

An Investigation into the Impact of Educational Technology on the Teaching-Learning Process in Higher Education

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Abstract - Nowadays, educational technology has become an integral part of the teaching-learning process. Every day a new gadget or software appears that makes teaching easier. Technology has opened new doors to previously untouched aspects of education and has greatly influenced all areas of education, including higher education. Technology in education is changing the traditional role of the teacher in the classroom. New educational technologies have brought many changes in the current education system. It is playing an increasingly important role in the education sector. Interactive technologies have influenced the nature of the teaching and learning process. As technology advances, it benefits students of all ages in the learning process. Technologies are helping to transform the educational environment. These technologies are electronic and computer-based devices and associated human interactive materials that enable the user to use them in a wide range of teaching and learning processes. These technologies include computers, video, television, sensors, interface boxes, the Internet, telecommunications, satellite connections, and any programs and materials that help teachers use them to teach their students. The aim of the study is to reveal the function, role and relationship between educational technology and the teaching-learning process in higher education.

Keywords: Higher Education, Educational Technology, Teaching-Learning process, Future enhancements, Digital technologies, Digital classroom, Education, Students, Teaching-learning.

1. INTRODUCTION

Educational technology is sometimes reduced to edutech or edtech is a smart field. Educational technology is a science of design, a collection of different types of research fields that address fundamental and central questions of learning, teaching and social organization. It is a process of using modern technology in an organized and systematic manner to improve, enhance and improve the quality of education. Technology refers to the systematic and organized application

of scientific or other organized knowledge to practical work. Educational technology therefore relies on theatrical knowledge from various disciplines (communication, psychology, sociology, philosophy, artificial intelligence, computer science, etc.) as well as empirical knowledge from educational practice. (Natalie Deseryver). Educational technology aims to increase the efficiency and effectiveness of current practices while creating pedagogical changes to improve education. It is considered a design science that deals with fundamental, fundamental and important questions of learning, teaching and social organization and therefore uses all modern methods of the social and life sciences.

The Association for Educational Communications and Technology (AECT) has defined educational technology as “the study and ethical practice aimed at facilitating the teaching-learning process and improving performance through the creation, use and management of appropriate processes and technological resources and the practice of designing, developing, using, managing and evaluating processes and resources for the teaching-learning process. » As such, educational technology refers to all valid and reliable applied educational sciences, such as: B. devices, as well as processes and procedures derived from scientific research, and in a certain context may refer to theoretical processes, algorithmic or heuristic processes: this does not necessarily mean physical technology. Educational technology is the process of integrating technology into the teaching-learning program of higher education.

A positive way that promotes a more diverse learning environment and gives students the opportunity to learn how to use technology and their shared role. Educational technology is a term that encompasses both the hardware tools and the theoretical foundations required for learning and teaching. Educational technology is not limited to high technology, but includes anything that enhances learning in the classroom through the use of blended learning, in person or online.

Objective

- Know the functions of educational technology in the teaching-learning process.
- Evaluate the role of educational technology in the teaching-learning process.
- Examine the relationship between educational technology and higher education.

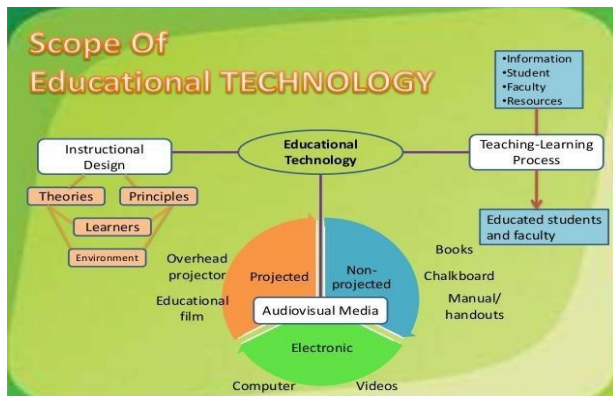


Figure 1: Scope of educational technology

Importance of Educational Technology

The analysis of educational technologies has always had a big agenda. This usually only emphasizes the excessive efficiency or effectiveness of current practice, but generally emphasizes the modification of education. Although it is considered a conceptual science, it collectively addresses the fundamental problems of learning, teaching and social systems and therefore uses the full range of methods of modern science and the humanities. We sleep in a very dynamic world that is encapsulated by an infinite amount of knowledge.

II. RELATED WORKS

Jang and Tsai (2012) conducted a study to examine the technological, pedagogical, and content knowledge (TPACK) of Taiwanese elementary school science and mathematics teachers in relation to current use of interactive whiteboards (IWBs) and to determine the relationships between TPACKs of in-service teachers and other factors.

N.Sahu (2013) examined “A study on the use of technology by teachers of professional courses in trams in terms of phases of concern and contributing factors”. In today's world, technology has become an integral part of our lives. Every day a new device or software appears that makes life easier. However, making life easier is not the only role technology plays in our lives. It plays an increasingly important role in the teaching-learning process in higher education. Technology promotes student collaboration, project-based learning, and higher-order thinking.

L. Stosic (2015) examined “The Importance of Educational Technology in Teaching” and concluded that the presence of educational technology in the teaching-learning process in higher education is increasing. The new generation of children is ready to work with these new technologies, which play an important role in children's learning and acquisition of various cognitive knowledge. For this reason, educational technologies should be integrated into future curricula and appropriate strategies should be used to apply educational technologies in the teaching-learning process.

Lachance et al. (1980:183) also focus on the process idea: educational technology as a systematic process integrating the various functions of the educational process. It aims, on the one hand, to analyze problems related to teaching and/or learning and, on the other hand, to develop, implement and evaluate solutions to these problems through the development and exploitation of educational resources (cited by Lapointe, 1991)

Gagne et. al. (2011) Educational technology is the development of a set of systematic techniques and accompanying practical knowledge, for designing, testing and operating schools, educational technology drawn upon many disciplines, including those which design working space, like architecture, equipment like physical sciences, social environments like sociology and anthropology, Administrative procedures like science of organizations and conditions of effective earning like psychology. Gagne views educational technology as instructional designing.

Derek Rowntree, et. al. (2000) says educational technology is as wide as education itself. It is concerned with the design and evaluation of curricula and learning experiences and with the problems of implementing and propagating them. Essentially it is a rational problem-solving approach to education, a way of thinking scientifically and systematically about learning and teaching.

III. METHODOLOGY

The study is based on secondary data sources. The main sources of data are various types of magazines, books, newspapers, websites, etc. This study addressed a research question that meets the objective of the study.

Types of educational technology

There are three types of educational technology:

1. Technology in Education or ET-I
2. Technology of Education or ET-II
3. Systems Approach or ET-III

Technology in Education or ET-I: Technology in Education refers to the application of engineering principles in the development of electromechanical devices for educational purposes. This type of technology is known as ET-I or Hardware or Media. From simple audio-visual aids to sophisticated electronic devices, they all fall into this type of alien. The use of media in education, especially in teaching, learning and educational management, has revolutionized the education system worldwide. It provides us with a set of devices (media) with tremendous capabilities to facilitate the learning process of a specific group of students. Educational equipment technology refers to the use of mechanical materials and devices in the educational sector. In this sense, audio-visual media such as graphics, models, film strips, slides, audio cassettes and sophisticated equipment and devices such as films, projectors, radio, tape recorders, record players, televisions, video teaching machines and computers etc fall under the category of hardware. The hardware approach is based on the application of physical and technical principles to the education and training system. The mechanism is introduced through the preservation, transmission and development of human knowledge. For example, a teacher may address a large group of students by speaking on the radio or television.

Educational Technology or ET-II: Educational technology is also a process and a way of thinking about a problem. Significant contributions from social sciences, including principles of psychology, Skinner's operant conditioning, etc., led to the development of ET. Educational technology refers to the detailed application of learning psychology to practical educational problems. The focus is on the scientific way of teaching: the design, structuring and implementation of lessons to achieve clearly defined goals. This means a greater variety of strategies are used to meet the different needs and learning styles of students. This type of technology is also called ET-II or software or programmed instruction. Educational technology suggests how these media can best be used to achieve certain specific goals. The software or software technology approach to education has its origins in behavioral science and its applied aspects linked to the psychology of learning. It grew out of the engineering efforts of Skinner and other behavioral scientists. According to Arthur Melton (1959), software education is indirectly related to the psychology of learning, which is about changing behavior based on experience. This view of educational technology is associated with modern teaching principles and theories, teaching models, pedagogical theory and theory of teacher behavior, and principles of programmed learning.

Systemic Approach or ET-III: The systemic approach to the design and analysis of teaching/training situations is the basis of the vast majority of developments related to modern

educational technologies. This type of technology is called ET-III or Operating Systems or Management Technology. The concept refers to a dynamic ordering of interacting parts and processes. For example, the classroom is a system of a larger system, the school and all systems have goals that are consistent with the overall goal of a larger system. The basic assumption of the systems approach is that teaching is a science, a professional activity aimed at achieving certain educational goals.

Need for digital technologies in education

The globalization of education already requires the use of digital technologies. Online platforms were available to offer courses, share resources, conduct assessments, and manage the day-to-day operations of academic institutions. However, the use of these platforms was proactive. The COVID-19 pandemic has forced institutes to adopt online teaching mode to support the education system. Developed countries were well equipped to deal with this crisis. However, developing countries have worked hard to meet this requirement. Digital technologies have become the savior of education at this critical time. This global crisis highlights the need for international integration in the education system. Digital technologies help develop skills that require students to perform professionally, such as problem solving, creating thought structures, and understanding processes. They are also preparing for a more unpredictable and changing future in which technology will play a key role. The qualities and skills students acquire are crucial to their professional success. Educational resources and digital tools help improve the classroom environment and make the teaching-learning process more attractive. In addition, they offer each educational institution greater flexibility and individual adaptation of the study plan to the needs of each individual student. Children could be more engaged in learning if technology were used in the classroom. Since today's youth are used to using electronic devices, integrating these devices into school would certainly help stimulate their interest and increase their engagement. Integrating technology into education provides students with an engaging learning experience and allows them to become more interested in the subject without being distracted. The use of projectors, computers and other modern technological devices in the classroom can make learning fascinating and entertaining for students. Student learning can be made more dynamic and engaging by providing in-class assignments that include technology resources, oral presentations, and group participation. Participation can also go beyond verbal communication. The use of computers and other devices as well as digital tools allows students to take a more proactive role and be at the center of the process. The trainer becomes a companion in this process and can confirm the effectiveness of

the learning. With a variety of digital resources, students can download the information they need or upload their content. Web 2.0 technologies (wikis, podcasts, blogs, etc.) make it easier for students to create content, collaborate with others, evaluate each other's work, and make progress in collaborative learning. Digital technologies make it easier to use teaching tactics such as gamification or approaches such as flipped classrooms that optimize learning. Learning landscapes have evolved into a pedagogical tool that combines multiple techniques and allows different itineraries to be presented to each student. Technology makes teaching more inspiring and meaningful.

Digital classroom

Digital classrooms are defined by the use of electronic devices or platforms such as social media, multimedia and mobile phones to teach students. With digital technology in education, the current educational landscape has changed for the better or improvements have been made. Digital learning is a learning strategy that uses technology to deliver the entire curriculum and enable students to learn quickly and quickly. The digital classroom focuses solely on teaching through the use of technology. Students use technology or internet-connected devices such as laptops, tablets, Chromebooks, etc. Instead of taking notes on what the teacher taught, the majority of the curriculum is delivered to students online through an engaging and interactive platform. Despite its many facets, education is fundamentally a form of communication. The Internet has led to the emergence of new communication channels that have expanded the possibilities of transmitting and accessing educational information.

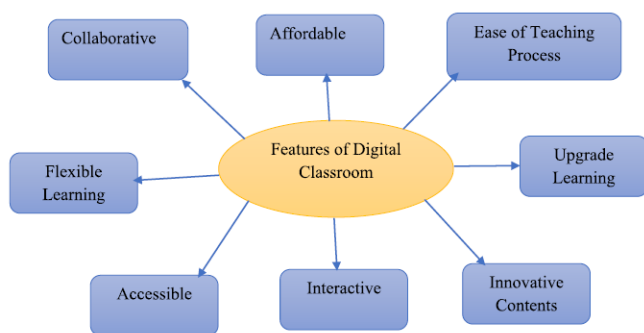


Figure 2: Features of Digital Classroom

These media and virtual places serve as learning facilitators. Figure 1 shows various functions of a digital classroom. Digital classrooms use educational applications and websites to help students improve their learning experience. Feedback loops and technology are two essential elements of a digital classroom. Feedback loops are essential for students to receive real-time feedback from their teachers. Teachers can use feedback loops to provide feedback based on

many factors such as student, lesson, group, etc. PPTs, video presentations, e-learning methods, online training and other digital approaches are increasingly being used in the teaching-learning process. This makes teaching in the classroom more participatory. Students can now learn many topics independently using internet resources and digital classrooms. In schools, color charts, diagrams and models illustrate first-class teaching. However, they are now considered outdated teaching methods. Classroom teaching is no longer just about reading books, writing on the board to explain chapters and concepts, and making notes in your books.

IV. IMPORTANCE OF EDUCATIONAL TECHNOLOGY

The importance of educational technology is to promote the effectiveness of education by improving the quality of teaching, educational administration and educational research. Therefore, educational technology is important for the following reasons:

1. **For effective teaching:** Research on educational media shows that motivated students can learn a lot from any medium. TE can improve the effectiveness of teaching.
2. **To facilitate individual differences:** ET enables individual students to learn according to their needs and pace of learning. Individual students interact with the teaching materials and carry out their learning tasks in their own learning style and have the opportunity to receive feedback on their progress. ET thus individualizes teaching.
3. **Providing equal educational opportunities:** ET is necessary to provide equal educational opportunities to all. For example, nationally broadcast educational radio and television programs are aimed at every student without discrimination. Scheduled teaching tests can be taken by any remote or underdeveloped student or employee, school dropout, etc.
4. **To preserve knowledge:** Modern electronic devices offer enormous opportunities to preserve knowledge and information for future use, including in printed media. Much information can be stored electromechanically in the form of audio and video programs, computer software, video discs, etc. This lesson is also part of ET.
5. **To impart knowledge:** Through the use of modern media in education, students all over the world can be reached and taught. Almost the entire country can be covered by the radio or television network system at the same time. Communications satellites have increased the effectiveness and efficiency of long-distance communications, making it possible to connect more than one location and more than one group of students through a two-way communications system.

6. For improving learning: It is needed to facilitate human learning through systematic identification, development, organization and utilization of a full range of learning resources and through management of these resources.

7. Imparting Quality Education: With prior planning and involvement of available experts in the field of study, imparted education provides quality education to an unlimited number of students. The education provided makes it possible to employ the best available teacher in the region.

8. For educational planning: Educational technology contributes to society-wide planning and deals with the qualitative and quantitative design of the entire educational system of a community. A systematic approach to teaching and learning includes setting goals, designing and structuring content, establishing assessment techniques, etc.

9. Improve learning: There is a need to facilitate human learning through the systematic identification, development, organization and use of a comprehensive range of learning resources and the management of these resources.

10. For pre- and in-service teacher training: Educational technology is needed to make teacher training more effective through various new approaches, namely micro-teaching, simulated teaching, teaching models and interaction analysis, all to improve classroom interaction produce effective teachers and help teachers become better teachers.

11. For Preparation: Through analyzing the content and organizing it in a systematic, logical and psychological order in their lesson plans for teachers, especially prospective teachers, visit the classroom with confidence and put up a high-profile performance due to their total control on content and process.

12. For Modification: It adds to the teaching competence, modifies their teaching behavior and style, inculcates a scientific outlook, approach and attitude and helps them in transferring to the learners.

V. RESULT & DISCUSSIONS

Functions of educational technology:

Educational technology has an important present and a promising future in the education sector. It contributes to the process and products of education at all levels and levels.

Some of the important features of educational technology are:

- Educational technology has an important present and a promising future in educational technology. Educational

technology seeks to discover the various variables of teaching, their interrelationships, theories of teaching, phases of teaching, principles and maxims of teaching, etc. This helps in the development of pedagogical theories. in improving the quality of education.

- Educational technology analyzes the learning process and the theories associated with it. The help of various empirical generalizations from the fields of psychology, sociology, natural sciences and engineering is required. Enables more learning in less time.
- The educational goals are reviewed and revised over time. Educational technology helps set the right goals in the face of new circumstances and environments.
- Teachers must cope with this new type of environment with a new curriculum and new materials. It is therefore important that they receive appropriate training. Educational technology also contributes to teacher training. The use of videotapes and CCTV helps teachers to properly design and redesign their teaching behavior.
- Educational technology identifies behavioral needs in the classroom. Since mass education has lowered the level of education, the use of educational technology can maintain and improve the level through the use of teaching materials and programmed teaching materials. Educational technology can encourage self-learning among students in the classroom.
- Audiovisual media have always played an important role in the teaching-learning process. Software, hardware aids, computer-based instructions and other similar devices and devices are successfully used in a teaching-learning environment and help achieve the goals of educational technology. Educational technology contributes to the development of these supports.

Role of educational technology

Its function can be described as follows:

- Technology improves the training of prospective teachers by providing access to more and better teaching resources, providing multimedia simulations of good teaching practices, encouraging teachers to collaborate with students, and increasing productivity in off-task educational tasks.
- Technology also empowers working teachers by providing professional development opportunities and individual training opportunities.
- Technology helps teachers acquire and update their knowledge. Therefore, its role as a source of spiritual knowledge and teaching is now evolving into that of a facilitator of student learning acquired from many sources.

- Technology is a powerful tool for problem solving, conceptual development and critical thinking. The person uses technology to collect, organize, and analyze information and use that information to solve problems.
- Access to the Internet has opened the doors to global learning. Teachers and students can use this opportunity. It is an ocean of knowledge. Sitting in one place gives them access to libraries, dictionaries and the latest information that is not available in textbooks. Therefore, there is freedom to learn according to students' interests, pace, time, energy and money.
- In addition, the Internet has reduced the distance between people in the world. People can share their ideas and discuss an important topic. Email offers the opportunity to get in touch with other people in a short period of time.
- Technology helps summarize and present results. The results published on the World Wide Web are accessible to various people and comments are also easily available.
- Different types of educational software are designed and developed to make it easier for children or teenagers to learn certain topics. Preschool software, computers, simulators and graphics software make learning easier.
- The “information explosion” and the “population explosion” both lead to changes in developed and developing countries and raise crucial questions for education. The quantitative expansion and qualitative improvement of education can be facilitated and accelerated through educational technology.

Therefore, it can be said that technology plays an important role and its use in education helps to maximize learning experiences.

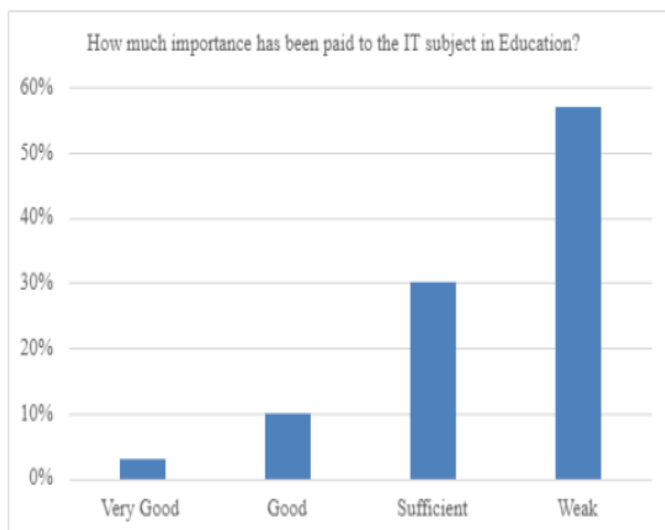


Figure 3: Importance of technology subject in education

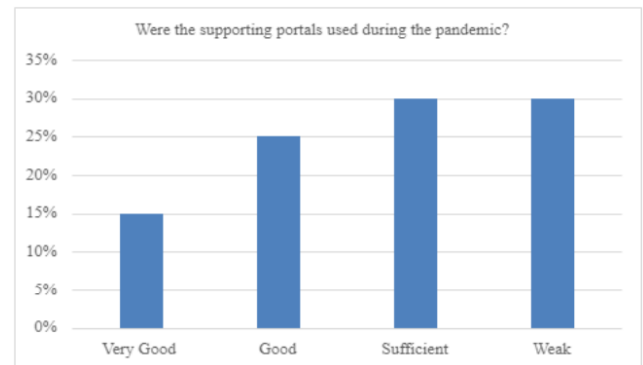


Figure 4: Use of supporting portals during the pandemic

Relationship between educational technology and higher education:

Technology has a major impact on all aspects of higher education around the world. It offers new opportunities and means to improve access and quality of higher education. However, for various reasons, the incorporation of how technology can be used to improve higher education varies across regions, countries and institutions within a country. Therefore, even if the significant potential to reduce gaps and inequalities in access to knowledge and information is recognized and exploited, it is important to recognize that the risk of exacerbating existing inequalities or creating new inequalities is equally high and requires appropriate resources and infrastructure and human skills to harness the potential of technology in higher education.

At the beginning of the 21st century, new and rapidly evolving technologies are transforming higher education. Each year since 1994, the Campus Computing Survey has shown increasing use of technology-dependent resources such as email, the Internet, course websites, and computer simulations in college classrooms. Technology has the potential to revolutionize the traditional teaching and learning process. It can remove spatial and temporal barriers to education and significantly expand access to lifelong learning.

Students no longer have to meet at the same place and at the same time to study with a lecturer. Fundamentally, modern technologies have the ability to transform the design of a higher education institution. A college is no longer necessarily a physical place with classrooms and dormitories where students come to pursue higher education.

Computers and telecommunications are the major technologies transforming higher education. Because of advances in each of these areas, e-mail, fax machines, the World Wide Web, CD-ROMs, and commercially developed simulations and courses are disrupting the daily operations and expanding the missions of colleges and universities.

Technology can also help make higher education a much more interactive and collaborative process. Email, course websites, and computer discussion forums are among the technological resources that facilitate communication and teamwork among students. Research by education experts has shown that shared learning opportunities improve memory, comprehension, and problem solving. Technology can greatly facilitate the work of collaborative design teams, peer writing groups, and other types of collaborative learning groups, even among students who do not live in the same geographic area and cannot meet in person.

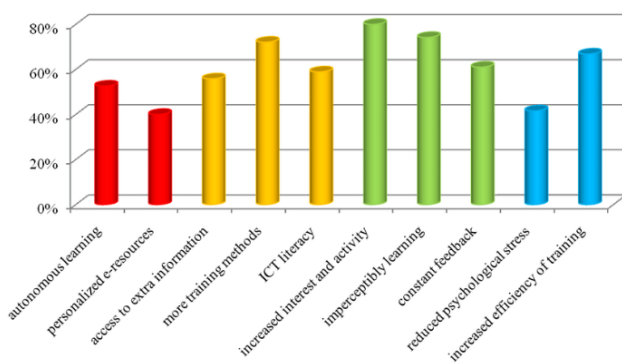


Figure 5: Benefits of implementing technology-enhanced learning

The technology's potential to reduce the cost of higher education was one of its main attractions. The ability of computers and telecommunications to reach large audiences with the same high-quality educational programs has raised hopes for economies of scale that would never be possible with traditional, labor-intensive forms of education. So far, technology's promise of reducing the cost of education has not been fulfilled. Developing the infrastructure required for teaching and learning using technology has proven to be a very costly exercise. However, it is possible that new and advanced technologies will ultimately reduce the cost of higher education as researchers and educators learn to combine traditional teaching and technology in more cost-effective ways.

Barriers:

Several factors have been identified that are likely to be a barrier to technology adoption. These factors are detailed below:

1. Lack of teacher training.
2. Lack of appropriate update software.
3. Technophobia.
4. Lack of money.
5. Lack of time.
6. Infrastructure and lack of equipment.

7. Lack of updating and renewal of courses and training programs etc.

Therefore, due to these obstacles, technology cannot be fully utilized and education can reach its peak.

VI. SINGNIFICANCE OF THE STUDY

This article provides an opportunity to identify the factors that influence the teaching-learning process in the use of technology by university teachers. By knowing these factors and controlling them, it will be possible to motivate teachers to increase their use of technology. They can be encouraged to update their skills through retraining programs and workshops. They may even be encouraged to choose online courses to learn how to use technology properly. By studying the different levels of interest, you will get an idea of the benefits of awareness, management and collaboration for the use of educational technologies in the teaching-learning process in higher education.

VII. CONCLUSION

According to the above discussion of general findings, 21st century educational technology has significant impact on the teaching-learning process in higher education. However, too many problems have arisen in the application of technology in the teaching-learning system. For example, there is a lack of proper updating software, financial resources, schedules, teacher training, etc. However, we cannot deny the use of this technology in today's times. Because educational technology has greatly influenced all areas of higher education. Technology in education is changing the traditional role of the teacher in the classroom. Therefore, it is necessary to help parents, the community, the government, all members and the sector to motivate the use of technology among teachers and students.

Suggestions for Future Research

There are several areas for future research that could build on the results of this study. First, future studies could examine the impact of educational technology on specific subject areas, such as mathematics or science, to determine whether there are differences in its effectiveness across different disciplines.

Second, future research could examine the impact of different types of educational technologies, such as virtual reality or augmented reality, on student learning outcomes. This could provide insights into the potential benefits and limitations of these new technologies in the classroom.

Finally, future studies could examine the role of teacher training and support in facilitating the effective use of

educational technologies in the classroom. This could include examining the effects of different types of training programs on teachers' attitudes, perceptions, and instructional practices, as well as examining the types of support teachers need to effectively integrate technology into their education.

Overall, this study highlights the importance of educational technology in the teaching and learning process and suggests several avenues for future research that could improve our understanding of its potential benefits and limitations.

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