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E-learning Technologies in Education: Process, Benefits and Challenges

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ABSTRACT

This article attempts to present the development process, advantages and challenges of e-learning technology in education. The results show that e-learning can be defined as the use of existing information and communication technologies to facilitate learning. It is combination of education and the use of the internet. Through e-learning, we can provide quality education to remote and rural areas using modern technologies such as satellite, internet, mobile phones. The origins of the concept of online education in India. Meanwhile, India's schools also began with the development of smart classrooms and satellite learning. With the passage of time and advancement of technology, online education in India has witnessed a tremendous growth. In recent years, educational institutions have been trying to increase teaching effectiveness by supporting classrooms with audio-visual aids like overhead projectors/slide projectors and videos. E-learning has become a mainstream teaching method for over a decade now. Before the COVID-19 pandemic, students were taking advantage of online learning to enhance their skills by opting for online certification courses. However, with the coronavirus pandemic and the continued closure of schools, the country has proven that online learning can be successful. Online learning has eased the pain of mass education. Therefore, this article suggests that e-learning technologies should be used and implemented appropriately and the government can play a significant role in this regard.

Keywords:

Computer, E-learning, Education, Internet, & Student.

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INTRODUCTION

Education has become a human need. Everyone needs to learn to improve themselves. Modern education provides good employment opportunities and supports the economy of the country. E-learning provides a great opportunity to learn (Thakare et al., 2016). The inclusion of computers and the internet in education has changed the learning patterns and standards (Jaiswal, 2012). We can support students to achieve academic success through inquiry and other activities. Information and Communication Technology (ICT) supported education is a new technology. Every professional should be aware of this (Sharma, 2015). Although students seem to enjoy using computers and the internet, their understanding of e-learning needs to be addressed (Nanda et al., 2017). The role of technology in education is increasing at an alarming rate and is changing the way teaching and learning is carried out. Different technology tools are being designed to adapt to the different demographic characteristics and needs of university students (Sarkar, 2024).

E-learning can be defined as the use of broadband Internet and computers to facilitate teaching and learning. Technology provides students with countless opportunities online, allowing them to explore and gain independence. It also makes learning easier by making the subject understandable through instructional videos (Bhatia, 2011). Technology has provided great support for multitasking, setting reminders, communicating effectively, paying bills with a single click, and meeting simple needs such as grocery shopping. New technologies provide many benefits such as increased efficiency, productivity, connectivity, access to information, innovation, and improved quality of life. It can also lead to advancements in many areas such as health, communication, transportation, and education (Thanji and Vasantha, 2018). Technology can use everywhere. From tablets to smartphones, smart homes to connected watches,

these digital devices have become indispensable. They facilitate communication, entertainment, and control of our daily lives, helping us to live in collaboration and information. (Siddiqui & Masud, 2012).

Information and communication technologies offer a great opportunity to increase the quality of education for individuals with disabilities (Kumar et al., 2011). With the rapid changes in technology, new methods have been developed and implemented in higher education for acquiring and sharing information and knowledge. Today, education has become more efficient with the development of internet technology. Internet provides an easy way for ordinary people to access unlimited information and knowledge. E-learning is a global phenomenon that has emerged because students need additional support due to social, financial and technological constraints. Skill development is increasingly widespread in all countries and is considered as the key to future prosperity and success (Rao, 2011). Online learning or online education encompasses all forms of learning and teaching done electronically. Information and communication are particularly useful tools for implementing learning processes, whether online or offline. In today's scenario, schools are struggling to find the right combination of students, teachers, processes and systems to manage their learning. The emergence of World Wide Web, business networks, advanced computers and various mobile devices will allow people all over the world. Over the years, online learning and technology have impacted education by overcoming the problems of cost, accessibility, time or convenience faced by classroom learning (Homavazir, 2015).

IDENTIFICATION OF THE PROBLEM

Lack of education leads to a variety of social issues, including poverty, reduced health outcomes, and limited opportunities. It affects gender inequality, exacerbates existing inequality and hinders general development. Lack of education can also lead to

increased crime and violence rates. It limits employment opportunities, deserves possibilities, and captures individuals in a cycle of poverty. Without the required skills and qualifications, individuals are less likely to find and maintain stable employment. Lack of education can affect general economic growth by reducing workforce productivity and innovation. This can lead to healthy outcomes due to lack of knowledge about prevention, nutrition and hygiene. It can limit the ability of individuals to improve their social and economic status and to maintain inequality across generations. Untrained parents may have difficulty in creating stimulating environment for their children, which can lead to negative developmental outcomes.

Lack of education may result in a lower level of citizen engagement and political participation that hinders the democratic process. Untrained people are more susceptible to exploitation, both economically and politically. Lack of education can contribute to radicalization and violence, as lack of education can be susceptible to extremism ideology. It disproportionately affects girls and women, hinders their progress and limits their chances. Lack of access to high-quality education create and strengthen existing inequalities based on socioeconomic status, ethnicity and other factors. The lack of proper school infrastructure, such as classrooms, libraries, and technology, can hinder learning and development. Without access to relevant training and skill development, it could limit individuals' ability to find employment and promote careers. Employment opportunities in India grow every day. Students also plan careers overseas and hone their skills. Lack of education means lack of skills, and there is only one place left for low-paid jobs.

RATIONALE BEHIND SELECTION OF THE PROBLEM

Online and traditional educational methods provide a variety of advantages and disadvantages that provide a variety of learning styles and preferences. Traditional education emphasizes individual interactions, structured graphs and direct feedback of instructors. Online learning uses a digital platform to provide flexibility, independent education and more resources. Electronic education overcomes geographical barriers, allowing students to approach educational resources anywhere in the world. Students can study with their own speed and graphics to satisfy individual demands and preferences. Students can return to lectures and materials many times as needed to improve understanding and maintenance.

Electronic training can reduce the cost of physical class, travel and materials. The electronic learning platform can optimize the learning process and save time and effort for both students and teachers. Electronic education includes multimedia, interactive modules and a common tool for creating more dynamic and attractive education. It gives people the opportunity to improve employment and job prospects by acquiring new skills and knowledge. It can be used effectively to teach employees, reduce costs and increase performance. Through this, people participate in continuous education and professional development and know the latest trends and technologies. This reduces the impact of environmental education, minimizes travel, and relies on physical resources.

LITERATURE REVIEW

The rapid development of the internet has led to major changes in many areas of science and technology. The internet is not a means of searching and storing information, but through it has become the king of all media, we can get virtual information, create a virtual library, provide timely and quality service to users. It brings

new opportunities for learning in all disciplines, including library and information science (Patel, 2016). The concept of e-learning has become a learning way of presenting information to students based on new technologies in mathematics, global information and more media, discussion, debate and virtual classroom (Abed, 2019). Nowadays, e-learning has become popular. It is widely used not only in schools but also in business and commercial sectors that require the fastest and cheapest exchange of information and communication (Keksela et al., 2016). E-learning involves the use of digital tools for teaching and learning purposes. It uses technological tools to help students learn anytime, anywhere. This includes providing education, sharing knowledge, and encouraging students to be social, communicate, and respect different opinions (Arkorful and Abaidoo, 2014).

The rapid development of technology has created incredible opportunities for new teaching and learning. Considering the importance of human presence in the learning process, there are ongoing discussions about the effectiveness of e-content (Deshmukh, 2020). E-learning allows users to gather information and learn effectively through synchronous and asynchronous methods to meet the need for timely and rapid access to new information (Mahanta and Ahmed, 2012). E-learning is the practice of using information and communication technologies to create educational experiences that can be freely created, developed and produced without restrictions (Bibi et al., 2024). Online teaching is a teaching method that allows teachers to teach knowledge anytime and anywhere via the Internet and electronic devices (synchronous and asynchronous mode). The COVID-19 pandemic that began in the spring of 2020 caused all schools, colleges, and universities to be closed, forcing teachers to teach online. Teachers start teaching online without any prior experience (Shaheen and Hoque, 2021). The COVID-19 pandemic has led to school closures worldwide, and education has rapidly shifted to online/distance learning or emergency distance

learning. Teachers and students have shifted from face-to-face interactions to online environments, affecting curriculum, instruction, and student outcomes overall (DeCoito and Estaiteyeh, 2022).

Therefore, development of new technologies has transformed the delivery of higher education from face-to-face courses to online learning. Learning through online teaching and learning is called online learning. The term online learning is often used in distance learning (Kunwar et al., 2016). Virtual learning is a type of teaching and learning where teachers and students are in separate locations (Hadadnia et al., 2012). Today, students are learning about digital technologies from an early age. They love texting, playing online games, socializing, reading books, and going to the movies; moreover, none of them can even dream of writing a book. (Norkulov et al., 2020). E-learning has changed the patter of teaching learning process.

OBJECTIVES

The objectives of the paper are:

(a) To study the significance and features of the e-learning technology in education.

(b) To identify the e-learning technologies in education.

(c) To study the benefits of e-learning technologies in education, and

(d) To evaluate the challenges before the learning technology in education.

METHODS AND MATERIALS

This study is descriptive in design. Author has utilized quantitative approach. The present study is based on the secondary data. The data has been collected from reports of e-learning and online education. Various journals and books have also been referred in the present study. To reveal the r-learning technologies in education in general and challenges perspectives in particular, descriptive analysis, and content text analysis have been performed.

RESULTS AND DISCUSSION

Technology plays a vital role in the acquisition of basic knowledge, improving problem-solving and decision-making skills, and teaching psychomotor and attitudinal thinking. Learning is student-centered, with accessible materials, where students can develop, and where teachers are encouraged to make decisions based on the individual needs of each student (Patil and Razdan, 2014). The new generation of students are aware of the best educational technologies from an early age and are interested in using technology and social media platforms for educational and entertainment purposes (Hirkani and Supe, 2018). Active teacher learning is combined with passive learning and is facilitated by technology (electronic/online tools only). Advances in technology have made it an important part of teaching and learning, especially in schools and businesses (Shangerthana & Chandrasekar, 2016). The concepts, tools, models, and processes of e-learning can be easily applied to the fields of communication, business, and industry. It will help to achieve goals and achieve all our accomplishments (Rajpal et. al., 2008). Importance of e-learning a form of distance learning today, is a collaborative effort to provide quality content for students to actively learn, and is integrated with various activities, lectures, tests, assignments, research, and often homework provided to students. Businesses often use technology to improve their operations (Bhoyar et al., 2016).

The United Nations and the World Health Organization have recognized e-Learning as a viable tool to address the training needs of healthcare professionals, especially in developing countries (Dhar et. al., 2017). E-learning means that students can learn anywhere and at any time (home, work, town, library, etc.) without having to go to a learning center. This opens up a world of learning that was previously out of reach due to disabilities, family circumstances, or having to take classes in other parts of the world. E-learning makes learning fun, interesting, and meaningful. With the help of such learning, complex and boring classes can be made simpler, more interesting, and more exciting. With e-learning, students can manage their own learning in a way that suits each student. E-learning means that students can be exposed to a wide range of

topics, information, and people, which allows each student to receive personalized information and education that suits their needs. It helps for revenue of an organization. Many organizations report that they save labour costs and time by increasing productivity, reducing time to market, and reducing training time, as well as increasing customer and employee satisfaction, which leads to higher customer satisfaction and employee loyalty. For organizations, e-learning plays a vital role in maintaining flexibility and competitiveness in the marketplace (Karmakar and Nath, 2014).

THE FEATURES OF E-LEARNING

The most important feature of e-learning is easy access to information and resources. It means that person can access and use information and resources anytime, anywhere. Students can attend free classes whenever and wherever they want outside their residences. Another feature is the opportunity to access multimedia information (Anand et al., 2012). Information and communication technologies offer powerful tools in delivering information to large masses. This has the potential to improve access and equity across the education system. It can be used to support distance learning models at all levels (Thomas, 2017). Web-based learning/training has the potential to meet people's needs for flexibility, location, and outcomes (Ray, 2016). E-learning is basically the computer and network-enabled transfer of skills and knowledge. It includes the electronic applications and processes applied to teaching and learning. E-learning applications may include web-based learning, computer based learning, virtual classrooms, and digital collaboration.

The key features of e-learning are:

- **Personalization:** The future of learning will be personalized. Courses will be selected based on students' interests, abilities, academic achievement, and social needs. The course menu that will be opened to each student will be determined according to the student's previous academic performance, prerequisites for new courses, and administrative training status. Students' meals will vary and change according to their

daily performance.

- **Flexible learning:** Classes can be created in various formats based on the input data. Different methods can be used according to the course objectives and the interests of the students. Students can access educational content using a variety of devices with different processing and memory capacities, from desktop and laptop computers to mobile devices such as PDAs.

- **Interoperability and reusability:** E-learning systems that contain content from multiple sources and multiple authors need to be able to work together. There needs to be a good relationship between different e-learning platforms. Although technology is used to create educational content, it can be reused in applications and environments. This requires that the content be separated and incorporated into other applications with some escape constraints. The content must be consistent and the data must be reusable.

TYPES OF E-LEARNING

There are many benefits of e-learning. In on-site teaching, a technology teacher can teach many students in one place at the same time in another place. Teacher-student relationship is a form of communication between students and teachers. Since books are expensive to purchase, new materials can be delivered digitally through e-readers. Independent learning through computer-based instruction is an important and essential aspect of higher education (Bhadauria, 2016). It is synchronous and involves interaction between the participants and the instructor over the internet. Students and teachers communicate online using instant messaging, chat, audio and video conferencing. The benefit is that education can provide students with the information they need at any time. Participants can practice whenever they want. This includes on-the-job training, where participants receive the necessary training to complete their tasks. These are also called newsletters, magazines, and conferences. Group discussions can be used to encourage groups of participants to work on the same topic or to encourage participants to participate in related activities (Subrahmanyam and

Ravichandran, 2013).

DIFFERENT TECHNOLOGICAL TRENDS OF E-LEARNING

Today, e-learning technology is vast and growing rapidly. In the competitive world, new models of providing quality education to students are emerging every day. Effective use of digital learning tools in the classroom can increase student engagement, help teachers improve lesson planning, and promote personalized learning. It also helps students develop essential 21st century skills. Virtual classrooms, video, augmented reality, robotics, and other technological tools can not only make classrooms more dynamic, but also create more engaging and motivating learning experiences. It encourages collaboration and curiosity, and helps teachers collect data on student records. Teachers want to improve student achievement, and technology can help them achieve this goal. To overcome the challenges, leaders need to help teachers gain the skills they need to improve student learning through the use of technology. In addition, classroom technology should make teachers' jobs easier without adding extra time to their schedules. Technology provides students with easy access to information, accelerated learning, and fun ways to apply what they learn. It allows students to explore new topics and gain a deeper understanding of complex concepts, especially in STEM fields. By using technology inside and outside the classroom, students gain the 21st century skills they will need for their future careers.

Popular technology e-learning includes:

- **Mobile Learning:** Mobile learning is the ability of individuals to access or deliver educational content via personal pocket devices such as PDAs, smartphones, and cell phones. These devices, which have access to network connections or have their own resources, will become the primary focus of e-learning.
- **Micro Learning:** Micro learning is a method of teaching and delivering small, highly specialized content to students. Students have control over what they learn and when. Often designed and presented as rich text, this approach is a learning-centered

approach that provides instant learning that can be applied to a variety of devices.

- **Internet of Things:** It refers to the increasing number of physical objects or objects around us that have IP addresses to connect to the Internet, and the communication that takes place between these connected objects and other devices through the Internet and technology. It includes everything that uses art tools to communicate and interact with the external environment through the Internet.
- **Cloud based E-Learning:** This type of e-learning is creating ripples in the world of education and business. This education system is hosted on the internet and can be easily accessed by logging into the service's website.
- **Gamification:** This type of e-learning is done through games and it really depends on the class and the audience. Children in particular can benefit more from this type of e-learning because it keeps them engaged and keeps them for longer. Gamification helps online learners gain better knowledge and skills.
- **Beacon E-Learning:** This is another great use of technology for e-learning. This beacon e-learning or beacon technology is a wireless device that sends signals to other nearby devices through Bluetooth Low Energy connectivity. This is used as an indoor space.
- **Video E-Learning:** This course helps students learn the content by watching videos. When a student wants to learn more about a topic, then can use google or youtube.com.
- **Augmented Reality:** The technology overlays computer-generated images onto the user's real-world view. It's related to a general concept called mediated reality. This is a huge boon to students or learning in general.
- **Adaptive E-Learning:** Adaptive e-learning uses computers as interactive teaching tools. This system adjusts the distribution of funds to people and media according to the specific educational needs of each student. This is also called smart education.

- **Artificial Intelligence:** This technology can also shape the world of e-learning. It is more like intelligent software designed to perform some intelligent functions to read the entire environment.

BENEFITS OF E-LEARNING

In recent years, e-learning has gained popularity as an important teaching method. This tool shows the advantages of e-learning over traditional teaching (Gaur et al., 2015). Unprecedented developments in information technologies, convergence in communication technologies, reduction of costs, competition and globalization will make education more valuable (Tiwari, 2011). With the introduction of e-learning platforms, many problems in school education have been eliminated. Teachers find it quite easy to teach students and distribute learning materials (Sachdeva and Kavita, 2017). First of all, users can complete the program on their own. Users can access e-learning anytime, anywhere and learn only what they need. E-learning can be accessed via web browser software on any platform (Sharma et al., 2014). E-learning technology allows teachers to update their teaching content easily and quickly. Students can control the content, and learning order to adapt their learning according to their learning goals. Internet technology enables the distribution of digital content to users anywhere and anytime (Suresh et al., 2018). Software training will fill the gaps in legislation and ensure effective implementation in rural and urban areas. E-learning networks can create connections between community and legal organizations dealing with legal issues.

Governments can use e-learning media in many ways. It helps the government communicate its policies and ideas. It provides the public with exposure to many ideas and concepts. It will provide people with an open platform for communication or learning. E-learning has the potential to produce both partial and unbiased knowledge (Gaikwad and Randhir, 2016). Education has become more accessible, better access has been provided, a wider audience has been reached and there is a greater potential and in the long run it reduces costs (Azhari and Ming, 2015). Today, information and

communication technologies are a revolution affecting every aspect of human life, especially in the field of education. The ICT revolution has transformed early childhood education into the real world (Nayak and Kalyankar, 2010). Some advantages of e-learning are comprehensiveness, affordability, flexibility, personal comfort, speed, adaptability, large groups, easy to manage students, and good relationships.

One of the most important benefits of e-Content is its adaptability to different learning environments and challenges. Digital resources can be customized to individual student needs, provide personalized learning. While e-learning emphasizes flexibility and personalization, online learning offers a collaborative, community-based experience that appeals to a variety of needs and interests. E-learning is not just a technological shift, but is part of redefining how we as humans transfer knowledge, skills, and values to young workers and students. Studies show that e-learning improves students' knowledge, communication, learning quality, positive thinking and learning ability, and that teachers' teaching roles are related to students' interest in higher education. E-learning and technology are essential for student learning and staff development. The rapid development of technology makes it increasingly important for employees to have the right skills and education.

CHALLENGES TO BE FACED BY E-LEARNING

Lack of self-confidence, deterioration of communication skills such as body language, moving away from peer learning, and decline in social skills and leadership are the negative aspects of the e-learning mechanism. According to collaborative research, interpersonal relationships are an important part of learning (Nelasco et al., 2007). However, this situation also brings with its administrative, financial and competitive challenges. These include integrating collaboration and allocating resources according to the organization's priorities (Gupta et al., 2017). The problem is how to reach out to the rural people. Social impact of e-learning is a very important issue to be considered for the success of e-learning in India (Pande et al., 2016). The level of interaction is usually limited. The development of an e-learning system requires more time and

money than expected. Some learning strategies cannot be best provided by computer-based training and require more personal contact (Sharma et al., 2017).

Online learning has revolutionized education by providing easy and convenient way for people to acquire knowledge and skills without leaving home. However, online learning often comes with its own set of challenges. It is becoming increasingly difficult for students to adapt to the digital environment and continue their education. Educational challenges in e-learning refer to any technology-related issues that may hinder effective delivery of online learning materials. These challenges include lack of appropriate equipment, unusable devices, poor internet access, and slow loading of online courses. One of the biggest challenges of online learning is the lack of physical interaction, which makes it difficult to communicate with peers and teachers. Since English is still the primary language in e-learning, e-learning can be difficult, especially in remote areas where English proficiency is low. This also means that schools and universities do not have a common curriculum for creating e-learning content.

The major problems we will be facing are:

- Education should create a learning environment that provides one-on-one mentoring and motivates students to make the experience meaningful, applicable and personal.
- In rural areas, students and parents are still not aware of e-learning and online learning. Therefore, performances, discussions and training should be held to make the community understand its importance.
- The limited bandwidth of the internet connection reduces the quality of audio, video and image density, causing long waiting times in the download process, which affects the ease of the learning process. Increasing the bandwidth will help the teacher solve his problem.
- For teachers, online learning will reduce their workload, leading to protests from teachers' unions.

- Due to accessibility issues, all schools may not have equal access to information. Schools with less funding will face this problem. This is a big problem in India because there is a huge gap between the poor and the rich in India (Nayak and Kalyankar, 2010),

CONCLUSION

E-learning has many advantages over traditional classroom education. The most important benefit is the convenience and cost reduction of travel. E-learning has the benefits of cost-effectiveness, additional learning, flexibility and better knowledge. Colleges or schools offering online distance education can abandon the traditional approach and adopt blended learning as a classroom tool to achieve great results. Through e-learning, students can better remember and apply the learning content, thus gaining better knowledge, skills and attitudes. Acceptance of e-learning depends on many factors, such as computer ownership, students' knowledge and understanding of e-learning, age, gender, history of computer use, experience of adopting technology and personal learning. Collaboration with multiple stakeholders including students, schools and government are the part of the learning. With the introduction of online education in schools, children and youth will grow up with technological knowledge. Their exposure will increase and therefore their knowledge will increase. The use of the internet for educational purposes will change many things in lives. Web-based learning takes quality learning to new areas with the personal support of online instructors. It is important to understand students' perspectives on this issue. It is important for educators and policy makers to understand the benefits of e-learning and how well students accept it so that they can improve it in the future.

Challenges of online teaching are unplanned digital content, keeping track of assignments, teachers lacking technical knowledge, engaging students, and taking charge of class online. Challenges of online learning are lack of motivation, lesser attention span, too many distractions, lack of clarity & timely feedback, unawareness of specially-abled children, lack of technology facilities, poor time management, and health Issues. Online learning time is equal to 6-7 hours spent at school. Long hours in

front of the screen can be harmful to students' health. Health issues are a challenge in online learning.

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