, illustrations, learning activities, etc. The material performs the role of a teacher who can guide, instruct, moderate and regulate the learning process in classroom situations. Thus, the course material should direct the entire process of learning.

6. **Self-evaluating:** To ensure optimum learning, the learners should know whether they are on the right track. Self-evaluation in the form of self-check questions, activities, exercises etc., provides the learners with much-needed feedback about their progress (check your progress), reinforces learning, and motivates them for learning. Course writers have to prepare “possible or model answers” to the questions, exercises and activities placed in the unit/lesson so that learners can cross-check their own answers and assess their progress in learning.

2.1.3 The Rationale for the Criteria Development

There can be two sources in doing this step: (1) existing literature and (2) the perspective of experts. In this study, sources from existing literature are used in identifying the set of criteria and sub-criteria that characterize the quality of self-learning modules. Through a literature review, the following decision criteria were identified:

Table 2.1. Criteria Suggestions from the Literature

| References | Criteria Identified |
|---------------------|---|
| Lemmer et al.(2008) | Content <ul style="list-style-type: none"> • All learning outcomes are included. • Contextualized to the learners’ level. • Is rendered scientifically correct. • Different themes are presented separately. • Contents included are relevant. |

| | |
|-----------------------------|---|
| | <p>Instruction</p> <ul style="list-style-type: none"> • Considers the background and environment of the learners in the activities. • Includes a variety of activities. • Assessment tasks are contextualized to the learners' level. • Tasks are accessible. <p>Technical</p> <ul style="list-style-type: none"> • Sufficient sketches are included. • Sketches are clear. |
| Devetak and Vogrinc (2013). | <p>General</p> <ul style="list-style-type: none"> • The structure is clear and transparent • Technical guidance is considered. • The content is consistent with the learning objectives/aims/goals. • The content is learning- goals based. • Extends coherent learning material in the framework of the specified educational program. • The inductive approach is used. • The content is correct. • The content is didactically adequate. • Suggestions for cross-curricular integration. <p>Textual</p> <ul style="list-style-type: none"> • Text is linguistically correct and appropriate. • Text contains motivational elements. • Text encourages active learning. • Text contains activities at different cognitive levels. <p>Pictorial</p> <ul style="list-style-type: none"> • Visuals are of high quality. • Visuals contain motivational elements. • Visuals stimulate recall • Integration of visuals and text • Different types of visuals • Multi-presentational aspect of the visual • Visuals in activities |

Based on the suggestion from the criteria listed on table 2.1 and a thorough and successive discussion with open and distance learning experts, a questionnaire is developed to understand the opinion of the respondents on the four different attributes of modules, namely content, instruction, technicality, and ethical and moral considerations. A five scale Likert scale is used to measure the opinions of the respondents.

2.2 Empirical Literature Review

Around the world, the burgeoning demand for ODL institutions to provide opportunities to learners to pursue higher education has shifted the attention of stakeholders and interested parties to the importance of quality. In light of the increasing competition with conventional universities, the ODL institutions need to offer quality courses and modules that satisfy learners and make them feel there is value for money and the education is a good investment; this in turn ensures that the ODL institutions can continuously “sell and survive” (Koul, 2010) and, at the same time, overall improvements in quality in addition to openness and transparency become the key drivers of “competition and collaboration in education and research” (Anderson, 2008; Ossiannilsson and Creelman, 2012).

Ideally, quality learning materials in an ODL setting must be “simple to interact with and should be understood by learners,” so much so that the materials should be self-explanatory, requiring minimal or even no assistance from tutors (Adegoke and Oni, 2015). If learners are unable to understand the module, they may underperform in their exams, lag behind in their studies, become demoralized and eventually contribute to the high attrition rate of learners at the ODL institution. In fact, the factors for the high attrition rate among ODL learners include “study material in tough or difficult language and delay or non-receipt of study material” (Kumari, 2012). Meeting deadlines is also very important, as failure to achieve the set deadlines can affect other subsequent processes and lead to “devastating consequences” (Belawati and Zuhairi, 2007).

Hence, the accuracy of the content in learning material is crucial. Information must be up-to-date and new changes must be taken into consideration as these will “ensure the appropriateness and quality of the learning materials” (De Fazio et al., 2012). Therefore, there should be zero tolerance for errors such as grammatical errors, factual errors or mistakes in formulas or calculations in the learning material. Learning material which is difficult to understand will contribute to high attrition (Kumari, 2012), whilst “inaccurate and outdated learning material” will not make the learners achieve the desired outcomes (Idrus, 2006).

3 Methodology

3.1 Research Design

The current study aimed at measuring students’ opinions of the quality of learning materials/modules. In doing so, descriptive research design was utilized. The choice of the design

was informed by the type of research questions, purpose and the data collection instruments used in this study.

3.2 Sampling and Sample size Determination

The study targeted undergraduate students across all available programs of CODL who took at least seven terms of courses. The selection of the target population is based on the assumption that students with experience of seven terms or more will give a good assessment of the textbooks/modules. Out of this, a sample of 100 students was selected for the study. The rationale for the small size of the sample is the expected homogeneity of the population.

3.3 Sampling techniques and tools

A 31-item questionnaire based on Lemmer et al. (2008) and Devetak & Vogrinc (2013) was developed and used for the data collection. To understand the opinion of the respondents on the overall quality and different attributes of modules, a five scale Likert scale is used: "Very poor, Poor, Fair, Good and Excellent". The systematic sampling technique is used to select the samples from the population.

3.4 Methods of Data Analysis

After the collection of data from students through a questionnaire, it was accordingly categorized, analyzed, and interpreted by using different analytical methods. SPSS version 20 was used for data analysis. The analysis is based on finding and interpreting the measures of central tendency values, mean, mode and median, of the observations. To interpret the result, the researcher used two different ways of analyzing data collected in Likert scale measures as the analysis is different in the way you consider the type of data as ordinal or interval data.

4 Data Analysis, Discussion, and Interpretation

4.1 Response Rate

After distributing 100 questionnaires to respondents, only 87(87%) are returned and the remaining 13(13%) are either not returned or properly filled so that the analysis is conducted using the 87 sample data collected.

4.2 Data Validity and Reliability

4.2.1 Data Validity

To ensure data validity, the questionnaires were distributed to respondents after a rigorous discussion is made with academicians and Open and distance learning experts. Besides, the choice of the target population, students with more than two years of experience, ensures the validity of the process.

4.2.2 Data Reliability

Internal consistency refers to how well a survey, questionnaire, or test actually measures what you want it to measure. The researcher calculated Cronbach's alpha value to measure the internal

consistency of the survey data. Cronbach's Alpha ranges between 0 and 1, with higher values indicating that the survey or questionnaire is more reliable.

According to Tavakol, M., and Dennick, R. (2011), there are different reports about acceptable values of Cronbach's alpha, ranging from 0.70 to 0.95. The test result of the data is presented below and it shows that the scale is reliable.

Table 4.1 Reliability Test

| Description | Cronbach's alpha | No. of Items |
|----------------------------------|------------------|--------------|
| Content | 83.78 | 10 |
| Instruction | 88.66 | 9 |
| Technicality | 79.97 | 9 |
| Ethical and Moral considerations | 91.65 | 3 |
| Overall | 94.11 | |

Source: - Own analysis through SPSS

4.3 Background Information of Respondents

As can be seen in Table 4.2 below, from the total number of respondents, female respondents account for 55.2% and the remaining 44.8% are male.

Table 4.2:- Gender of Respondents

| Sex | Frequency | Percent (%) |
|--------|-----------|-------------|
| Female | 48 | 55.17 |
| Male | 39 | 44.83 |
| Total | 87 | 100 |

Source: own survey (2023) Table 4.3:- Age of Respondents

| Age | Frequency | Percent (%) |
|-------|-----------|-------------|
| 18-30 | 63 | 72.4 |
| 31-45 | 21 | 24.1 |
| 46-60 | 3 | 3.5 |
| ≥61 | 0 | 0 |
| Total | 87 | 100 |

Source: own survey (2023)

As can be observed from Table 4.3 above, 87 respondents, 72.4%, were between 18-30 Years of age. This result might indicate a shift in the demography of open and distance education, i.e. more and more young students are enrolling in the program.

4.4 Descriptive Analysis of data

In relation to this study, the researcher believes that there is a reality that can be apprehended or perceived; customer view of module quality do exist out there and are external to the

consumers that perceive these realities. This tilts our study towards an objectivist way of looking at social phenomena. It is a clear fact that companies strive hard to improve service and product quality.

The research used structured questions developed from which respondents choose their answers. Through this method, the researcher became very objective in the study and thereby answered the research questions attaining the specified objectives. The research is not seeking to understand each respondent's opinions but rather get a general answer on consumers' opinions of textbooks/modules quality. The opinion of the students is classified into levels where each respondent identifies the range where he/she belongs by using the Likert scale.

4.4.1 Findings Related to the Content of Modules

The content in a module must be designed in a systematic way to facilitate learning without the regular supervision of a tutor. The content must also be interactive with an element of guided didactic conversation that can create warmth, closeness and two-way communication between learner and materials or between learner and the module writer. Toward this end, the module has specific roles to play in ensuring that "the learning outcomes are clear to the learner, content is arranged in the proper sequence, there are adequate activities, diagrams and illustrations to aid learners and also assignments to regulate learners' progress" (Koul, 2010).

Likert scale mean scoring: Attitude was then determined based on the argument that a mean score of 3 on the Likert scale represents a neutral attitude; mean score of less than 3 represents a negative attitude; and greater than 3 represents a positive attitude. The range of interpreting the Likert scale mean score was given as follows: 1.0-2.4 (Negative attitude), 2.5-3.4 (Neutral attitude), and 3.5-5.0 (Positive attitude).

Table 4.4:- Students opinion about the content quality of modules

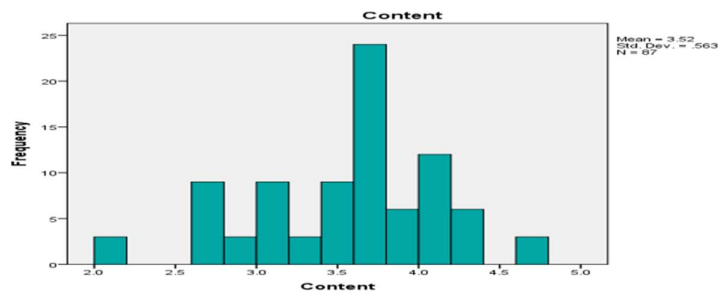
| Statements | 1 | 2 | 3 | 4 | 5 | Mean | Attitude |
|--|----------|----------|----------|----------|----------|-------------|-----------------|
| The content of the module covered the learning competencies. | 3 | 0 | 30 | 39 | 15 | 3.7 | Positive |
| Texts and visual aids are accurate and error-free. | 3 | 12 | 51 | 18 | 3 | 3.1 | Neutral |
| Contents and outcomes are matched. | 0 | 9 | 18 | 54 | 6 | 3.7 | Positive |
| Aligned with the course description. | 9 | 3 | 27 | 42 | 6 | 3.4 | Neutral |

| | | | | | | | |
|---|------------|----|----|----|----|-----|-----------------|
| Topics and assessments are aligned with the intended learning outcomes. | 0 | 3 | 18 | 48 | 18 | 3.9 | Positive |
| Covers the learning objective of the course/subject. | 3 | 6 | 21 | 42 | 15 | 3.7 | Positive |
| Defines intended learning outcomes. | 0 | 3 | 21 | 54 | 9 | 3.8 | Positive |
| Contains theories and principles in real life setting. | 3 | 15 | 27 | 36 | 6 | 3.3 | Neutral |
| Comprehensive and based on facts and credible sources | 3 | 9 | 33 | 30 | 12 | 3.4 | Neutral |
| Indigenization is given due attention. | 3 | 18 | 36 | 21 | 9 | 3.2 | Neutral |
| Overall Average | 3.5 | | | | | | Positive |

Source: own survey (2023)

The statements crafted to measure the opinion of students on the content of the modules are compiled and transformed into a single variable that captures the view of students on the overall content of the modules, and the mode and median of the observation is calculated so as to know the frequency of the measures of module content quality.

Figure 4.1 Measure of Central tendency of the observation about the view of students on content of modules.



Source: own survey (2023)

As can be seen from Figure 4.1, the majority of the respondents' view on the content of the modules used in Open and Distance learning at St. Mary's University is classified as "Good" as the median is 3.70 and the mode is 4.00. That is in the eyes of the majority of the respondents (62%), the content of the module is good.

4.4.2 Findings Related to the Instruction

Instruction is the process of teaching and engaging students with content. Modular instruction is an alternative instructional design that uses developed instructional materials that are based on the needs of the students. Students are encouraged to work on various activities that are interesting and challenging to maintain focus and attention thereby encouraging independent study.

Several papers have agreed on the vitality of instruction in the production of learning

resources, specifically in contextualizing its contents and instructional strategies to learners' varied needs. Contextualization constructs and transforms a more extensive environment for students (Haris & Putri, 2011; Weinberg, Besile, & Albright, 2011). When content and instruction are contextualized, materials, experiences, and situations that are relevant and meaningful to students are considered (Madrazo & Dio, 2020). However, contextualization requires time given the unavailability of local materials and pedagogical difficulty. Also, the fact that the learners' needs are various means that not all topics may be applicable (Madrazo & Dio, 2020).

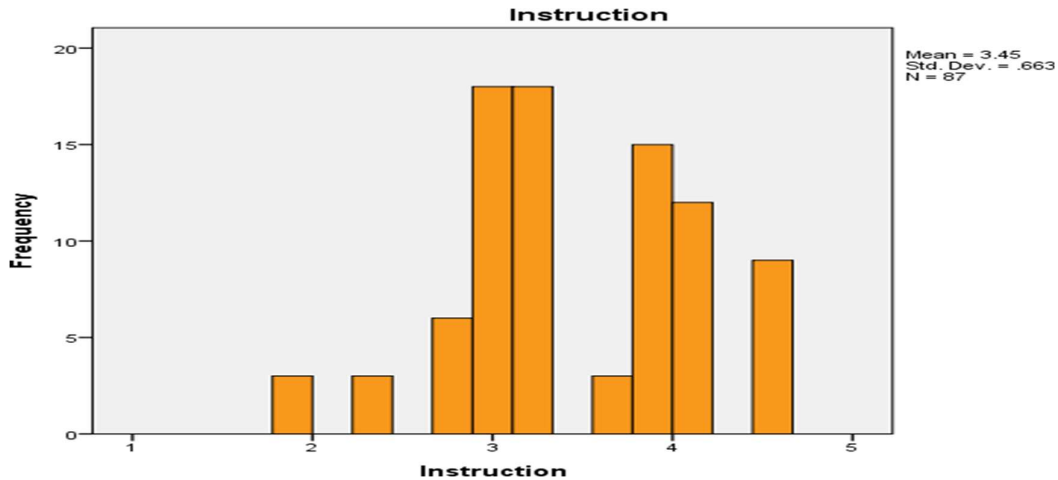
Table 4.5: Students opinion about the instructional parameters of modules

| Statements | 1 | 2 | 3 | 4 | 5 | Mean | Attitude |
|---|------------|----|----|----|----|------|----------------|
| Appropriate and contextualized according to the needs (i.e. learning styles, multiple intelligences, etc.) of the learners/students | 3 | 12 | 30 | 36 | 6 | 3.3 | Neutral |
| Includes a variety of relevant and interactive written and performance tasks | 0 | 0 | 33 | 45 | 9 | 3.7 | Positive |
| Encourages the use of ICT | 3 | 27 | 21 | 30 | 6 | 3.1 | Neutral |
| Provides development of cognitive, affective, and psychomotor domains of students | 3 | 12 | 30 | 33 | 9 | 3.4 | Neutral |
| Discusses basic applications prior to complex situations | 0 | 9 | 36 | 33 | 9 | 3.5 | Positive |
| Includes research outputs as supplementary materials in instruction | 3 | 15 | 30 | 24 | 15 | 3.4 | Neutral |
| Uses problem-based activities/projects and frames questions that encourage higher-order thinking skills | 3 | 15 | 30 | 24 | 15 | 3.4 | Neutral |
| Encourages reflective practice and self-evaluation | 0 | 9 | 27 | 42 | 9 | 3.6 | Positive |
| It takes into consideration of the learners capabilities and resources | 0 | 6 | 30 | 39 | 12 | 3.7 | Positive |
| Overall Average | 3.4 | | | | | | Neutral |

Source: own survey (2023)

The statements crafted to measure the opinion of students on the instruction of the modules are compiled and transformed into a single variable that captures the view of students on the overall instruction attributes of the modules, and the mode and median of the observation is calculated so as to know the frequency of the measures of module instructional quality.

Figure 4.2 Measure of Central tendency of the observation about the view of students on instruction of modules



Source: own survey (2023)

As can be seen from Figure 4.2, the majority of the respondents' view on the instructional attributes of the modules used in Open and Distance learning at St. Mary's University is classified as "Fair" as the median is 3.22 and the mode is 3.00. That is in the eyes of the majority of the respondents (52%), the instructional attributes of the module are fair.

4.4.3 Findings Related to the Technicality

In their paper, (Dreckmeyr et al., 1994) emphasized that technical aspects, such as the quality of illustration, sketches, and graphs should be considered in learning materials like textbooks; the same applies for SLMs. Given this, teachers should ensure that there are no blurry visual elements when they produce SLMs. Defective illustrations sometimes result from poor photocopying quality; thus, they should be given attention during production.

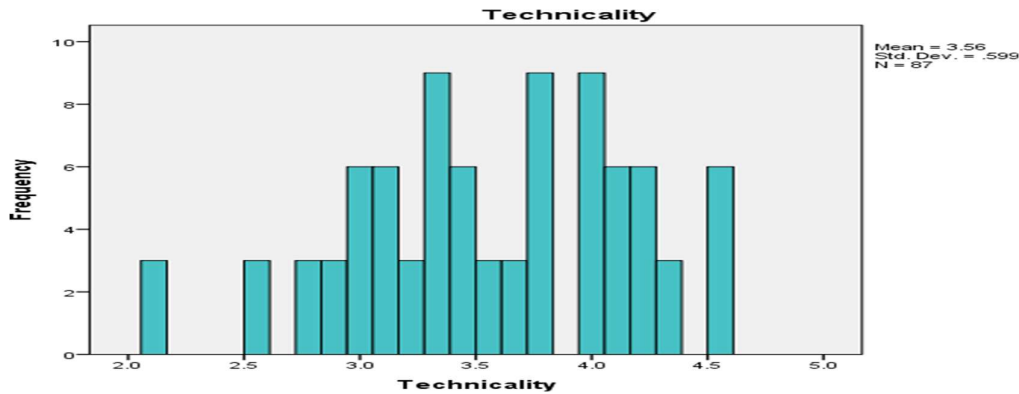
Table 4.6:- Students view on the technical attributes of modules

| Statements | 1 | 2 | 3 | 4 | 5 | Mean | Attitude |
|---|------------|----|----|----|----|------|-----------------|
| Has correct grammar and spelling | 6 | 3 | 24 | 30 | 24 | 3.7 | Positive |
| Logically and systematically arranged | 0 | 12 | 33 | 24 | 18 | 3.6 | Positive |
| Not plagiarized and sources are cited properly | 0 | 12 | 33 | 36 | 6 | 3.4 | Neutral |
| Has good lay-out | 3 | 15 | 21 | 36 | 6 | 3.4 | Neutral |
| Has uniform formatting | 0 | 9 | 18 | 48 | 18 | 3.7 | Positive |
| Has readable font style | 6 | 6 | 27 | 27 | 21 | 3.6 | Positive |
| Uses clear pictures | 3 | 21 | 21 | 30 | 12 | 3.3 | Neutral |
| Uses simple but scholarly-constructed sentences | 0 | 6 | 21 | 45 | 15 | 3.8 | Positive |
| Uses consistent terminologies or concepts | 0 | 6 | 39 | 33 | 9 | 3.5 | Positive |
| Overall Average | 3.6 | | | | | | Positive |

Source: own survey (2023)

The statements crafted to measure the opinion of students on the technical attributes of the modules are compiled and transformed into a single variable that captures the view of students on the overall technical qualities of the modules and the mode and median of the observation is calculated so as to know the frequency of the measures of module technical quality.

Figure 4.3 Measure of Central tendency of the observation about the view of students on technicality of modules



Source: own survey (2023)

As can be seen from figure 4.3, majority of the respondents view on the technical attributes of the modules used in Open and Distance learning at St. Mary’s University is classified as “Good” as the median is 3.56 and has two modes, 3 & 4. That is, 46% of the respondents view on the technical quality of the module is good.

4.4.4 Findings Related to the Ethical and Moral considerations

The paper by (Veugelers & Vedder, 2003) posits on the importance of integrating ethics in classrooms, emphasizing that the set of values embedded in the curriculum must be included in teachers’ pedagogical practice. As argued by several papers (Goodman et al., 1992; Edwards et al., 1994), this exercise is a way to prepare students to function in a democratic society. To satisfy this sub-criteria, instructional and learning materials, including SLMs, should be based on living values and grounded on knowing, desiring, loving, and acting the good (Komalasari & Sapudin, 2017). Moreover, the materials must be contextual, bridging the values with their real-life application.

Table 4.6:- Students view on the modules from Ethics and Moral perspective

| Statements | 1 | 2 | 3 | 4 | 5 | Mean | Attitude |
|--|---|---|----|----|----|------------|-----------------|
| Introduces good values and good etiquette indirectly | 6 | 6 | 15 | 54 | 6 | 3.6 | Positive |
| Observes ethical considerations | 3 | 9 | 24 | 30 | 21 | 3.7 | Positive |
| Observes Moral considerations | 3 | 6 | 21 | 45 | 12 | 3.7 | Positive |
| Overall Average | | | | | | 3.6 | Positive |

Source: own survey (2023)

As shown in Table 4.6, respondents indicated that the modules used at St. Mary’s introduce good values and etiquette (3.6). They also specified that they are able to observe the ethical and moral considerations that are put into in the preparation of the modules (3.7).

The statements crafted to measure the opinion of students on the technical attributes of the modules are compiled and transformed into a single variable that captures the view of students on the overall technical qualities of the modules and the mode and median of the observation is calculated so as to know the frequency of the measures of module technical quality.

Figure 4.4 Measure of Central tendency of the observation about the view of students on ethical and moral considerations of modules



Source: own survey (2023)

As can be seen from figure 4.4, majority of the respondents view on the ethical and moral considerations of the modules used in Open and Distance learning at St. Mary’s University is classified as “Good” as the median is 3.67 and the mode is 4.00. That is 52% of the respondents view the ethical and moral considerations of the module as “good”.

4.5 Analysis of Open-ended Questions

4.5.1 The level of importance in Module Quality

From the four dimensions crafted to assess students’ view on module quality, respondents

were asked to level each of these dimensions based on their importance to them. And by counting the respondents' answers, the most important dimension is identified. Of the total respondents, a significant number of respondents give priority to the instructional dimension and followed by content, and technicality, respectively. Some respondents believe that these dimensions are inseparable and equally important to them. Hence since more respondents believe the instructional dimension is crucial to them, the University should focus on this particular attribute in its effort to upgrade the old ones and prepare new modules.

4.5.2 Challenges faced by students during using modules

About 32% of the respondents faced problems related to getting timely access to course modules at the time of registration, especially those students who are out of Addis Ababa. According to these respondents, in the program, it is very common to face problems related to timely delivery of access to modules. This problem created a great deal of inconvenience for the students and affected their results and schedule. The other major challenge mentioned by the respondents was the problems associated with the very broad content of the module. The respondents mentioned that they face a great deal of problem in covering the entire portion of the modules as they are very broad and detailed.

4.5.3 Suggestions to improve the modules

To capitalize on the good qualities of the modules and to solve the problems mentioned above, the respondents suggest addressing the bulkiness and redundancy of the contents of the module so that it will be easy to read the entire topic and achieve the learning objective of each course. The students also suggest that a user friendly online access to the modules will help to alleviate the problem related to module delivery. Besides, the students also suggest on improvement on the technical quality of the module as it enhances its overall quality and will spark an interest to read and succeed.

5 Conclusion and Recommendation

5.1 Conclusion

In assessing the opinion of students on the features of the modules of CODL, St. Mary's University, the following conclusions are drawn based on the findings of the study:

The view of the students on the overall quality of the modules used as textbooks at St. Mary's University, College of Open and Distance Learning, is generally classified as "Good" using Likert scale criteria. The modules fell short of the excellent aspiration that the University has set to meet in all aspects of its operations.

Particularly, one of the attributes – Instructions - failed to meet the expectations of the students. Instruction is the process of teaching and engaging students with content. The student's opinion on the way that the modularized instruction is crafted is classified as "Fair" unlike the other three attributes.

In addition, almost all of the respondents criticized the bulkiness and redundancy viewed in the modules and recommend preparation of summarized and updated modules. Visual design and page structure are also fundamental in ODL textbooks. According to the results of the

study, the design should have better integrity and clarity. While designing modules in ODL, the integrity of the design, and the integrity of the pages in terms of continuity must be given the necessary attention as it affects student's attention during study.

5.2 Recommendations

Within the scope of the study, the critical suggestions that should be considered in the preparation and upgrading of ODL textbooks are as follows:

❖ As Instructional attributes are the ones with the lowest ranking in the eyes of student respondents, individual learning characteristics should be taken into account in ODL textbooks:

- Engaging content with intriguing questions and examples to keep students' attention must be submitted.
- It should be considered that students can learn in different styles. For this purpose, graphs and pictures should be used in different activities.
- Variety of relevant and interactive written and performance tasks should be included.
- Problem-based activities/projects and frames questions that encourage higher order thinking skills should be used.

❖ Content features should be taken into account in ODL textbooks:

- The necessary information about the unit (such as activity, application and time) should be given.
- More than one path in the transmission of content (such as text, pictures, and graphics) should be employed.
- The content which is made up of headings and subtitles should be clearly categorized.

❖ Technical attributes should be given serious attention in ODL modules:

- Visual design features should be taken into account in OLS textbooks.
- Pages should be visually exciting and straightforward.
- Important terms should be bold or italicized.

5.3 Areas for future research

This research is conducted to provide a general overview of students' opinion on the modules of CODL, St. Mary's University. It is a broader assessment and other researchers can pick up on more specific attributes of a module and drive meaningful recommendations. A more comprehensive study can be conducted by taking into account the opinion of subject matter experts, students, editors and tutors.

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Current Trends and Practices in Open and Distance Learning(ODL): Technological Innovations in Focus

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Abstract

Authorities in Open and Distance Learning (ODL) stressed the need for stakeholders in the field to keep well-informed about the emerging technological trends. The importance of keeping abreast with the emerging trends in ODL has been stressed by scholars, via different education Journals and literature. This small paper intends to explore the current technological trends in the field of ODL. The trends presented in this paper were products of integrative literature search and review, conducted to summarize the current status and future directions of ODL. Hence, the paper attempted to find out some of the emerging technological trends in ODL and check whether the technologies are playing effective role in ODL as well as underline the implications for local situation. The results indicate that distance education systems have changed due to emerging technology and methodological trends. All new equipment and technologies have a positive effect. By reducing the distance through face-to-face conversations, students now have many sources of information and apart from their textbooks. The conclusion is that all distance learners need to adopt new methodological trends.

Keywords: Open and Distance Learning (ODL), Technological Innovations

2. Introduction

ODL has transformed from early correspondence education status, using primarily print-based materials into a worldwide movement using various modern technologies. In spite of recent phenomenal developments in the world of electronic networks, especially the recent global attention to the Internet, which has provided the primary technological thrust, several other emerging technologies have also promised to change the landscape of education in general, and ODL in particular drastically. The field of ODL is, therefore, at the center of dynamic growth and change. McIsaac and Gunawardena (2001) observed that the directions which distance education takes will depend on such factors as the development of new media and computing technologies, different methods of group learning and information gathering, and the development of government telecommunications policies.

Authorities in ODL, via different education Journals and literature, have established the need for stakeholders to be informed and prepared with strategic plans equal to foreseeable challenges in the future. There is, therefore, the need for stakeholders in the field of ODL practice to keep well-informed about the emerging technological trends in the field. The importance of keeping abreast with the emerging trends in ODL has been stressed by scholars. For instance, Beaudoin (2003) opined that institutional leaders would be informed and enlightened to the point of asking fundamental questions that could influence institution's

future viability. Some of such fundamental questions include: How many faculties do we need in ten years? Will the notion of classrooms survive? Is the present structure of the institution viable? Will teachers and students need to meet on campus anymore? , and so on. In view of these and other pressing questions, decision makers must clearly understand all influencing factors. This is because decision makers often rely on long-term demographic and economic projections, based on current trends and foreseeable influences in their strategic planning (Reeve & Perlich, 2002). This present study intends to explore the current technological trends in the field of ODL. The trends presented in this paper were products of integrative literature search and review, conducted to summarize the current status and future directions of ODL. Hence, the study attempted to find out some of the emerging technological trends in ODL and check whether the technologies are playing effective role in ODL as well as underline the implications for local situation.

3. The Concept of Open and Distance Learning (ODL)

The Commonwealth of Learning, COL, (2005), argued that there is no one definition of open and distance learning. Rather, there are many approaches to defining the term. Most definitions, however, pay attention to the following characteristics (COL, 2005; Keegan, 1986):

- Separation of teacher and learner in time or place, or in both time and place;
- Institutional accreditation; that is, learning is accredited or certified by some institution or agency;
- Use of mixed-media courseware, including print, radio, and television broadcasts, video and audio cassettes, computer-based learning, and telecommunications;
- Two-way communication allows learners and tutors to interact as distinguished from the passive receipt of broadcast signals;
- Possibility of face-to-face meetings for tutorials, learner–learner interaction, library study, and laboratory or practice sessions; and
- Use of industrialized processes; that is, in large-scale open and distance learning operations, labor is divided and tasks are assigned to various staff who works together in course development teams.

In its broad sense, Farrell (2003) insists that open distance education embraces open learning, distance education, flexible learning, online learning, e-learning, and virtual education. According to him open learning practices allow entry learning with no or minimum barriers in respect of gender, age, etc. Distance learning, on the other hand, deals with training or teaching people who are separated by time and space from their teachers utilizing certain mediating processes to transmit learning content. Flexible learning involves providing learning opportunities which can be accessed at any time and place with much emphasis on scheduling of activities than to any specific mode of delivery. Online and e-learning are terms used to describe applications of ICTs to boost distance education, implement open learning policies among others while virtual learning combines both online and e-learning but it is web-centric and not limited to learners outside conventional learning setting.

Thus, distance learning can be defined as a hybrid type of learning, combining the latest technology with traditional forms of learning. The main advantage of distance learning over full-time education is, first of all, its convenience: the student himself chooses the time and place for training, which allows him to work or study full-time in another city or even country. In addition, the replacement of lecture notes with electronic resources and the latest teaching methods, as well as constant consultation with the teacher give this form of self-education additional advantages over distance-learning. Analyzing the scientific literature, we can see that researchers emphasize the convenience of distance learning and highlight its many advantages over other forms of learning, namely:

- The opportunity to study at any time;
- The opportunity to study at their own pace;
- The opportunity to study anywhere. Students can study from the comfort of their home or office anywhere in the world. To start learning all you need is a device with Internet access.
- High results of training. According to researches of American scientists, results of distance learning are not inferior or even superior to results of traditional forms of education, though a great part of educational material is studied by students independently;
- Mobility. Communication with teachers and tutors is carried out in different ways: both online and offline;
- Individual approach. With traditional teaching, it is difficult for the teacher to pay the necessary attention to all members of the group, to adjust to the pace of learning of each of them. The use of distance learning technologies is suitable for the organization of an individual approach. The student himself chooses the pace of learning, he can quickly get answers to all questions from the teacher;
- Convenience for the teacher. Teachers, tutors, and teachers engaged in distance learning can pay more attention to the students and work, even if for some reason they have to be at home.

4. Major Concerns in Distance Learning

Even though there has been an unprecedented expansion of distance learning, there are certain key issues in this field which are yet to be addressed (Sheeja, 2011).

Quality: Large enrolment is considered as the goal and an achievement of distance education. The question of quality is not given as much attention as it deserves. This kind of attitude actually deteriorates the quality of many distance education institutions. Maintaining high standards of the programs is an important issue in this field. A systematic approach is needed in the design of courses and learning materials. Courses must be constantly revised and updated and learning objectives and outcomes must be clearly stated. Often, it is believed that technology itself will improve the quality of distance education. The real issue is not technology itself, but how it is used in the design and delivery of courses.

Dropout rates: Increase in the number of dropouts is a very serious problem experienced by most of the distance education institutions. Loss of student motivation due to lack of face-to-face contact with teachers and peers is a great barrier to distance learning. This often results in high dropout rates unless there is regular support of peers and tutors. Providing support to students

is extremely difficult in the distance learning process.

Assessment of students: In distance learning program tutors do not have an opportunity to know the student and his/her communication style and presentation. This often raises the issue of reliability of the student's responses. The issue of assessment- i.e knowing whether the trainees have achieved the learning objectives is more difficult in situations where tutors and students seldom meet each other.

Student concerns: Because of the self-directed nature of study, distance learning is more appropriate for the people who already have high levels of education and access to information and equipment. Tolerance for uncertainty, need for autonomy, ability to be flexible etc. are some of the essential characteristics required by students who pursue distance education. Hardy and Boaz (1997) found that compared to most face-to-face learning environments, distance learning requires students to be more focused, better time managers, and to be able to work independently and with group members.

Cost effectiveness: Cost of online courses is affected by how they are implemented: as an enhancement or as the primary teaching medium. If it is implemented as a primary teaching medium, it is more expensive. The startup costs, maintenance costs, and personnel costs should also be considered to arrive at a true cost for a distance-learning program. As technology is very expensive, properly designed distance learning programs are highly expensive.

Problems related to technology: Advancement in technology by itself does not lead to effective distance education. Instructors need to be trained to use distance learning technology. Often some sorts of problems arise also from the instructor's attitudes about using the technology. Technicians have a great role in the instructional process. Equipment and hardware malfunctions can also pose a great threat to the effectiveness of distance learning. Frequent occurrence of such problems interrupts the entire learning environment.

Infrastructure: Distance learning requires sufficient infrastructural facilities to ensure that training material reaches the learner. Adequate telecommunication and internet facilities are required. Developing countries must aim at formulating new policies to tackle these challenges.

5. Technological innovation in ODL

The new trend in education is technological innovation- the use of the latest software and new teaching methods. Because of the rapid changes in methods and technology, ODL has also changed, so all the new concepts, the latest style, teaching methods and new technologies to promote teaching learning process is a new trend in education. ODL teaching is more challenging than the formal education system. According to Natarajan (2005), methods of teaching students off-campus, in a far-off and flexible timetable, largely self-taught, but with regular guidance from teachers, students may or may never face each other. In this age of science and technology, educators should not dismantle trees in order to produce print-based

materials for the reader, because the purchase of these materials is expensive and there is a high risk of miscommunication in a synchronous media. On the other hand, the use of the Internet and state-of-the-art technology can be cost-effective, and there is less chance of erroneous communication in a synchronous manner. Therefore, bearing in mind this, most of the emerging trends in ODL are designed in a synchronized manner with the help of network technology and software (Rahman, 2014).

According to Kinley (2001), today focus on distance education has shifted to web-based technology and Internet-based delivery. According to Cetron (2003), one of the most obvious trends affecting distance education is technological advancement. Powerful, high-speed network connections continue to expand as computer speed doubles; costs are reduced, and faxes, picture phones, replication and other modes are merging and becoming available at lower prices. All of the latest technology used to assist the teaching and learning process is the emerging trend of education. Distance education systems cannot ignore emerging method trends; because promoting learners is a major requirement for distance education, and by using emerging technological trends, distance learners can be best promoted. The use of different emerging methodological teaching processes may be more flexible, more comfortable, and more convenient for teachers and students (Harris, Smith & Carry, 2011).

Noreen and Hafeez (2012) conducted a study on the use of emerging methodological trends by distance learners. The study population included MS / M.Phil students. The results indicate that distance education systems have changed due to emerging technology and methodological trends. All new equipment and technologies have a positive effect. By reducing the distance through face-to-face conversations, students now have many sources of information and their textbooks. The conclusion is that all distance learners need to adopt new methodological trends. Some students are already using emerging technologies. All students believe that the use of emerging methods contributes to better academic achievement, but that distance learners lack the skills to use the latest software.

Hybrid Learning

One important trend in recent years has been the emergence of "hybrid" or "blended" approaches that combine online activities and face-to-face interactions (Graham, 2005). According to Purnima (2002), the term hybrid learning is used to describe a solution that incorporates several different delivery methods, such as collaboration software, Web based courses, and knowledge management practices. Hybrid learning is also used to describe learning that mixes a variety of event-based activities, including face-to-face classrooms, real-time e-learning, and self-learning. A study by the North American Online Learning Committee predicts that a mixed approach may become the dominant teaching model and more prevalent than traditional, purely face-to-face classroom instruction or teaching that is completed entirely online (Watson, 2008).

Information Communication Technology (ICT)

New communication technologies provide a creative and stimulating way to present information and provide opportunities for interaction (Leach & Moon, 2002). According to Murali (2009), in the distance learning system, learners are remote to institutions and in large-scale. It is difficult for learners to access the institution on a daily basis to obtain support available in the conventional system, and it is even difficult for the institution itself to provide various services to learners at different stages of the student learning life cycle due to the limited available human resources. ICTs are the primary resource for overcoming these constraints and are a set of technologies that provide support services at different stages of student learning in distance learning systems. A study by Rahman (2014) focused on the important role of information and communication technologies in distance education.

Asynchronous and Synchronous Media

Asynchronous online systems allow participants to interact with each other- not all participants online at the same time- including blogs, wikis, and discussion forums. In contrast, synchronizationsystems require everyone to be involved, including chat rooms and video conferencing. Face-to- face communication between instructors and distance learners on the Internet is a new methodological trend in e-learning, where computers with Internet facilities are needed and they can talk to each other, and students can learn from teachers, obtain guidance and instructors can instruct the learner. It not only allows students' to communicate in real-time to discuss courses, of course, but it allows easier access to the teacher to communicate and clarify the subject of discussion. Dede (2003) studied the experience of distance learning students in learning asynchronous and synchronous interactive media, and students reported that synchronous media helped them better understand and interact with their classmates. Further research reported that their distributed learning experiences positively influenced their participation and learning.

Learning Management System (LMS)

The LMS is a software application for managing, documenting, reporting and tracking guidance programs, classroom and online activities, e-learning programs and training content. The LMS hasseveral definitions, and the basic description is a software application that automates the management, tracking, and reporting of training events. It provides educational content and resources for distance learners. Many educational institutions have implemented versions of LMSsuch as WebCt, Moodle, Blackboard Learn and e-Portal, providing users with an exciting step intothe next generation of teaching and learning platforms that are new social learning and teaching tools to provide students with more logical, visual impact and positive learning opportunities to help them maintain contact with their educational experience. In their study, Nair and Patil (2012)reported on the positive impact of LMSs on student learning. Another finding of the study was thatstudents from previous academic years were less aware of LMS than students in the current academic year.

Social Networking

In the field of distance education, social networking sites are playing large role. Through the use of these services, students can easily communicate with their mentors and peers, and can get a lot to solve their problems. A social networking site is defined as a website that provides an opportunity for a user to increase the level of communication by connecting to each other and sharing personal content as features of the basic characteristics of the online community. Facebook, Twitter, LinkedIn, Skype, Twitter and Oovoo are common social networking services that play an important role in reducing the isolation of distance learners (Buss & Strauss, 2009). A study by Ozmen (2014) shows that students have a positive attitude towards using social networking sites and distance learning applications that have a positive impact on the quality of communication between teachers and students.

Mobile Learning

Mobile technologies, such as mobile phones, have great promise for distance education as a cognitive delivery tool to enhance interactive collaborative learning while addressing the challenges of student isolation. The term mobile learning refers to the use of mobile and hand held IT devices, such as personal digital assistants. Mobile learning via SMS helps to reduce the distance between mental and communicative spaces that are often confronted by distance learners in geographic distance and time separation (Moore, 1997). Yousaf's (2007) study on the effectiveness of mobile learning has shown that promoting mobile learning can improve distance learning by enhancing communication among distance learners, facilitators and support staff.

Digital Libraries

The digital library provides answers to most information access questions for distance learners. A digital library is a collection of documents in organized electronic form, available on the Internet or on CD-ROM. Depending on the specific library, users may be able to access magazines, articles and books, papers, images, sound files, and videos. The digitization of academic materials is one of the many initiatives taken by the global distance learning community to facilitate the wide access and availability of such materials. Rezaei (2009) conducted a study on the use of digital libraries in the distance education process from an expert's perspective in order to investigate the quality of learning, realize the possibilities of information, reduce educational costs and improve the scientific level of students. The results show that the effective use of digital libraries in the distance education process is 95%.

World Wide Web

According to Harris, Smith & Carey (2011), web 2.0 technology provides the power to evolve as academic professionals modify learning techniques and methods. Web 2.0 can theoretically develop learning experiences by promoting group reactions, obtaining outside experts, or by encouraging and shaping communities of practice. Some examples include web-based communities, hosted services, web applications, social networking sites, video sharing sites, wikis, and blogs. It facilitates distance learners and teachers to enjoy a more vibrant

educational experience at a lower cost and with more effective face-to-face learning. According to Simons (2005), Web-based learning is migrating to web2.0, a two-way infrastructure medium that has become popular in distance education because it gives learners the prospect of communicating with mentors and teachers. Therefore, this means that Web 2.0 is a two-way media, representing the next stage of Internet use. All new devices and technologies have a positive effect and take time to learn new equipment and the use of the latest software so that learners of distance learning can be easily accessible. Instructors should also learn about the emergence of teaching needs and use of upcoming technologies to meet the needs of distance education systems. Gilani, Zaman and Ambreen (2012) discuss the effectiveness of Web 2.0 technology in distance learning. The study is essentially experimental; study population consisted of 89 students enrolled in the M.Phil education program. The results show that the Web 2.0 tools can improve the average learning performance of the distance learners more effectively than the ordinary ones, and the network skills are more helpful to improve the average problem solving ability of the distance learners than the traditional ones.

6. Conclusion

Most of the countries consider ODL as a new approach which enhances access, quality, cost effectiveness and equity. Distance mode of education offers the common man an opportunity to study regardless of geographic, socio-economic and other constraints. ICT revolution has expanded the scope of distance learning. Developments of technology allow new paradigms of access and new delivery systems.

In spite of all the potentials of distance learning, there are many critical issues which are yet to be resolved. Quality, cost effectiveness, assessment, lack of motivation and dropout rate etc. are some burning issues in field of distance learning.

The real challenge is the designing of cost-effective and educationally-effective methods of teaching. Increasing numbers of students enrolling in distance learning classes emphasize the need for comprehensive and thoughtful evolution of distance education if it is to become the educational model of the future.

To minimize the challenges experienced by distance learning, e-learning should be encouraged. Infrastructure can be updated by introducing modern technology, fast Internet connection, continuous power supply, security, regular maintenance, and efficient administration of distance learning. Distance-learning universities should provide a computer lab equipped with sufficient number of computers and connected with fast Internet. Lecturers and students should also have skills and confidence to use electronic equipment, and to have the necessary knowledge about the method in which the information is delivered. Technology can also be used to improve the quality of traditional education rather than changing the methods of instruction. Lastly, e-learning should be supported in distance learning because it can help learners to have access to education irrespective of distance.

7. Suggestions

After reviewing the literature regarding emerging technological trends in distance education generally, following suggestions are put forth:

- Distance learning institutions may take steps to organize a specific website for students so that they can easily communicate with their peers and mentors.
- Social networking sites like Facebook, Twitter and LinkedIn may be used to develop a better relationship between peers and academics.
- For video conversations students and teachers may use Oovoo and Skype.
- Alert text messaging service on cell phones of the students may be started along with the letters.
- There is an urgent need to provide distance learners with the use of digital libraries in a quick and easy way so that they can easily get help from books and articles to complete assignments and research.
- It is further recommended that students use the Internet and the latest software to adopt new methods and trends.
- It is suggested that further research could be conducted to investigate the effectiveness of emerging technologies for different levels of distance education including administrative, teachers and students.

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Open and Distance Learning for Agricultural Development in Ethiopia

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Abstract

Ethiopia is a country with a large agricultural sector, but the productivity of its farmers is low. Open and distance Learning (ODL) has the potential to improve agricultural productivity by providing farmers with access to high-quality agricultural education and training. There are a number of ODL programs in Ethiopia that offer agricultural education. These programs are offered by a variety of institutions, including universities, colleges, and non-governmental organizations. The programs vary in terms of their content, delivery methods, and target audiences. Some of the benefits of ODL for agricultural development in Ethiopia include: reaching a large number of farmers, including those who live in remote areas, being more affordable than traditional face-to-face education, and being more flexible, allowing farmers to learn at their own pace. However, there are also some challenges to using ODL for agricultural development in Ethiopia, including: varying quality of ODL programs, the availability of infrastructure, such as computers and internet access can be limited in rural areas, and unfamiliarity of farmers with ODL methods. Despite these challenges, ODL has the potential to play a significant role in agricultural development in Ethiopia. By providing farmers with access to high-quality agricultural education and training, ODL can help to improve agricultural productivity and food security.

Keywords: open and distance learning; agricultural education; agricultural development; Ethiopia

1. Introduction

Ethiopia has been struggling to feed its growing population in the last decades. Despite the positive economic achievements in the last two decades, food insecurity still affects about 40–50% of Ethiopia’s population (Regassa & Stoecker, 2012; Shone et al., 2017). Food insecurity mostly resides in people who produce food themselves, namely the millions of family farmers in the countryside. More than 40% of Ethiopian family farmers are food deficient (CSA, 2014).

Shortage of technological advancements is one constraint depressing the agricultural productivity in Ethiopia (Yigezu Wendimu, 2021). Application of advanced technology in farming practices among farmers is positively related to literacy rate (Shafi et al., 2019).

There are a lot of factors affecting the literacy rate of rural people among which, the lack of

access to school or educational center, shortage of well qualified teachers and poverty could be mentioned. Even if the opportunity of technology is still not yet fully provided to rural population, these people are highly affected through lack of education to enhance their development (Deressa, 2012).

Here, flexibility is the key concept which is useful for applying open and distance learning in Ethiopia. Open and distance learning reduces the high cost and inaccessibility issue of education. Farmers can adjust their timing to educate themselves even during working times. Since it is learner centered, it is highly beneficial to enhance and incorporate indigenous knowledge with modern science (Lewis & Spencer, 1986). Therefore, this paper tries to identify the role of ODL in increasing the accessibility of education and as a result agricultural productivity in Ethiopia.

2. Open and Distance Learning: Concepts

The key concept of distance learning is the separated execution of teaching behaviors and learning behaviors apart from each other (Moore, 1973). In distance education, communication between the teacher and the learner must be facilitated by print, electronic, mechanical or other devices. Open learning is a very different concept to that of 'distance education'. It overcomes barriers that result from geographical isolation, personal or work commitments or conventional course structures which have often prevented people from gaining access to the training they need (Finn, 1984).

A rather different and wider definition was given by Lewis and Spencer: "'Open Learning" is a term used to describe courses flexibly designed to meet individual requirements. Open learning courses may be offered in a learning center of some kind or most of the activity may be carried out away from such a center (e.g. at home). In nearly every case specially prepared or adapted materials are necessary' (Lewis & Spencer, 1986).

3. How Education Helps in Increasing Agricultural Productivity

Education enhances one's ability to receive, decode, and understand information (Nelson & Phelps, 1966). In addition, education - even primary schooling enhances the ability of students to perceive new classes of problems, to clarify such problems, and to learn ways of solving them (Schultz, 1975)."

Welch (1970) related the effect of education to agricultural production and identified two distinct phenomena through which schooling can have a productive value, namely, the "*worker effect*" and the "*allocative effect*." According to Welch, the "*worker effect*" describes that well-educated workers are simply able to use a given amount of resources more efficiently.

In contrast, the "*allocative effect*" is characterized by the ability of an educated worker to sufficiently acquire and decode information about costs and productive characteristics of other

inputs (Welch, 1970).

As a result, the more-educated farmer allocates resources more efficiently. This phenomenon can hence be called the “*allocative effect*.” With regard to the relevance of these two effects for agriculture, there is nowadays a consensus among researchers that farmers’ schooling generates its productive value mainly as a consequence of the *allocative effect*, and only to a relatively limited extent from the worker effect (Huffman, 1999).

The first argument commonly used to justify a potentially positive impact of education on agricultural productivity is a direct consequence of the above definitions. If one accepts that education allows farmers to make better use of the information available to perceive new classes of problems, and to autonomously find solutions to them, it directly follows that those peasants will possess superior decision-making skills and will hence be better “managers” who allocate their resources more efficiently (Asadullah & Rahman, 2009).

As a second argument, it is often claimed that well-educated farmers also have better access to required information. Against the background that in many developing countries the majority of farmers have not received any schooling and are hence illiterate, it is easy to imagine that this lack of education is a severe obstacle for those farmers when seeking information. Thus, education provides farmers with the ability to disengage themselves from the tight grip of inefficient ‘word-of-mouth’ communication patterns (Asfaw & Admassie, 2004; Welch, 1970)

Taking this argument a step further, Evenson (1984) even argues that well-educated farmers potentially pay and receive better prices for their inputs and outputs, indicating that education can be a remedy to prevailing information asymmetries in the market.

A third argument that has received considerable attention in the literature suggests that well-educated peasants are more likely to adopt new technologies or products early since they have superior access to related information and are more capable of distinguishing between promising and unpromising innovations. In contrast, farmers with little schooling will often prefer not to introduce a new technology until its profitability has been proven, for example, waiting until other farmers have successfully adopted the innovation (Nelson & Phelps, 1966). This provides the educated farmer with a first-mover advantage, making the new technology even more profitable and thus attractive for adoption.

Various authors have empirically tested the above-described argument that educated farmers are more likely to adopt new technologies early and have found overwhelming support for its validity (e.g., (Asfaw & Admassie, 2004; Feder et al., 1985; Hossain et al., 1990).

A fourth argument has also emerged from the literature claiming that educated farmers adopt new technologies earlier because they are more willing to adopt riskier production technologies

if these technologies provide higher expected returns (Asadullah & Rahman, 2009; Knight et al., 2003). Hence, education is supposed to decrease the perceived level of uncertainty and, therefore, to reduce the farmer's disinclination towards risks arising from the farmer's choice of production technology.

Knight et al. (2003) tested this hypothesis empirically using household data from rural Ethiopia, and found a significant reduction of risk disinclination if the household head had received at least some schooling. This result implies that providing education to farmers not only lets them adopt new technologies earlier, but it may also change their attitude towards relatively risky traditional production technologies (e.g. crops they did not dare to plant previously). As a consequence, the farmer may—after having received some schooling—optimize his mix of crops (including also riskier crops if they provide high expected returns) based on an improved ability to evaluate the associated risks and opportunities.

4. How ODL is the Best Choice for Providing Education in Rural Ethiopia

Open and distance education (ODL) is a flexible and cost-effective way to deliver education and training to large numbers of people. It is particularly well-suited for agricultural development, where there are many rural areas with limited access to traditional educational institutions (Chaudhary & Dey, 2013). ODL can be used to provide farmers with training on a variety of topics, including basic primary education, trainings on crop and livestock production, soil and water conservation, pest management and also advanced higher education programs. It can also be used to train extension workers, who can then disseminate this knowledge to farmers in their communities (Ghosh, 2012).

There are many benefits to using ODL for agricultural development. Some of the key benefits include flexibility of its nature, cost-effectiveness and accessibility.

5. Conclusions and Recommendations

Based on a number of references, education has shown a great positive correlation with agricultural productivity. In addition, ODL has also proven to increase education access in the rural societies like Ethiopia where education is not accessible. Hence, we can conclude that ODL can increase agricultural productivity in Ethiopia.

Recommendations

- Private or public education centers should consider ODL to increase the accessibility of education to rural societies
- Basic education as well as education specifically designed to increase agricultural productivity should be delivered through ODL.

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