Accessibility of e-learning in education: A review study

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Abstract- The science of learning without using printed instructional materials on paper can be best characterized as e-learning. The delivery of information for education and training through telecommunications technology is known as e-learning. E-learning is becoming the model for contemporary education as information and communication technology development continues to advance. The asynchronous and synchronous learning network concept of e-learning liberates interactions between students and instructors from constraints of time and geography. The deliberate use of networked information and communications technology in teaching and learning is referred to as elearning. This method of instruction and learning is also referred to by a variety of other names. Online learning, virtual learning, distributed learning, network learning, and web-based learning are some of them. Since the letter "e" in "e-learning" stands for the word "electronic," the name "e-learning" would include any educational activities that are carried out by individuals or groups working online or offline. It therefore encompasses much more than only online learning.

On campuses and in distant learning, information and communication technologies—including the Internet—are widely used. In order to be successful in college, students must get used to the extensive use of e-learning (i.e., technology used by instructors to support the learning process), which includes PowerPoint presentations in class, web-based discussions to advance in-class dialogue, and the full range of information and communication technologies that faculty use when teaching courses entirely in-person, entirely online, or in a combination of the two. Students are expected to access course administration systems like WebCT and Blackboard, download course materials from specific course websites, and create PowerPoint presentations in the modern learning environment. The inclusion of students with visual impairments in higher education classrooms may be made easier through e-learning. If the course web sites are accessible and the students have access to the necessary information and computer communication technologies, such as adaptive software for screen reading and magnification, they can access class notes and handouts on the course web sites without assistance in traditional classes.

INTRODUCTION

When compared to Instructor-Led Training (ILT), which is a single class that needs to be planned, e-learning has the advantage of being accessible 24/7/365. Compared to ILT, which has scheduling conflicts and is inconvenient, e-learning is more convenient for the learner. ILT is expensive because there are many costs associated with it, such as course development costs, good teaching professional costs, printing costs, paper costs, infrastructure costs, electricity costs, training material costs, stationary costs, travel costs, meal costs, lodging costs, parking costs, and several other costs are associated with it. In contrast, elearning is cost-effective because course content once developed could be easily modified in the future, used for teaching and training. The actual presence of the teacher in the classroom, who is able to respond to students' questions right away, is one advantage of ILT over e-learning. Elearning allows students to learn at their own pace, whereas ILT forces students to finish a course in a set amount of time and is not self-paced. In contrast to ILT, where all students are taught all the material at the same level as the rest of the class, e-learning allows students to focus on what is important and skip the less important material. After taking into account all of these variables, it can be concluded that e-learning is a much more effective, affordable, and learner-friendly method of instruction than traditional ILT.

E-learning is still in its infancy today, with many unclear concerns that need to be sorted out and researched. The efficiency of e-learning can be affected by a wide range of variables, including media features, the learning context, technology, and student characteristics. Although our trials have shown that, in

some circumstances, e-learning can be at least as effective as traditional classroom instruction, we are not in a position to assert that e-learning can completely replace traditional classroom instruction. The majority of learning is a sociocognitive process. E-learning may not be a good fit for every student's preferred learning method. In front of the computer, some pupils experience boredom or intimidation. E-learning must also take into account additional crucial aspects. Trust, permission, confidentiality, and personal accountability problems need to be overcome. Intellectual property owners ought to receive fair compensation. The public's unrestricted access to this global network makes security on the Internet a rising concern. Additionally, a high-bandwidth network is a prerequisite for effective content access because multimedia resources are frequently employed in e-learning systems. However, e-learning is a viable replacement for conventional classroom instruction, and it is especially helpful for lifelong learning and training that takes place remotely. E-learning frequently serves as a valuable supplement to traditional classroom instruction. The importance of e-learning as a component of academic and professional education will only increase. The best way to produce more engaging and efficient online learning environments should continue to be investigated. To do this, one strategy is to incorporate effective pedagogical techniques, improve system interactivity and personalisation, and increase learner engagement.

Although it may seem clear, there are many different types of disabilities. Accessibility is frequently oversimplified and stereotyped. It conjures up the idea of a user who needs a screen reader when it comes to online material. This is completely false. Disability is not merely a health issue, as the World Health Organisation states. It is a complicated phenomenon that reflects the relationship between physical characteristics of an individual and social characteristics of the society in which they inhabit. In order to create Web standards, member organizations, a full-time staff, and the general public collaborate within the World Wide Web Consortium (W3C). Your site content must pass five simple accessibility tests in order to meet the basic standards. We've made a straightforward online accessibility checklist that explains how to rapidly assess your site content and comply with these guidelines in order to be of

assistance. To make sure your web content complies with the accessibility rules, use our practical online accessibility checks checklist. Key checks consist of: Page headings, alternative text for images, Text (headings, contrast of color, and resizing), Access to the keyboard, visual focus, forms, labels, and mistakes, Checks for movement, flashing, blinking, multimedia, and the basics of structure.

Will instructor-led training (ILT) be replaced by online learning?
E-learning has been a potential tool for on-the-job training and lifetime learning over the past few years. E-learning is a technology-based learning method in which instructional materials are electronically transmitted to distant learners over a computer network [1]. Companies must use effective and efficient training techniques to guarantee that their staff members and channel partners have access to the most recent knowledge and cutting-edge capabilities. Numerous universities throughout the world are now offering thousands of online courses, including degree and diploma programmes, in an effort to quickly meet this demand. MIT declared its intention to make almost all of its course materials freely available online for non-commercial use in 2001 [2, 3]. Elearning provides several advantages over ILT, including the ability to be designed and distributed much more quickly, as well as the ability to be used simultaneously by a huge audience dispersed around the globe. The learner can access it whenever is most convenient for them and can explore the course to view the content that applies to their needs. Information that is unrelated to the learner may be included in ILT. A learner can navigate an online course using filters to only participate in the portions that apply to his current job. The learner and the business both save time and money by doing this. Even little expenditures in e-learning technology typically result in considerable returns for most businesses. Even little expenditures in e-learning technology typically result in considerable returns for most businesses. The majority of e-learning users have quickly noticed the first-tier advantages, such as lower expenses for travel, customer support, administrative costs, and regulatory compliance, and eventually second-tier advantages, like improved employee performance that directly affects profitability [4] (McLeod, 2006). According to [5] Dobrin (1999),

85% of the faculty members instructing online courses believed that student learning outcomes were on par with or even superior to those observed in traditional classroom settings. E-learning offers benefits in almost every area, including effectiveness and speed. Online students have an efficiency advantage because they can cover the same subject in about half the time of a traditional class, according to a Forbes article by Brandon Hall. Elearning also has a velocity advantage because it can quickly reach a large number of learners. Imagine a classroom event that must be booked weeks in advance. E-learning, on the other hand, can provide instant access to knowledge at the precise moment it is required. Anyone, including employees, can receive training whenever and wherever it is most convenient for them, whether that be at home or at work [6]. The advantages of e-learning typically outweigh those of ILT. The learner benefits greatly when instruction is provided in an online mode. Of course, some courses might work better with a mixed learning strategy, but overall, e-learning rules over ILT.

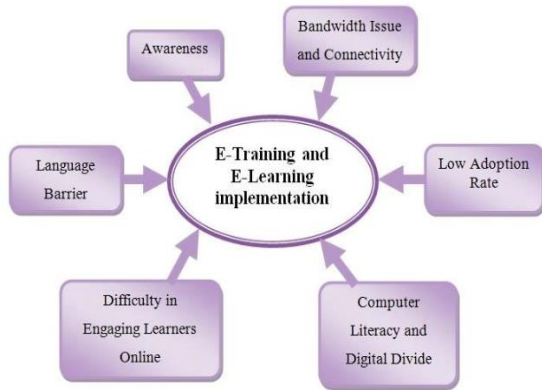Challenges for Students with Disabilities in Education

Figure 1: Implementing e-learning and e-training: Problems and Challenges [8]

Knowledge is strength. It serves as the cornerstone for a nation's multifaceted socio economic development. In the current situation, human capital—also known as labor—is necessary to produce a nation's growth and development. The Indian government has undertaken numerous measures to advance education at all levels, including primary, secondary, and higher education. The development of human resources in our nation is still hampered by challenges including a high dropout rate at all educational levels, rural-urban discrepancy, gender disparity, and interstate variations, to name a few. Even India's employment rate shows the importance of careful planning for skill development and job opportunities. Perhaps most intriguingly, the general and conventional higher education institutions that are currently in place are ill-equipped to deal with the challenges and changes of the modern world, and as a result, the nature of the curricula that are largely in place tend to only mildly inflate our nation's wages. So, in order to improve education quality and deliver need-based educational programmes that can foster human power in society, we need institutions and institutional arrangements that can address today's concerns. Effective or high-quality education, particularly at the higher levels, can be extremely important in fostering the development of human resources on many different fronts and facilitating learner integration into the workforce and self-employment.

Today's society is referred to as a knowledge-based society. A knowledge-based society is compelled to produce human capital by design. A nation's progress can be fueled by skilled labor, which education as a vehicle of knowledge can provide. A nation can profit socially, economically, culturally, educationally, and in other ways from education by developing its citizens in the fullest sense of the word. As a result, education is regarded as the cornerstone of all socioeconomic developments in a nation. Each and every person has the fundamental right to receive an education in a democratic society like India, regardless of any type of prejudice. Article 45 of the Indian Constitution mandates free and compulsory education for all children between the ages of 6 and 14 [7]. However, this Constitutional clause's intended consequence, i.e., education for all, was not fully realized. As a result, the Government of India has taken numerous steps to ensure that everyone has access to education by designating it as a Fundamental Right in accordance with the 86th Amendment to the Constitution in 2002. The Right to Education Act of 2009 has now been put into effect in India for all children between the ages of 6 and 14 years.

The deployment of e-learning and e-training faces six key problems, including poor acceptance rates, language barriers, bandwidth constraints, difficulty enticing learners to participate online, and finally low computer literacy and the digital divide as shown in Figure 1 [8]. The difficulties and problems must be resolved in order to improve the efficacy of

understanding the notion of e-training. One of the issues is determining the organization's ICT (information and communication technology) training needs and ensuring that the staff is ICT literate. To address skill obsolescence and adapt manufacturing and services to the market in a flexible manner, training and re-qualification are crucial. For a continuous training system to be successfully incorporated into the working environment and become a part of the organizational culture, organizations must progress towards it. To track any organizational demands that call for training, competence and knowledge management should be closely connected. ICT can be broadly referred to as tools, facilities, processes, and equipment that offer the necessary environment with the physical infrastructure and the services for the generation, transmission, processing, storing, and disseminating of information in all forms, including voice, text, data, graphics, and video, that may help with the delivery of future job assignments or job improvement.

Consequently, according to the Constitution's fundamental rights, education is now acknowledged as a human right from birth.In addition to several discrepancies such as rural-urban disparity, career disparity, gender disparity, and inter-state difference, there is still a significant dropout rate at all levels of education. Another major problem is degree inflation, in which many graduates from Indian universities and other institutions of higher education do not meet the criteria for employability. [9] As a result, these graduates add to the number of unemployed and unemployable people in the population. The number of employment opportunities in the nation has not increased proportionately. In order to increase human power in a society, we therefore need an educational programme that can inspire students to upgrade their abilities through need-based education. Even though the medical circumstances may vary, postsecondary students with disabilities (SWDs) continue to face difficulties for two main reasons:

1. The number of SWDs in higher education is not well known. There is a lack of data due to many issues. Because they are concerned about prejudice, some students decide not to reveal their condition. Additionally, several developing or impoverished nations still lack access to trustworthy data collection methods or a plethora of pertinent data. In circumstances where data is really accessible, retrieving that data could be challenging due to privacy restrictions. All of this contributes to a low representation of postsecondary SWDs.

2. Insufficient knowledge regarding SWDs' university experiences. The issues and worries faced by SWDs in the higher education system are not fully represented due to the data shortage. As a result, it becomes challenging to recognise emerging concerns affecting these kids and to develop strategies that cater to their unique needs.

The overall number of students enrolled in postsecondary institutions in the United States increased by 29% between 2000 and 2017, according to the National Centre for Education Statistics' (NCES) [10] Digest of Education Statistics. By 2028, this number is projected to rise by an additional 3%. Additionally, the most recent NCES data demonstrate that 19.4% of all postsecondary enrollments in the U.S. are made up of students with identified disabilities, such as intellectual, physical, sensory, and psychiatric impairments. Students with disabilities are still less likely than classmates without impairments to attend college and are more likely to have bad experiences there, despite the rise in overall enrollments. SWDs who do attend college may leave because their institutions do not provide them with the accessibility they require. Numerous studies indicate that SWDs have lower graduation rates than their peers without disabilities, and additional research demonstrates that SWDs have poorer rates of college adjustment. The proportion of SWDs with bachelor's degrees is therefore lower than that of their contemporaries without impairments. For SWDs, accessibility issues at the university level might occur in a variety of situations. As a result, compared to their counterparts without disabilities, SWDs often have a more stressful everyday existence and may have less chances. It is important to note that this imbalance of opportunity persists, with employment rates being greater for pupils without disabilities.

Despite the fact that barriers vary depending on the kind of disability a student has, a few general examples of inaccessibility include dormitories and classrooms that lack architectural accessibility, mass university emails that aren't screen reader-friendly, a lack of assistive technologies in institutions with limited funding, and dim lighting in some areas of campuses. The list might continue. SWDs' lives are impacted by difficulties on a variety of levels. SWDs continue to be

socially isolated from their peers, which has a negative impact on their self-esteem and keeps them from experiencing the sense of community that every student deserves. SWDs are consequently more likely to worry about important day-to-day encounters, which may be detrimental to their mental health. The impacts carry over to the academic setting, where SWDs may perform poorly and experience intellectual discomfort if poorly supported. These effects are concerning since they will have an ongoing negative influence on the pupils' quality of life.

Statistics on accessibility challenges
Accessibility concerns continue to be a major barrier given that entirely online or hybrid course formats are still widely used at colleges and universities around the world. The transcription and captioning company Verbit commissioned a survey of higher education professionals and students in North America, the United Kingdom, and Australia about the accessibility of materials and technologies used on their campuses, their familiarity with students' accessibility needs, and the challenges involved in order to learn more about the state of accessibility in higher education. Responses were gathered between April and May of this year from 132 campus administrators and 100 students who had been identified as having a handicap. The majority of respondents (72%) stated that their institution now offers at least half of all courses virtually or online, and 85% stated that they intend to continue offering these courses through the Fall semester in either a fully online or hybrid format. The majority of schools (89 percent) use online conferencing solutions for synchronous classes, with Microsoft Teams (77 percent), Zoom (62 percent), and Google Meet (57 percent) being the most often used platforms. [11]

The main difficulty, according to more than half of respondents (54 percent), is now student involvement. Numerous tactics have been used by institutions to keep students interested in distance learning settings. The most popular technique was identified by 93 percent of respondents: sharing additional videos to improve courses. Following that are offering opportunities for peer-to-peer interaction (86 percent), utilizing interactive technologies (80 percent), advising students to keep their video cameras on (79 percent), providing assistive technologies (79 percent), conducting attendance-based activities that have an impact on grades (73 percent), and incorporating more Universal Design for Learning principles (66 percent). The top three institutional pain points were student engagement, retention, and accessibility issues. And according to 75% of responders, COVID-19 clearly had an influence on inclusivity and accessibility at their schools. The top barriers preventing institutions from investing more in accessibility are a lack of funds and/or resources (cited by 40% of respondents), a lack of support for accessibility/inclusion technologies (cited by 38% of respondents), a lack of staff expertise (cited by 38% of respondents), a lack of knowledge of existing solutions (cited by 35% of respondents), and a lack of time (cited by 27% of respondents). Another important problem is that, according to 94 percent of survey respondents, fewer than half of students really reveal their difficulties.

According to 50% of respondents, recording and transcribing lectures, providing live captioning and transcriptions during lectures, offering note-takers, recording lectures without transcription, providing sign language interpreters, and providing audio description are the accessibility accommodations most frequently provided to students. However, these services are not frequently offered proactively: Only 8% of respondents claimed that accommodations are available everywhere throughout the university. Many schools only offer accommodations when a student requests them for their classes from the disability department (mentioned by 46% of respondents), when the student asks them for a particular piece of content (41%), or when creating a new academic programme (41%). In the end, almost all of the students who participated in the poll (92 percent) agreed that having access to high-quality accommodations and resources has a beneficial effect on their learning. From this, the conclusion can be made that "Since these technologies do make a significant difference to learners, it's likely that institutional leaders who do more to reduce faculty resistance to using them and promote more training will see improved engagement, retention, and success for their students."

CONCLUSION

For many firms, especially those working online, like the digital marketing sector, web accessibility is crucial. Accessible websites provide a positive user

experience, and search engines reward them for it. Internet accessibility is also advantageous for online schools. Web accessibility is almost as crucial for students taking online classes as having a strong, reliable home internet connection. For an uninterrupted and flawless online learning experience, both are required. Web accessibility in the context of education refers to the creation and specific design of tools, technologies, and websites for the use of people with impairments. These pupils can easily navigate, engage with, and comprehend website material and online learning resources because of web accessibility.

FUTURE WORK

Web accessibility is almost as crucial for kids with special needs and impairments as having a fast and reliable internet connection. However, not all websites for online learning have good accessibility, and many students could still find it difficult to navigate these sites. To make it simpler for students to use the school website, comprehend their lessons, and communicate with other students and professors online, educational institutions must handle web accessibility.

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