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Technical Challenges of E-Learning During the COVID-19 Pandemic

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Abstract

The COVID-19 pandemic forced various educational institutions across the globe to change their teaching methods from conventional face-to-face contact to online education. This sudden change in teaching methods revealed the various technical difficulties that hindered the learning of students. There were various difficulties, including slow internet connectivity, lack of gadgets, lack of technologically savvy students and teachers, and lack of infrastructure in various educational institutions. This study employed descriptive statistics and an online survey targeting one hundred higher education students to identify the various technical difficulties that were encountered during the pandemic. The study findings reveal that slow internet connectivity was the dominant technical difficulty encountered during the pandemic. After this difficulty, various problems were encountered in online platforms and gadgets for online education. This study highlights the need for teachers to address the various technical difficulties to enhance fairness and prepare for the future.

Keywords: E-learning, COVID-19 pandemic, Technical challenges, Internet connectivity, Digital skills, Online learning platforms.

Introduction

The COVID-19 pandemic has introduced unprecedented changes to the education system across the globe. The sudden outbreak of the pandemic has compelled all levels of educational institutions to make a rapid transition from the traditional face-to-face learning process to the online learning process. This sudden transition was made without any prior preparation, which made it difficult for both teachers and students to adapt to the new digital settings.

One of the most important concerns related to this transition is the development of various technical issues. These technical issues include limited availability of suitable digital devices, poor Internet connectivity, power failures, and lack of institutional support for online platforms. Moreover, both students and teachers lack necessary technical knowledge, which makes it difficult for them to actively participate in online learning activities.

The objective of this research paper is to identify and discuss the technical issues of e-learning that were encountered during the COVID-19 pandemic. Through the analysis of data gathered from, this research paper aims to emphasize the most important technical issues that impacted the process and efficiency of online learning.

Literature Review

Limited Internet Connectivity

Previous studies regularly identified insufficient Internet connectivity and inadequate access to digital technology as significant impediments to effective e-learning, especially for students in impoverished and remote areas. Gurajena et.al. (2021) said that students in remote areas who are not well-connected to the Internet and don't have the right digital gadgets had a lot of trouble with online learning. Turnbull et.al. (2021) also pointed out that students in distant parts of Middle Eastern countries sometimes had sluggish upload and download speeds, which made it hard for them to take part in online learning activities. Saeedi et al. (2022) reiterated that exorbitant Internet expenses, coupled with inadequate connectivity, hindered access to remote learning for students hailing from underprivileged areas. Inadequate Internet connection and poor technology constituted the principal issues confronted by students, particularly those residing in undeveloped regions, who faced more significant impediments due to restricted Internet availability. (Ullah et.al., 2021).

Lack of Digital Skills and Poor Training for Teaching and Learning Online

Numerous studies have underscored that inadequate digital competencies and insufficient training for both educators and learners markedly hindered the efficacy of e-learning. Gurajena et.al (2021) discovered that numerous educators and students possessed insufficient digital competencies, since instructors frequently lacked training in online teaching and were not well-versed in fundamental technology tools like video recording and editing software. Students and teachers had a hard time getting used to learning from home, especially because they didn't have much experience with online tests and managing them. (Turnbull et al., 2021). Salakhova et al. (2022) corroborated these findings by emphasising students' inadequate technical preparedness, as well as issues concerning the functionality of e-learning platforms and the quality of online educational resources. Anand et.al. (2022) also said that instructors' lack of technology abilities was a big problem because many of them didn't get enough training and had trouble using digital tools for teaching. Not being ready or trained enough to teach online is a major issue that is impeding the progress of e-learning. (Moustakas et.al., 2022).

Unstable Internet Connectivity and Infrastructure Limitations

A significant amount of research shows that unreliable Internet connections and limited infrastructure are major obstacles to effective online learning. Weak network signals, slow Internet connections, and power outages that happen from time to time were key problems that made it hard for students to participate in e-learning. (Hermawan,2021). Salakhova et al. (2022) also stated that students often complained about disconnections, frozen screens, bad audio quality, and unpredictable Internet connections, all of which made it hard for them to follow online courses. According to Yuzulia (2021) students' main problems were unstable Internet connections and trouble understanding the materials they were given. A substantial number of people (80%) reported that they had trouble connecting to the internet and using mobile data efficiently during online lessons. (Twagiramungu, 2023). Mourabit et.al.(2023) also revealed that 62.6% of participants said their Internet connections were slow and unstable, which sometimes caused audio problems during virtual sessions. In Cambodia, Em (2021) stressed that the lack of infrastructure, especially poor Internet connectivity, made it much harder to use e-learning.

Access to Digital Devices and Internet Infrastructure

Limited access to digital equipment and technology has been regularly identified as a substantial impediment to e-learning, especially among students from low-income households. Numerous learners were deficient in suitable digital gadgets and dependable Internet access, a concern particularly evident among pupils from economically disadvantaged backgrounds. (Anand et.al., 2022). Twagiramungu (2023) corroborated this by discovering that fifty percent of the surveyed students lacked access to laptops, hence hindering their engagement in online learning activities. Ullah et al., (2021) highlighted that students' lack of Internet connection and ineffective technology were major problems. The lack of cell phones for educational usage was another problem that made it harder for students to use e-learning platforms. (Em, 2021).

Infrastructure and Equipment Problems in E-Learning

For online learning to work well, there needs to be enough infrastructure and access to technological equipment. However, there are big discrepancies between schools and teaching settings. Anand et.al. (2022) discovered that schools with the necessary infrastructure for online education were predominantly private institutions, whereas merely 17% of government schools were suitably equipped, indicating a lack of digital preparedness in the public sector. Moustakas et.al. (2022) also pointed out that teachers often did not have the right tools, like good headsets, reliable Internet connectivity, and well-organised workspaces at home and at school. Students also said that bad infrastructure was a big problem, such when they had trouble managing and getting to a lot of learning materials that were sent at the wrong times. (Saeedi et al., 2022). These findings highlight that both institutional infrastructure and the accessibility of appropriate equipment are crucial for effective e-learning deployment.

There have been reports of many other things that make online learning less effective, in addition to problems with connectivity and infrastructure. High Internet costs and bad network coverage made it much harder for students to take online classes. (Gurajena et.al., 2021). Low bandwidth and frequent service outages also made it hard for students to watch online lectures, which made it harder for them to stay interested and keep learning. (Gurajena et al., 2021). There are more problems with practical and experiential parts of education. Hermawan (2021) emphasized that online courses that require lab work or hands-on practice are difficult to deliver effectively online. Students often have problems at home, like noise and distractions, and they get tired from using screens for a long time. Unlike in-person classrooms, long online sessions can cause eye fatigue and shorter attention spans, which makes virtual lectures less effective and shorter. (Hermawan,2021).

Methods

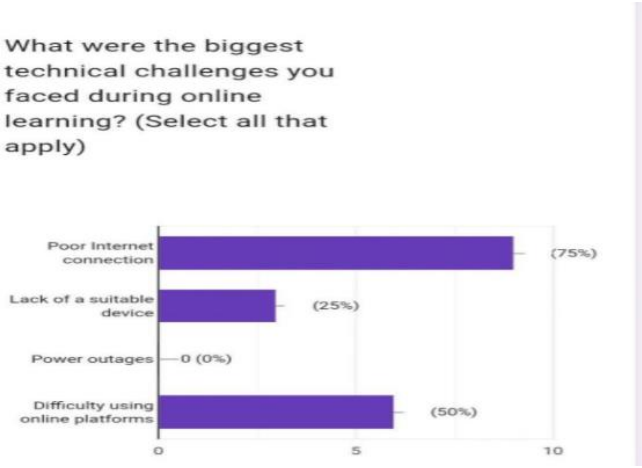
The research applied an online survey methodology to gather quantitative data. A structured questionnaire that contains 11 closed-ended questions, including multiple-response items, was developed to investigate students' experiences and challenges during the COVID-19 pandemic. The questionnaire was delivered online using Google Forms, and all of the answers were collected online.

One hundred students who were already in higher education institutions participated in the study. The information obtained was subsequently analysed using descriptive statistical methods to determine the prevailing trends and challenges encountered by students during the transition to online learning.

Results

The results showed that the biggest technical problem students had with e-learning was slow Internet connections. This was reported as the main problem that kept students from going to online classes, getting learning materials, and engaging in virtual activities.

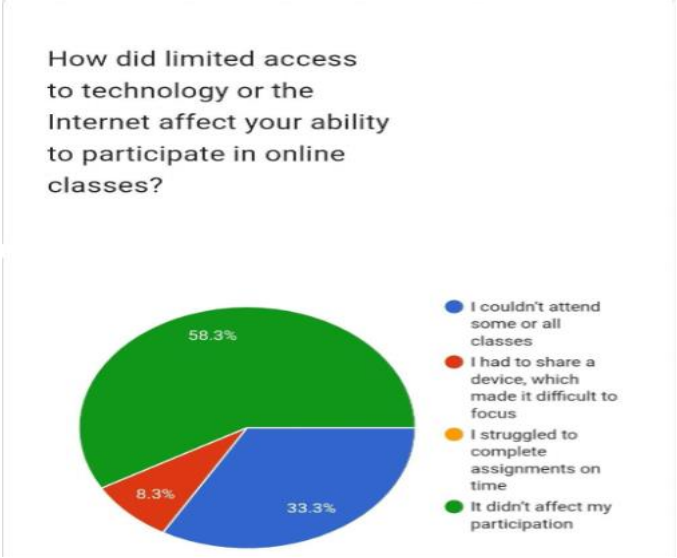
Table 1: Biggest Technical Challenges Faced by Students During Online Learning



The second most common problem was difficulty using online learning platforms, such as not knowing how to navigate them or how to use digital tools. Students also said that they did not have the proper devices, like laptops or tablets, which made it even harder for them to participate in e-learning and made their overall learning experience worse. (Table 1).

A substantial number of students also said that technical problems, like problems with Internet connections, access to devices, and problems with online platforms, were the hardest parts of online learning when questioned about what they found most difficult. On the other hand, when asked, "How did limited access to technology and the Internet affect your ability to participate in online classes?" 58.3% of students said it did not affect their participation, while 33.3% said they were unable to attend some or all of their classes.

Table 2 : How did limited access to technology or the ability to participate in online classes?



Discussions

The current study investigated the obstacles that arose during the COVID-19 epidemic, which made e-learning a difficult task. Our results agree with the findings of other studies: technological issues hinder the success of online education. One significant issue was the internet's connectivity, which was inconsistent. Research has demonstrated that students encounter challenges in attending class, communicating with instructors, and completing their assignments due to internet issues, such as intermittent outages and poor connections.

Students encountered difficulties with online learning as a result of their inadequate access to high-quality laptops and other technological devices. A significant number of students reported that they were unable to access academic resources due to the absence of a laptop or tablet. However, online learning faces many challenges for students who do not have access to the necessary technology. In some households, students lack the necessary devices, which makes their learning more difficult. In this case, students from low-income families are disadvantaged, which limits their chances of getting a high-quality education.

The report shows that instructors and students lack proficiency in using computer technology and other digital technologies. This shows that most students and instructors lack the ability to use technology that can be used to improve online education, and this has been identified as one of the challenges facing online education. Developing digital literacy skills among students and instructors is crucial in improving engagement in online education.

However, the process of learning is often interfered with by various institutional barriers, including the lack of proper infrastructure in various institutions of learning. This was also seen in the comparison of private institutions with public ones, as it affected the ability of the instructors and students to adapt to online learning. Similarly, our study shows that institutions must be ready to offer support to both instructors and students to reduce cases of technical hitches in online learning from home. Institutional support is thus crucial for effective e-learning. The majority of students reported irregular attendance. Nevertheless, more than half of them indicated that lack of access to technology did not influence their engagement. This indicates that the effects of technological constraints may differ from one group of students to another. Further studies need to be conducted to identify individual characteristics affecting students' engagement in online learning.

Implications for Practice

Investment in Digital Infrastructure: Higher education institutions and policymakers need to make expanding reliable internet access a priority. This helps reduce those frustrating connectivity problems and ensures all students can access learning opportunities fairly, no matter where they happen to be located.

Access to Devices: Educational stakeholders must implement real-world initiatives, such as subsidised equipment, device-loan programs, and partnerships with technology companies, to ensure that every student has the digital tools necessary for success.

Digital Literacy Training: It is imperative that we create comprehensive training programs for both students and instructors. These measures can help individuals build greater confidence in using online platforms, digital communication tools, and performing basic troubleshooting when technical issues arise.

Enhanced Technical Support: Institutions need dedicated technical support teams ready to help learners and faculty when issues come up in real time. This is especially crucial during live instructional sessions where timing really does matter.

Conclusions

This study illustrates that the COVID-19 pandemic presented technical obstacles to e-learning, with the most prevalent being an absence of internet access, limited device availability, and low digital literacy. Additionally, these obstacles restricted the daily participation of students and undermined the quality of the online learning experience for numerous higher education students.

It is crucial to remember that e-learning can only function effectively in times of emergency or future crises if there is a strong digital infrastructure, equal access to technology, and a foundation in digital literacy. These factors support the stability of educational institutions and guarantee that students can continue their online education.

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