Leveraging challenges: Advancing digital education in the digital frontier

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ABSTRACT

The purpose of this study is to investigate the difficulties faced by teachers while delivering online classes and to find various strategies to address these concerns. This study also aims to examine the post-pandemic shift toward blended teaching along with traditional methods. The present study utilizes a qualitative approach. The sample of the study comprises teachers in higher education institutions (HEIs) in Punjab. Semi-structured in-depth interviews with 32 teachers were conducted regarding the challenges they face while conducting online classes. The analysis was done using ATLAS.ti version 8. The findings shed light on six different categories of the difficulties faced by teachers: teaching amidst the home setting, assessment and evaluation, students' engagement in online learning, technical problems, personal problems faced by the teachers, and issues related to institutional support. The study also tries to illustrate the transition from online to blended teaching, which has now become a new normal or the 'next normal,' despite the challenges. COVID-19 is one of the most severe issues that humanity has ever encountered. The transition and acceptance process varied across countries, regions, and institutions due to local circumstances and guidelines, but it was undoubtedly a roller coaster for teachers. Different individuals gradually unfolded the challenges. Blended education offers a flexible solution that can effectively address the challenges associated with online education in the post-pandemic era.

Contribution/Originality: The study provides unique insights into the challenges faced by teachers during online teaching and proposes strategies to mitigate these challenges. These insights can be used by academic leaders to resolve problems and also by HEIs thinking about integrating online and blended approaches to improve student learning.

1. INTRODUCTION

COVID-19 is regarded as one of the most severe challenges humanities has ever faced (Alsafi, Abbas, Hassan, & Ali, 2020). Its impact on education was huge, as 1.3 billion students worldwide were unable to attend school or university, and India alone witnessed an impact on 320,713,810 students. The government announced a lockdown (Abdous, 2011; Pather et al., 2020) to restrict social gatherings and meetings to reduce the spread of the virus (Impey, 2020; Panesar et al., 2020). Governments and policymakers worldwide recommended the implementation of online teaching and virtual classes in all educational institutions across the country so that students could continue their studies. A number of digital platforms for students were proposed by The Ministry of Human Resource Development (MHRD) through a press statement issued in March 2020. These platforms included The National Programme on Technology Enhanced Learning (NPTEL), Study Webs of Active Learning for Young

Aspiring Minds (SWAYAM), e-Pathshala, and SWAYAM Prabha, among others. Esteemed educational institutions, such as the Indian Institute of Technology (IIT), Indian Institute of Management (IIM), Jawaharlal Nehru University (JNU), Symbiosis International University, Indira Gandhi National Open University (IGNOU) and Delhi University, offer online courses to cater to their students' educational needs. However, there are still many HEIs in India that may not have access to the necessary technology support, such as Moodle and Learning Management Systems (LMS). Despite this, these institutions made it necessary for the teachers to use digital methods of teaching through platforms such as YouTube, Skype, WhatsApp, Zoom, Google Meet, and Google Hangouts (Joshi, Vinay, & Bhaskar, 2021; Mishra, Gupta, & Shree, 2020). The rise in popularity and evolution of digital education has not come without major obstacles. The shift to online learning during the pandemic posed significant challenges for teachers and students. Adopting the technology and the preparation and execution of the content was a herculean task. When it comes to putting learning strategies into practice, teachers play a crucial role in making efficient use of a range of resources, technology, and instructional techniques to cater to the different requirements of their students. The teachers were not given the required training and resources to overcome the challenges involved in the transition from traditional to online teaching. They had to acquire new skills to use the technology optimally and effectively. They also needed to explore and implement innovative teaching methods suitable for remote instruction, such as creating interactive digital content, utilizing multimedia resources, and fostering virtual collaboration among students. They possess the knowledge to evaluate each student's development individually, pinpoint areas that need work, and modify training accordingly. Additionally, teachers provide a supportive learning atmosphere, encourage teamwork and critical thinking, and give students insightful feedback that aids in the development of crucial abilities.

Digital education also provides an opportunity to explore and leverage the potential of technology in education, leading to the development of new teaching methods, online collaboration tools, and personalized learning approaches. Ultimately, viewing challenges as opportunities allows teachers to embrace change, cultivate resilience, and unlock their full potential for growth and success. The extensive utilization of digital education during the pandemic has reshaped teachers' perceptions of this mode and led to a more widespread adoption of the same in the post-pandemic era, often referred to as the "next normal." As an emerging trend, digital education is poised to become an essential and integral component of education beyond the pandemic.

1.1. Aim of the Study

During COVID-19, pedagogy in academic learning underwent a transition from the conventional method to the contemporary methodology of teaching-learning; from the classroom to Zoom, from the person to the virtual, and from seminars to webinars. But with this massive change came a host of problems and difficulties that needed to be resolved. For educational institutions to fully benefit from asynchronous learning, which works best when done in a digital format, these barriers must be removed. During COVID-19, several authors published papers to address issues with online teaching and learning; nevertheless, most of the studies emphasized student difficulties without considering the viewpoints of teachers. Thus, the current study becomes more significant. Additionally, examining the applicability of online instruction in the wake of the pandemic allows researchers to evaluate how well educational systems have incorporated this new delivery method. The notion of the "next normal" has surfaced, denoting the modifications and adjustments that have been integrated into everyday existence.

2. LITERATURE REVIEW

Digital education has emerged as a transformative force in modern pedagogy, revolutionizing traditional learning models and enhancing educational experiences. Digital education has become increasingly prevalent in HEIs, especially with the shift to online classes. While digital education offers numerous benefits, it also poses unique challenges for teachers. The literature review is thematic in nature and is divided into themes related to the proposed study.

2.1. Digital Education

Digital education is an instructional delivery system and is flexible enough to help in any type of learning through the internet (Haleem, Javaid, Qadri, & Suman, 2022). The terms such as open learning, e-learning, online learning, web-based learning, digital learning, computer-aided learning, blended learning, and m-learning relate to using digital devices connected to a network, giving the users an option to learn from any place at any time (Cojocariu, Lazar, Nedeff, & Lazar, 2014). It offers teachers a way to connect with students who cannot attend traditional classrooms and also assists students who prefer to have control over the speed of their learning (Mishra et al., 2020). Digital learning is considered to have a wide range and reach, even to those areas where the traditional classroom concept is not possible. It is cheaper than a traditional setting as there are no travel, accommodation or other hidden charges (Khan, Nabi, Khojah, & Tahir, 2020). The feature which draws our attention toward digital learning is its adaptability; students have the benefit of selecting a suitable time and can plan their work accordingly to complete tasks (Maheshwari, 2021). The need for online courses arises from a desire to "provide quality education to all students, regardless of location or time" (Chaney, 2001). E-learning involves access to online tech resources that can be used both in and out of class (Maheshwari, 2021). Digital education is learning that takes place entirely online (Oblinger & Oblinger, 2005), and it has become an indispensable part of higher education owing to internet accessibility and adaptability offered by online courses (Khan et al., 2020; Luyt, 2013). The use of digital delivery can offer practical and pertinent methods for achieving learning objectives (Maheshwari, 2021). Factors such as technological aspects, an easy-to-use digital platform, class activities, and assessments influence the success of online learning (Chadda & Kaur, 2021; Wijekumar, Ferguson, & Wagoner, 2006). Digital education uses a vast array of technologies, including wireless and handheld devices, audio and video recordings, computer-assisted instructions, group communications (synchronous and asynchronous), web and multimedia content, simulation and gaming, and collaborative learning (Hiltz & Turoff, 2005). Furthermore, economic challenges confronting many HEIs, as well as students' demands, drive these institutions to focus further on employing digital education (Limperos, Buckner, Kaufmann, & Frisby, 2015). Education is becoming more accessible and convenient for everyone. India is a huge market for higher education, with over 1.5 million schools and 36,000 higher education institutions.

2.2. Challenges of Going Digital

During the pandemic, teachers realized the benefits of using technology for seamless and uninterrupted education for students. They recognized the need for online classes in order to continue teaching from home. Technology-enhanced learning requires the right equipment, expertise, and endurance in the face of unforeseen events (Bao, 2020; Paliwal & Singh, 2021). As teachers navigated through the pandemic, they ran into numerous issues. To achieve their learning objectives, teachers needed to not only employ efficient teaching methods, knowledge, and skills, but also consider external factors such as infrastructure, reliable internet access, digital literacy, and support services that contribute to the success of online learning (Khan et al., 2020; Mishra & Mehta, 2017; Zhang, Wang, Yang, & Wang, 2020). As stated in the study by Abdous (2011) digital education is divided into three stages—before, during, and after the session. This is because learning digitally entails preparing, planning, and designing the lesson in the first phase (*before* phase), followed by the *during* the lesson phase, and finally the *after* phase. These stages necessitate a variety of specialized competencies for every level of online learning and training. The effective use of digital tools and platforms is possible only if teachers possess digital skills, which is one of the major challenges (Joshi et al., 2021). This encompasses skills in digital interpersonal communication, content generation, and data analysis.

Another hurdle, known as technostress, refers to adverse conditions arising from the struggle to manage new technology, which can lead to issues such as addiction and stress (Palvia et al., 2018; Verkijika, 2019). According to a study by Jena (2015) among teachers in Indian higher education, technostress has a detrimental effect on organizational commitment and job satisfaction. The same result was found for K–12 teachers in the US (Califf & Brooks, 2020). Technology-related stress is thought to be fueled by privacy concerns (Ayyagari, Grover, & Purvis,

2011; Lee, Lee, & Kim, 2016). The possible stresses include low self-efficacy, unstable employment, work-life balance issues, information overload, and privacy concerns in the context of e-learning, influencing teachers' choices on how to integrate online instruction (Ayyagari et al., 2011; Chen, Tran, & Nguyen, 2019; Chou & Chen, 2016; Paliwal & Singh, 2021; Qi, 2019).

Another significant challenge is the issue of students' engagement and motivation in the digital learning environment (Maheshwari, 2021). Teachers must find innovative ways to foster collaboration, provide timely feedback, and maintain student interest. They also face the challenge of addressing the digital divide, ensuring equal access to technology and internet connectivity for all students. Hara and Kling (1999); Petrides (2002) and Vonderwell (2003) pointed out that learners are laid back when it comes to responses in digital environments, which can hinder their learning progress. Furthermore, Petrides (2002) raised doubts about the expertise of peers in online discussions, potentially affecting the quality of interactions. Feelings of seclusion and a lack of belonging have been identified as barriers by Woods Jr (2002) and Vonderwell (2003). Difficulties in collaborating with peers and technical issues have been highlighted by Piccoli, Ahmad, and Ives (2001) and Song, Singleton, Hill, and Koh (2004). In addition, challenges related to teachers, such as inadequate support or guidance, have been discussed by Muilenburg and Berge (2005). Higher student attrition rates have been observed in online learning, according to studies by Petrides (2002) and Muthuprasad, Aiswarya, Aditya, and Jha (2021). Furthermore, some researchers have explored the emotional and psychological impact on teachers, such as increased workload, isolation, and the need for continuous professional development to keep up with evolving technologies (Muthuprasad et al., 2021).

2.3. Digital Education in Post-Pandemic Era or the 'Next Normal'

In the past, traditional in-person instruction predominated, with teachers and students interacting directly in classrooms. However, the advent of the internet and technology has allowed for the transition to online learning, providing distant access to educational resources as well as virtual communication and teamwork. The global health crisis intensified the already rapidly expanding trend of online learning (Martin, Budhrani, Kumar, & Ritzhaupt, 2019; Twist, 2021). The transition from offline to online learning, and eventually to blended learning, has been a significant progression in the realm of education. Hybrid courses, also known as blended courses or mixed-mode instruction courses, combine elements of both face-to-face and online learning (Dziuban, Graham, Moskal, Norberg, & Sicilia, 2018) and are often regarded as one of the most effective forms of online learning (Dziuban et al., 2018; Hiltz, 1998; Khan et al., 2020). It is believed that blended learning facilitates deeper learning experiences for students by offering a balance between in-person engagement and the flexibility and reinforcement provided by the online environment. With the onset of the "next normal" following COVID-19, digital education is anticipated to maintain its significant role. Online learning will coexist with traditional education by combining artificial intelligence and mobile education, providing a wider range of educational opportunities, advancing educational equity, and fostering innovation in the field of education (Xie, Siau, & Nah, 2020). By utilizing cutting-edge technology, such as artificial intelligence (AI), augmented reality (AR), and virtual reality (VR), higher education institutions are embracing creative online teaching methods on a growing basis (Stephanidis et al., 2019; Wang & Siau, 2019). AI is used in many parts of education, such as proctoring tools and automated grading systems. VR-based education offers students immersive educational opportunities, including virtual field trips to explore landscapes and cultural experiences. A study in Bangladesh mentioned that blended learning has the potential to enhance the effectiveness of teaching and learning. Therefore, it is important not to allow online learning to diminish after the pandemic. In fact, online learning has unveiled new opportunities and possibilities for teaching and learning activities (Al-Amin, Jahan, Rabbi, & Islam, 2021).

Online courses and hybrid education are expected to be critical factors in ensuring the long-term sustainability of numerous universities. High tuition fees often deter many students from pursuing higher education. However, through digital education, universities have the potential to reduce the cost of operations and broaden their reach to cater to students who reside in rural areas or different countries. By offering more affordable and accessible learning

options, institutions can attract a more diverse and global student body, securing their viability in the evolving landscape of higher education. The future of education will be significantly impacted by technology. Even prior to the COVID-19 pandemic, global investments in educational technology reached approximately US$18.66 billion in 2019. The online education market is expected to grow substantially, with projections indicating that it could reach a value of US$350 billion by 2025.

2.4. Research Questions

This study aims to address the following questions by exploring the key obstacles encountered by teachers in the realm of online instruction and examining the prevailing trajectory of blended learning methodology.

RQ1: What specific challenges did teachers in HEIs in the state of Punjab face while conducting online classes during the COVID-19 pandemic?

RQ2: In the post-pandemic era, what strategies and approaches have teachers and educational institutions adopted to transition from online education to blended learning?

2.5. Objectives of the Study

- To identify and categorize the barriers encountered by teachers while delivering online classes.
- To explore potential ways to mitigate these challenges and adapt to the transition to blended learning in the post-pandemic era, considering the "next normal" in education.

3. METHODOLOGY

The study used a qualitative research approach since it was an exploratory examination into a new field of study that produced a hypothesis (Miles & Huberman, 1994). In cases where the research is exploratory in character, an explanatory research design is thought to be more suitable for addressing the research purpose. The current study examines the challenges associated with online instruction and testing during the COVID-19 era, when teachers were required to deliver instruction and administer tests from their homes because of lockdown procedures.

3.1. Sampling

The study was conducted among the teachers working with the higher education institutions in the state of Punjab. Firstly, all the universities recognized by the University Grants Commission were enlisted. Out of these, the top 10 universities ranked by the National Institutional Ranking Framework (NIRF), the Ministry of Human Resource Development (MHRD), and the government of India, were selected. Data was gathered through semi-structured interviews with 32 teachers. Out of the 32 participants, 18 held postgraduate degrees, while 14 had obtained a PhD degree. The group consisted of 17 males and 15 females, all aged between 30 and 57, each possessing a minimum of five years of teaching experience. A semi-structured interview style was determined to be the best qualitative research methodology (David & Sutton, 2004) to use in the current study. The sample comprised teachers from different academic fields such as Engineering, Science, Commerce, Humanities and Management. The number of participants for the current study were chosen based on the recommendation of between 5 and 25 respondents made by Creswell (2012).

3.2. Data Collection

Creating the questions for the semi-structured interviews was an essential part of the study preparation. There were no limitations or restrictions for asking open-ended questions. Ten experts from various fields, including science, engineering, management, and social science, vetted the questions. Adaptations were made based on their comments. The interviews were conducted via phone conversations, in-person meetings, Zoom, and other platforms. The duration of each interview ranged from 25 to 54 minutes, with audio recordings made for documentation purposes.

At the initial stage, teachers were presented with specific questions covering aspects including the transition from face-to-face to digital teaching, challenges faced in online teaching and assessments within a home environment, and the support provided by universities for online teaching and assessments. Suggestions were also sought from the teachers on how digital education can be made more effective despite the challenges.

3.3. Data Analysis

Based on Moustakas (1994) and Smith and Osborn (2003) the following steps were involved in the analysis of interview data:

- Step 1: All of the interview records (verbatim transcripts) were carefully read, and a list was made of any terms or phrases that could be used to identify obstacles to online instruction and assessments in home settings.
- Step 2: Notes were made based on the verbatim transcripts, specifically noting any developing themes on the transcripts.
- Step 3: Developing themes were noted down separately from the transcript as they were discovered. These themes were further examined for correlations, distinctions, and similarities before being grouped into clusters.
- Step 4: Identical themes were grouped together and were assigned well-defined higher-order labels. All of the study's interviews were carried out using this method.

The Ryan and Bernard (2000) cutting and sorting procedures were applied to detect impediments in online education and evaluations to ensure transparency and correctness. The data was separately coded by both authors, and the process was validated with an internal consistency of 86%. The identified themes were thoroughly debated until there was consensus.

Table 1. Coding descriptions.

S. No.	Code	Description	Example (Statements from data collected)
1	Teaching amidst the home setting	Explains the problems that teachers faced while teaching from home	• "I do not have a soundproof room in my home. External distractions, such as street hawkers and traffic noise, are not in my control". • "People have a tendency to walk into your home without even knocking, and my child was a continuous disturbance".
2	Assessment and evaluation	Expresses the challenges encountered by teachers while checking assignments and invigilating exams using a digital platform	• "Students copied, pasted and submitted the assignments." • "Reading was not easy from the screen. Taking printouts was not very effective."
3	Students' engagement in online learning	Reasons behind the drop in the level of engagement of students	• "The students are in that stage where they feel no one is watching them. They were in a lackadaisical mode and became passive listeners". • "They don't participate as they are engaged in too many things going on in parallel, they are in their comfort zones".
4	Technical problems faced	Point out the issues related to transitioning to online teaching	• "Internet connection was not stable as it is subject to weather disturbances". • "The platform that I was using was not compatible with Windows 7".
5	Personal problems faced	Health concerns of the teachers as the screen time went up, increase in the expenditure of the family	• "Screen time went up, eye strain became a problem, a migraine developed eventually". • "Integrating a practical or skills-based course online was a challenge".
6	Institutional support	Were the institutions/ universities able to provide all the necessary support to the teachers?	• "The institution should have included a nominal amount in the budget for teachers who are not from a sound economic background." • "We have to arrange for our own gadgets".

Table 1 represents the codes assigned to the challenges faced by the teachers along with their descriptions. Pertaining to these codes are examples of the statements received during data collection.

4. RESULTS & FINDINGS

The findings of the study shed light on the problems and difficulties faced by teachers when delivering online classes by employing different technology platforms and gadgets. This includes concerns regarding the comfort of navigating the digital platform, expensive internet plans, disobedient students, low student attendance, confidence of teachers in handling technology, dearth of educational resources, scarcity of Information and Communication Technology (ICT) expertise, and subpar network infrastructure. The findings have been grouped into six broad categories, termed as themes. These are: teaching in a home setting, assessment and evaluation, students' engagement in online learning, technical problems faced by teachers, support provided by the institutions for online teaching and assessment, and problems faced by the teachers at personal level. They also made suggestions on how to mitigate the problems faced. These themes are further elaborated upon hereunder.

4.1. Theme 1: Teaching Amidst the Home Setting

Factors that affect online teaching while at home included lack of basic facilities, such as whiteboards/blackboards, markers, and printers. In the home settings, these items were not accessible to teachers. Some respondents stated that it was difficult to interact with students via video conferencing in the absence of such facilities. Outside distractions, such as street hawkers, neighbors, street dogs, traffic noise, visitors, etc., were other concerns. One respondent said, "Continuity and lecture preparation get affected with such noises and distraction. The chances of making mistakes while evaluating the assignments on the screen were high." Interruptions from family members and pets were high, as space is limited in a home setting. In the words of one respondent, "As I was taking the classes from home, I was assumed to be available to my family, hence I was interrupted many times during the class." Another reported, "I live in a rural area, so internet connectivity in was a big concern".

4.2. Theme 2: Assessment and Evaluation

Teachers prefer to check the hard copy of assignments as it is easier. But "because of the limited available resources, somewhere the evaluation was compromised" said one instructor. "The assessment was time bound. There are due dates for submission and evaluation. Due to internet connectivity issues at times, the deadlines were not met," reported an instructor from a government university. One said, "Students were cheating and copying from one file and pasting into another. Honest students were at a loss because of this." Students' evaluation was difficult as reading was not easy from the screen. One respondent said, "Reading, understanding, assessing, and deducing are all necessary to evaluate an assignment, but constant discussion at home disrupts the flow and causes dissatisfaction." Online assessment was one of the biggest challenges that teachers faced.

4.3. Theme 3: Students' Engagement in Online Learning

A crucial aspect of digital education is students' engagement, i.e., keeping them involved and engaged throughout the class. One respondent stated, "The students were not interacting in the class. They just joined the class for attendance and remained non-responsive. The engagement level was very low." Another shared, "There are different reasons for students' non-participation, one of them is the connectivity problem, another is having a rural background as students remain busy with field work". One mentioned, "The students' engagement was very good initially as everybody was excited. But after 10–15 days, it dropped. The students reached a stage where they felt that no one was watching them. They were in a lackadaisical mode and became passive listeners". Another said, "Students' engagement was poor, very poor. Merely one or two students used to speak. It was difficult to engage large groups online. Only those students who could relate with the subject were participating." The analysis also revealed that the engagement depended upon the time of the class; for example, in the morning, the engagement level was excellent. Later in the day, it dropped. Engagement also depends on the teacher to a great extent. "A teacher can make or break a class. An instructor needs to bring a personal touch by using students' names," said another respondent.

4.4. Theme 4: Technical Problems Faced by the Teachers

The teachers faced various technical difficulties while transitioning to digital teaching. Poor or unreliable internet connectivity was a significant issue. Teachers often struggled with slow internet speeds, dropped connections, or complete outages, which disrupted their ability to deliver online lessons effectively. As per one respondent, "Technical difficulties were faced during online classes, and sometimes I had to cancel my class due to electricity supply issues or sites crashing due to high traffic." Teachers had to quickly adapt to new digital platforms and tools that they were not familiar with before the pandemic. One teacher stated, "I faced various technical issues during live sessions, such as audio or video synchronization problems, freezing screens, or difficulties sharing content. These disruptions interrupted the flow of lessons and made it harder to engage with students effectively". Also, online teaching introduced new privacy and security concerns for teachers. They had to navigate data protection regulations, ensure the safety of student information, and manage online classroom environments to prevent unauthorized access or disruptions. As shared by one respondent, "I was apprehensive about using an open-source platform as it is not safe. A student could share the link for the class and may even share resources with an outsider, who knows!" Teachers using institution-supported technologies had clarity regarding the designated teaching platform. However, confusion arose among teachers utilizing open-source software, as they faced uncertainty regarding the most suitable digital platform for delivering their lectures.

4.5. Theme 5: Personal Problems Faced by the Teachers

During the shift to online teaching, teachers faced several personal problems. The most common of all was related to health. One shared, "There was strain on my eyes at all times, and I eventually developed a migraine". Another reported, "I do not have an ergonomic chair. I began by sitting at my desk and later transitioned to my recliner, which resulted in numerous medial issues". The transition to going digital often blurred the boundaries between personal and professional life. Teachers had to manage their workload and ensure that they had time to plan lessons while also tending to their personal responsibilities and family needs. One teacher responded, "Scheduling time for personal work and lectures was tough. Moreover, I am not technically sound and always looked for support during classes. This eventually wasted class time. I experienced technostress due to lack of technical knowledge". When asked about the course integration with technology, the course instructors seemed negative, as some courses taught by the teachers were skill-based or purely lab-based. As mentioned by a respondent, "Experiments are to be done in lab. How can you expect me to exhibit chemical reactions while I am at home with no access to lab equipment? This is purely insane." Students need practical exposure, which was not possible in online teaching, hence for practical courses, face-to-face interaction is required. Teachers also missed the social connections and support typically found in the school environment, which led to feelings of isolation and loneliness. Most of the respondents said that teaching from a home setup was an additional burden on the pocket. "There are six of us at home, out of which three are working professionals and other three are school-going children. Imagine the cost we are incurring every month on mobile data and the gadgets we are using", said one respondent with pain.

4.6. Theme 6: Institutional Support

During the shift to online teaching, teachers received various forms of institutional support to help them navigate the challenges and ensure effective online instruction. However, in some cases, no support was extended. "I did not have immediate access to technical support or IT professionals who could assist me in resolving technical issues", said one respondent. This lack of support further compounded the challenges faced during online teaching. "The institution should spend money on a licensed platform to ensure security and effective teaching. It was a pain to teach using open-source platforms", reported another. Institutions organized training sessions and professional development programs to help teachers acquire the necessary skills and knowledge for online teaching. These sessions covered topics such as using online platforms, implementing digital tools, creating engaging online content, and

managing virtual classrooms effectively. However, a few teachers were deprived of basic product training. One said, "The transition was very sudden, and there was no time to think and act. We only got a WhatsApp message in a group stating that classes will now be online. I doubted myself as I am not trained to teach online". Another said, "I had a problem designing online quizzes for students using some free software, so made multiple errors while running the quiz and felt embarrassed". However, a handful of respondents acknowledged that their institutions provided them with access to digital libraries, databases, and online learning materials to supplement their online teaching. This ensured that teachers had a wide range of resources to enhance their lessons and provide students with additional learning materials.

4.7. Suggestion to Mitigate the Challenges Faced by Teachers

During the interviews with the participants, a specific question was posed regarding their perspective on how to mitigate these challenges to ensure the effectiveness of online classes. The teachers were receptive and forthcoming in sharing their thoughts on this matter. The suggestions as reported by a few respondents are as follows:

- "If appropriate and adequate infrastructure is provided and proper training is given to both the teachers and the students, online classes are going to be more effective".

- "If the students are responsive and interactive in the class then we can continue having online classes. However, if students are not participating then it is difficult to engage them. In such a scenario, offline/face-to-face instruction works best. Otherwise online is preferable."

- "Highly engaged content for the students is required and wonders can happen".

- "Every institution should develop its own digital platform rather than using Zoom and Google Meet. This will make digital education more effective and serious".

- "It is important to orient the students first and understand the age of the learner. Maturity plays a huge role."

- "The country talked a lot about digital education but did not take it seriously. There should be some guidelines from the government to combat these exigencies. All responsible stakeholders need to come forward and collaborate. Extensive training for students is also required."

- "First of all, teachers need to realize that this online system is not by choice. It is more like a compulsion and should be addressed as such. Nor it is the teacher's fault; the students also have to realize this. A teacher has to understand that a class is a class whether online or offline, the job of the teacher doesn't change".

- "The institution should set clear ground rules. All students with their webcams on can really help in effectively conducting online classes."

In the light of the suggestions received from the respondents, it was deduced that, despite the unexpected nature of the transition, teaching through digital modes was generally seen in a positive light by teachers in universities. While there may have been some initial concerns and reservations about the effectiveness and quality of online teaching, the circumstances compelled teachers to make the best use of available technologies and tools. As seen from the suggestions received, most of them mentioned students' engagement in an online environment, appropriate training for teachers and students, the university's own learning platform, and policy formulation at both the state and national levels. The shift to digital teaching required teachers to develop new skills related to technology integration, online pedagogy, and effective communication in virtual environments, which can be done through product training. Additionally, this forced professional development led to the acquisition of valuable digital skills that can enhance teaching practices in the long term. As a result, what began as an improvised response evolved into best practice over time. This transition was unplanned and reactive, as institutions scrambled to find viable solutions to continue providing education while ensuring the safety of their students and staff. As time progressed and institutions gained more experience with digital teaching, many teachers discovered innovative strategies and approaches that maximized the benefits of digital education. While there may still be challenges and limitations associated with digital instruction, the initial unplanned transition paved the way for a more deliberate and thoughtful

integration of technology into the educational landscape. It is now recognized that digital modes of teaching can complement traditional classroom-based instruction and offer additional opportunities for personalized learning, student engagement, and educational inclusivity.

5. DISCUSSION

When the universities had to quickly shift to online instruction, many institutions were unprepared to provide the necessary resources, training, and infrastructure to adequately support their teachers (Azevedo, Hasan, Goldemberg, Geven, & Iqbal, 2021). The sudden shift to online teaching highlighted the need for clear and consistent communication channels between institutions and teachers. However, inadequate communication and guidance from the institution made it challenging for teachers to align their teaching practices with institutional expectations and policies. During the transition phase, teachers lacked confidence while dealing with new technology. With the multitude of available options, each with its own features and limitations, teachers had to carefully evaluate and decide which platform best suited their specific teaching needs and the requirements of their courses. They had difficulties working with technology platforms, setting up online classrooms from home, dealing with technical glitches, and learning how to effectively use digital tools for teaching (Shenoy, Mahendra, & Vijay, 2020).

Maintaining students' attention and engagement during online classes also presented a significant challenge. Students showed reluctance to participate, often keeping their webcams turned off. Teachers had to devise inventive methods to maintain students' motivation, ensuring both effective communication and active participation throughout the class.

The shift to online teaching often blurred the boundaries between work life and personal life. Teachers faced the challenge of balancing their workload to make time for lesson planning, grading, and engaging with students, all while juggling personal responsibilities and family commitments. Managing online classes was challenging and demanded additional preparation and workload (Banihashem, Noroozi, den Brok, Biemans, & Kerman, 2023).

The above analysis of the findings depicts how tumultuous it was for teachers to deal with tough times that challenged their skills, competencies and technical expertise. But the study does not end here. The authors aim to transport readers to a bygone era in order to establish connections and correlations.

India is as an incredible nation embracing a rich tapestry of cultures, languages and traditions, which is beautifully reflected in its diverse educational system. Over the years, like in many other aspects of life, the educational system in India has undergone significant transformations to adapt and evolve. With the advent of technology, the approach to teaching and learning has radically changed from Gurukuls, where the Guru-Shishya system was prevalent in an open space under trees, to a four-wall classroom with blackboard and chalk, to a class with a whiteboard and markers, to an air-conditioned classroom with an interactive whiteboard and presentation aids, such as LCDs, to the present time where not only smart classes with touch screens are used but multiple learning apps are available in abundance. In addition, the concept of online schools and universities has also been in place for several years. Classrooms are no longer the same as they once were. The rapid advancements in technology over the years have significantly transformed the landscape of education, necessitating extensive research on how learning has been influenced by emerging technologies (Xie et al., 2020). Interestingly, the pandemic accelerated these changes, bringing about transformative events much earlier than expected.

The outbreak of COVID-19 compelled a widespread transition to online education during the pandemic. This sudden and global shift showcased the immense potential of online education. Students who may have previously faced barriers, such as geographical distance, physical disabilities, or the exorbitant cost of studying in a reputed institution, suddenly found themselves able to access quality education from anywhere. Online learning has played a significant role in opening doors to cross-border learning, enabling students and teachers to transcend geographical boundaries and engage in educational opportunities beyond their local institutions.

The use of ICT and online learning as a required component of tertiary-level teaching and learning has received substantial attention from the Indian government. To facilitate online learning, the government initiated the Study Webs of Active Learning for Young Aspiring Minds (SWAYAM) program, a Massive Open Online Courses (MOOC) platform offering courses in various subjects. Another noteworthy initiative by the MHRD is the e-PG Pathshala, managed by the University Grants Commission, which provides curriculum-based and interactive e-content across 70 subjects in all disciplines (Mishra et al., 2020). Also, the government of India has introduced a comprehensive initiative called PM e-VIDYA, aimed at bringing together various initiatives related to digital education, benefiting approximately 25 crore learners across the nation. Online lecture materials reach a global audience, breaking barriers of geography and promoting accessibility to educational resources without extensive travel. These materials can be easily updated and revised, ensuring that students have access to the most current information and resources. This adaptability helps to maintain the relevance of courses and ensures that students are learning the most up-to-date information. Nowadays, online doubt-clearing sessions, where students can seek clarification and guidance from teachers or peers are in practice in many institutions (Alam, Ahmad, Shahab, & Anjum, 2023).

Online education has become a mainstay in learning. As the world continues to navigate the post-pandemic landscape, a blended approach to education, combining online and in-person elements, may be the way forward to harness the benefits of both methods and cater to the diverse needs of learners. Lockee (2021) emphasizes the importance of the blended approach, which allows educational institutions to leverage the best of both worlds and provide a more versatile and inclusive learning environment for students.

Students, teachers, institutions, and universities made the transition from offline to online in their own time as it was sudden and no one was fully equipped. However, if any crisis or natural disaster happens again, the transition will be easier as we have already had the experience of going digital. According to recent research conducted by Fang, Pechenkina, and Rayner (2023) the implementation of online education in higher education settings may bring about certain challenges. Despite these difficulties, the advantages it offers for education cannot be disregarded, particularly in the post-pandemic era. Therefore, the findings of these studies underscore the importance of considering online education as a viable and valuable option to meet the evolving needs of higher education in the future. While physical classrooms have regained their prominence as the pandemic has subsided, the lessons learned during this time will continue to shape and influence educational practices. By leveraging the lessons learned from this experience, we can strive to create a more equitable, flexible, and future-ready education system in the post-COVID era.

5.1. Implications and Future Direction

The findings of the study can offer valuable insights to HEIs that plan to blend digital education with face-to-face classes and are considering the permanent integration of online teaching into their regular practice by offering specific courses to enhance the skills and competencies of students by making them employable and industry ready. The study highlights the need for better internet connectivity, learning management systems, and tools for online collaboration. Ensuring that the technological backbone of education is robust and accessible is essential for successful online integration. The study also found a new perspective for future research. As this study focused on HEIs, future research in this direction could target teachers in primary and secondary schools. Another interesting possibility could be presenting the approaches/suggestions received from the teachers to the Head of Academics/senior functionaries of the institutions to get their opinion on the most effective suggestion that can be implemented to mitigate the challenges of online teaching. Also, the present study is limited to the state of Punjab, so similar studies in the future can be conducted in other states or countries and the findings can be extended.

6. CONCLUSION

The acceptance of the transition has varied among different countries, regions, and institutions due to local circumstances, guidelines, vaccination rates, and institutional capabilities. After widespread vaccination, educational

institutions transitioned to blended learning formats, combining elements of online and offline education. Blended education offers a flexible solution that can effectively address the challenges associated with online education in the post-pandemic era (Banihashem et al., 2023). While some institutions resumed in-person classes, others provided the option for both offline and online instruction. However, the acceptance of this paradigm change has been mixed. While some students and teachers welcomed the return to in-person classes, appreciating the social interaction, collaborative learning, and networking opportunities that it provides, others expressed concerns regarding safety, particularly in regions where the virus was still prevalent at the time. The teaching fraternity across the globe faced challenges in adapting to technology during online classes. Overcoming these challenges requires a combination of technological proficiency, pedagogical adaptation, and a student-centered approach. Adequate support, training, and resources should be provided for teachers to help them navigate the complexities of online teaching and enhance the quality of digital education in HEIs. The future remains uncertain, making it imperative to establish standard operating procedures at both national and global levels for institutions, teachers, and students. These guidelines would serve as a proactive approach to tackle unforeseen events, such as natural disasters, allowing everyone to adapt swiftly and efficiently to such situations.

The literature pertaining to the future of education in the post-pandemic era indicates that blended education has emerged as a promising, balanced, and adaptable approach. This integration of online and face-to-face learning provides an opportunity to create a more comprehensive and enriched educational experience that caters to the evolving needs of students and teachers in the "next normal".

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