Challenges in Implementing Online Examination amidst COVID-19 Pandemic

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Abstract

The COVID-19 outbreak led to a remarkable shift in teaching methods, forcing educational institutions to swiftly move from physical classrooms to digital platforms. In this regard, E-examinations became a crucial mode of evaluation during pandemic. This research aims to explore challenges faced by educators in higher education institutions, and examine potential gender-based differences in perceived difficulties. From 51 Higher Education Institutions (HEI) in West Bengal, 116 teachers (49 female and 67 male) participated in the study. Using Google Forms, data were collected and analyzed with six distinct codes to categorize the challenges expressed by the teachers. During online examinations, six major challenges encountered were: managing answer scripts and administering exams, invigilation and evaluation, network connectivity, overall planning and implementation, and technological equity and access. Predominant tools used for online examinations: laptops, mobile devices, and computers or tablets. Primary challenges highlighted by teachers are mainly: administration of examinations and management of response scripts and the ethical implications of online examinations. This research offers insights highlighting the need for further in-depth research, possibly integrating qualitative or mixed-methods approaches. The implications of these findings may inspire practitioners, and policymakers to enhance online examination procedures with cutting-edge tools and techniques. Moreover, the study strongly advocates for crucial measures to address identified challenges, fostering a seamless and equitable online examination experience for educators and students.

Keywords: *COVID-19, online examination, digital device, digital tools and techniques, digitalized examination system*

Introduction

The COVID-19 pandemic has brought about significant changes in teaching and learning methods worldwide, affecting over 500 million students in India alone (Gupta & Tiwari, 2020). With traditional education systems disrupted by lockdowns, academia worldwide recognizes the potential of technology to facilitate teaching and learning during these challenging times. The sudden closure of schools, colleges, and universities forced a rapid shift to online and digital education formats (Martinez, 2020). The appropriate method of evaluation, one that ensures the students' safety and wellbeing, is the practice of administering tests online. Examinations could not be held at many academic Institutions; instead, students were promoted based on how well they had performed in earlier internal or half-yearly examinations (Rawat, et al., 2021).

E-examinations have demonstrated a more significant potential in terms of being advantageous to the students during the COVID-19 outbreak, used as the sole method of evaluation. It was discovered that, provided authenticity, security, and flexibility are used as key principles in the effective implementation of e-examinations, online examination is particularly pertinent for formative assessment of learning as opposed to summative assessment (Tuah & Naing, 2021). Due to the sudden emergence of COVID-19, researchers reveal that the faculty are facing issues and challenges like lack of online tutoring experience, preparation, or support from an educational technology as it requires lesson plans, different teaching materials like audio, video material, and technology support (Bao, 2020; Sahito, Shah, & Pelser, 2022).

The major problems identified are low internet access and lack of proper ICT skills (Sahito & Chachar, 2021). The challenge associated with online learning is access to ICT resources, as e-learning thrives on the availability of ICT facilities (Arthur-Nyarko & Kariuki, 2019). Not only the routine classes, but also, the assessment processes have been moved online. The majority of the teachers from different Higher Education Institutions (HEIs) confronted various challenges in conducting online examination. In spite of that, there may be doubts regarding the preparedness of stakeholders, designing and effective implementations of the online examination process are not addressed appropriately. In this regard, India may be the example as a, developing country, where technological constraints such as the digital divide, poor internet connection, poor bandwidth, costly internet pack, and etc. may pose serious challenges. Since the uncertainty regarding the re-occurrence of the pandemic and similar emergency may not be ruled out, educational institutions are required to be prepared to shift to online or hybrid mode in case of unforeseen circumstances.

Once the pandemic is over, using online platforms in education system may emerge as one of the potential alternatives to the conventional mode of teaching-learning system. In this regard, blended mode or hybrid mode may be considered for more effective and productive mode. With this backdrop, the present research embarks upon a journey to explore if any challenge encountered by the teachers from different higher education institutions in conducting online examination. The findings of the present study may persuade the stakeholders, practitioners and policymakers of education for enhancing the effectiveness and accuracy of the online examination procedures by embracing innovative tools and techniques and to take on essential measures to dispense with these difficulties so that the online examination process can be more effective and robust.

Evolution of Online Examination

The traditional paper-pencil test has been a longstanding method of student evaluation in education. With the advancements in educational technology, a variety of examination formats, including computer-based exams, electronic examinations, examinations taken on bring-your-own-device, and other types of digitalized examination systems, have been introduced to provide new opportunities for the inclusion of innovative pedagogies and assessments. However, each of these test types is given with a purpose to carry out a specific evaluation as: placement; formative; Summative; Prognosis and Diagnosis. With the outbreak of pandemic, the education industry has witnessed a sudden pedagogical shift in the traditional teaching-learning process towards e-learning to cope with the crisis situation posed by COVID-19 (Siddiquei & Kathpal, 2021). The approbation of online teaching in the onset of COVID-19 pandemic in India was unplanned and done in a helter-skelter way. Further, online teaching in India is suffering from lack of customised tools for online teaching, assessment and monitoring students' engagement and feedback on a continuous basis (Mishra & Shukla, 2021). The education system was obligated to reinvent itself to handle this unparalleled challenge. Earlier e-learning methods were majorly used in non-formal education and distance education programmes. However, COVID-19 has compelled formal institutions to embrace e-learning, as maintaining social distance. The Government of India (GoI) promoted online teaching to ensure the continuation of learning even during the lockdown (Kumar & Pande, 2021). The relevant authoritative regulatory authorities, including as the MHRD, UGC, CBSE, etc., issued several circulars, notices, and letters demonstrating their considerable care for students, teachers, and other stakeholders of education (Gupta & Goplani, 2020). In the initial phase of lockdown in 2020, the educational institutions were not fully prepared for online mode. Hence, teaching-learning process was asynchronous i.e., without real-time contact (Lapitan et al., 2021). The course content, study material, homework, etc. were shared through various digital platforms like WhatsApp, YouTube, Google Classroom, Moodle, and Learning Management Systems (LMS) of educational institutes (Pokhrel & Chhetri, 2021). Without losing much time, the HEIs switched to synchronous mode with the help of different applications like Zoom, Google Meet, Blackboard, Skype, Cisco WebEx, and etc. Subsequently, evaluation of students was attempted to conduct in virtual mode.

Challenges in Online Teaching and Assessment

The sudden shift to online education posed challenges for teachers and students alike, including asynchronous teaching methods initially and later synchronous modes using various digital platforms (Adnan & Anwar, 2020; Bdair, 2021). Since the teaching-learning gets shifted to online platform, so does the evaluation process that completes the cycle. In this regard, the term "Online assessment" is defined as web-based or technology-based assessment and is more difficult than traditional assessment. In this process, students' attendance, timely submission of assignments and active participation in various curricular activities are monitored in the technological environment (Ayo et al., 2007).

Adoption of Online Education Globally

The teaching-learning and assessment on online mode were implemented long before the COVID-19 pandemic. However, it was considered as a non-formal education and conducted for a limited number of programmes. With the outbreak of Covid-19, online education became the new normal and implemented in different programmes and across different HEIs. Increasingly, more sophisticated tools had been employed for efficient lesson delivery, including Neo, Zoom, Start.me, Google Classroom, Shift, Ted-Ed, Lan School, Blackboard, Edmodo, Class Dojo, Outs, We Video, and many others (Mishra et al., 2020). To promote online mode of teaching-learning, online libraries, television broadcasts, guidelines, resources, lectures, and video channels were accessible in at least 96 countries (UNESCO, 2020). In this digitally advanced era, various types of digitalized examination system have been devised. However, these available examinations are mainly employed for non-formal and distance education programmes. During COVID-19 pandemic, HEIs had to adopt online examination system almost for all academic programmes. This transition was not very smooth and the teachers faced various obstacles in conducting those online examinations. But, with time, more advanced tools and techniques were being developed and employed for effective online examination.

Challenges Faced by Students and Teachers

Students in India faced challenges beyond technological infrastructure, including psychological well-being (Pandita et al., 2021). The challenges for attending the online education identified by various researchers are, mainly, infrastructure, computers, internet connectivity, and maintenance of infrastructure network (Siddiquei and Kathpal, 2021). The major factors identified for foreseen determinants are: instructors, institution, students or learners, infrastructure, content factors, and motivational factors. On the other hand, the challenges experienced by the teachers are sudden shifting from offline to online; communication related issues during online class; preparation for the class and suitable teaching style. Regarding the institution, the challenges are training for teachers and taught; technical and multimedia support; technical troubleshooting team; and online counselling sessions (Panisoara et al., 2020). The key issues related to the students are identified are digital competency to learn online; network and uniformity of speed; and identity of the students, interaction and participation in classroom. Teachers have the psychological issues regarding the motivation; scrutinizing the assignments; family support, mental and emotional peer support and feedback from students.

Moreover, the technological issues are no less important and identified as: network issues and internet speed; digital device; easiness in use; and software or e-learning tools for online teaching (Adnan & Anwar, 2020; Bdair, 2021). With an online learning model, the faculty and students state that they are unable to teach and learn both practical and clinical subjects (Mukhtar et al., 2020). There is no immediate feedback, teachers cannot assess students' understanding during online lectures, students have limited attention spans and are intense toward online learning characteristics, misbehaviour of students and tendency to access the online literature during evaluation (Mukhtar et al., 2020). Due to the sudden emergence of COVID-19, the faculty members are facing issues and challenges like the lack of online tutoring experience, pre-preparation, or support from an educational technology as it requires lesson plans, different teaching materials like audio, video material, and technology support (Bao, 2020). The survey by Bhowmik and Bhattacharya (2021), among university students in West Bengal reveals that students feeling of isolation with boredom and frustration are found the most influential aspects in online learning. Further, Infrastructure and examinations are institution related factors which affect students' online learning. The researches point that the challenges faced by the faculty are connectivity; internet access in various geographies; learning environment for online teaching/learning; limited knowledge of digital device and online teaching among teachers (Sahito., Shah & Pelser, 2022). Further, the survey among faculty, in Jordan, finds the challenges in adapting to online education, especially for students with special needs (Almahasees, Mohsen, & Amin, 2021).

Strategies for Addressing Challenges

Efforts to address these challenges include encouraging student participation, providing support for communication, and creating positive study environments (Rayan, 2020; Kapasia et al., 2020). Moreover, the student-teacher (or trainee teacher) states the challenges as lack of sustainable communication and support; and frustration about the communication in Chile (Sepulveda-Escobar & Morrison, 2020). During the lockdown period, Kapasia et al. (2020) finds that around 70% of learners are involved in e-learning. Moreover, students were facing various problems related to depression, anxiety, poor internet connectivity and disparaging study environment at home. With this study, Kapasia et al. (2020) suggest that purposive interventions needed to create a positive environment for study among students from the disadvantageous section of society. It takes careful planning to create an educational system in West

Bengal that will guarantee the development of the young brains' employability and production skills.

Research Questions

The research questions framed for the research are: what are the digital devices used to conduct online examination? What are the perceived challenges experienced by the teachers of higher education institutions in conducting online examination during pandemic? With the qualitative approach of research, two additional research questions are also framed to gain a better understanding of the situation. The study also aims to explore the perceived challenges in relation to teacher gender; and also, to represent the perceived challenges within the teacher gender.

Methodology

Research Design

The present research employed mainly a qualitative research design. Data has been collected through an online survey and then analyzed thematically to address the research questions.

Population

The population of the present study consists of teachers teaching in HEIs of West Bengal, India, where online examination had been conducted during COVID-19 pandemic. The researchers have surveyed over HEIs teachers irrespective of their academic designations (Assistant Professor, Associate Professor or Professor), Type of management of their institutions (Central Government, State Government, Government-Sponsored or Private) and nature of recruitment (Tenured, tenure tracked or adjunct faculty).

Sample

There are 116 teachers from 51 different HEIs across West Bengal as the potential respondents for this study. The criterion of selecting the respondents is mainly to reach to those faculties who were directly involved in conducting examination through online mode during the COVID-19 pandemic. The sample is randomly pooled in two stages, i.e., selection of HEIs and sampling teachers from selected HEIs. The breakup of the sample includes 49 female and 67 male respondents. The descriptive statistics have been given in Table 1.

Table 1 presents a breakdown of the sample distribution concerning teacher gender, age, and teaching experience. In terms of teacher gender, there were 67 male teachers and 49 female teachers included in the sample. Next, the table presents information on the minimum and maximum teacher ages. The youngest teacher in the sample was 29 years old, while the oldest teacher was 62 years old. Finally, the table indicates the minimum (1 year) and maximum teaching experience (29 years) of the participants.

Research Tool

A survey questionnaire was framed in Google Form to be administered during pandemic. The Google Form was divided into two parts. The first part accumulated the information related to demography and occupational details. The second part of the questionnaire included the focal open-ended question, "Please cite the two major challenges you encounter while conducting online examination". Specifically, the researchers have considered gender of the respondents as the demographic variable.

Data Collection

The data have been collected during fall semester 2021 and spring semester 2022. During this timeframe, HEIs have been saddling between resuming to the physical mode and reverting to online mode with the spurt of COVID 19 cases. A Google form is created to collect data online and to reach to the respondents during COVID 19 times. The link of an organized Google Form was sent randomly to the teachers from different HEIs through e-mails and cross-messenger Application.

Data Analysis

The qualitative data (open ended response to the focal question) were analysed thematically.

Table 1. Sample distribution and information

Gender of the Teachers	Male	67
	Female	49
Age of the Teachers (in years)	Minimum age	29
	Maximum age	62
Teaching Experience (in years)	Minimum experience	1
	Maximum experience	29

Note: The table demonstrates the panoramic overview of the characteristics of the sample.

Some basic statistical calculations are done to find the frequencies and the data is represented by pie chart, stacked bar diagram and grouped bar diagram. The determined codes involved the analysis of 232 responses from 116 teachers to understand the phenomena and identify the significant issues.

The Qualitative data (text) were analysed thematically to determine the codes. The coding involved the steps as analysis of the 232 units and identifying the significant issues; understanding phenomena and reducing data; and developing constructs or codes (Saldana, 2013). Once the six (6) codes were identified, the data collected were sorted or grouped into these identified codes. The validity of these categories was determined through an inter-rater agreement among three researchers. As an adopted framework, the study clubs the factors (Kisanga, 2016) that may prompt teacher attitudes to reflex as challenges toward online teaching (see Figure 1).

Figure 1 represents the Framework of the Research Methodology. It provides a step-by-step graphic breakdown of the procedures the researchers use to carry out their investigation. The essential phases of the research are depicted in the figure, from the first literature review to the last qualitative analysis and graphical representation of the data gathered. Overall, Figure 1 gives a clear and concise depiction of the research methodology, showing the logical flow of the research process from the first literature review to the final analysis and graphical representation of the acquired data. It makes it easier for readers and researchers to comprehend the general structure and how each phase advances the achievement of the goals or objectives of the present research.

Results and Discussion

The responses collected from the teachers are categorized into the codes (see Table 2). The identified code through ground theory is defined with the appropriate categories taking cues from the responses obtained.

Table 2 offers a comprehensive breakdown of the primary categories of issues and challenges
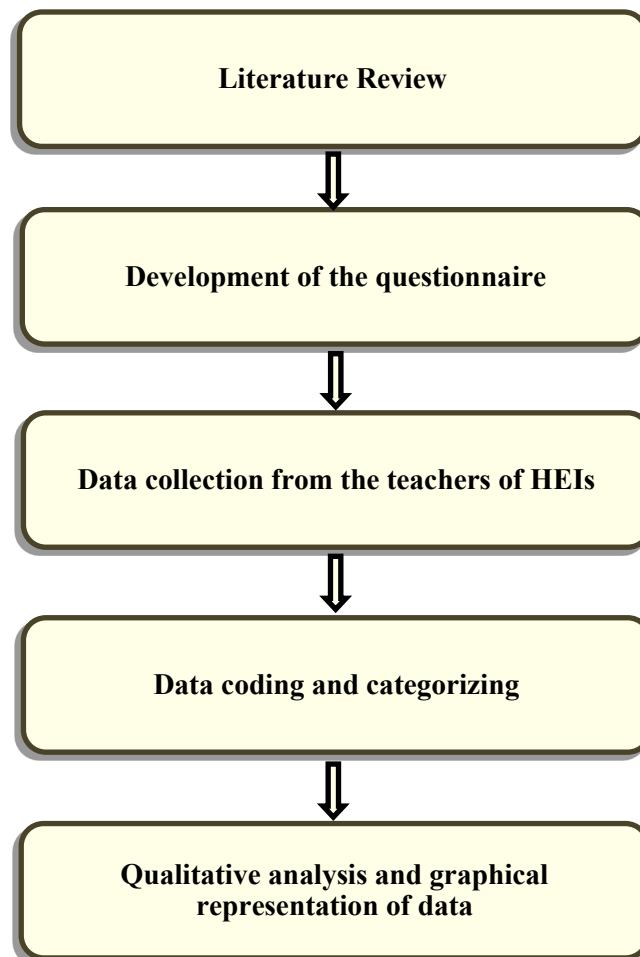

Figure 1. Framework of the Research Methodology

associated with online examinations, accompanied by specific codes representing the ideas or problems within each category. This structured approach helps researchers and educators understand the key aspects they need to consider when conducting online exams in Higher Education Institutions.

The distribution of challenges related to online examination can vary based on teacher gender. Examination Administration and Answer Script Management, Ethical Issues in Examination, Invigilation and Evaluation, Network Connectivity, Overall Planning and Implementation and Technological Equity and Access were the six main categories used to group the problems. The study intends to discover possible variations in how male

Table 2. Category of Codes

Codes (ideas)	Category
Invigilation and Evaluation	Lack of proper monitoring and invigilation during online examination, difficulty in checking answer scripts in online mode, tedious evaluation process and lack of proper assessment for descriptive type questions.
Examination administration and Answer Script Management	Framing suitable questions for open book examination, difficulty in tracking answer scripts due to overloaded mail box, timely submission and lack of clarity of scanned copies due to students' lack of proper technical knowledge.
Network Connectivity	Internet and server problem, connectivity
Ethical Issues in Examination	Learners' identity and authenticity, lack of originality in writing, copy from internet and learners take external help
Technological Equity and Access	Digital divide in the society, access to the internet in remote areas and lack of android phone
Overall Planning and Implementation	Transparency and sanctity of the process, lack of proper implementation strategy and doubtful integrity of the whole process

Note: In-depth analysis of the main types of issues and challenges associated with online examinations

and female teachers perceive and manage the obstacles of online exams by evaluating the distribution of these issues in relation to teacher gender. The development of focused tactics and support systems to accommodate the unique needs of teachers with the aid of this information can enhance the entire online examination process (see Table 3).

The distribution of challenges found in teachers' attitudes regarding examinations conducted online, broken down by teacher gender, is shown in Table 3. The table shows the distribution of each task among the gender groupings as well as percentages within each gender category. The table offers insightful information on the particular difficulties that male

and female teachers have while dealing with online examinations. It shows that while certain tasks are fairly constant between genders, there are some differences in how challenges are distributed based on teacher gender. These results may aid in improving the experiences of teachers taking online examinations by helping to customize assistance and interventions to match their unique requirement.

Qualitative Data Analysis (for RQ1)

From the data, it is revealed that, among 116 teachers from 51 different higher education institutions across West Bengal, Laptop and Mobile were used by 46.55% and 35.34% of the sample respectively while conducting online examination,

Table 3. Distribution of Challenges identified in Teacher Attitude towards Online Examination in relation to Teacher Gender

Challenges identified through Teacher Attitude		Teacher Gender		Total
		Male	Female	
Invigilation and Evaluation	% within Gender	21.26%	20%	20.25%
	% within challenges	57.45%	42.55%	
Examination Administration and Answer Script Management	% within Gender	22.72%	28%	25%
	% within challenges	51.72%	48.28%	
Network Connectivity	% within Gender	19.70%	13%	16.81%
	% within challenges	66.67%	33.33%	
Ethical Issues in Examination	% within Gender	21.21%	21%	21.12%
	% within challenges	57.14%	42.86%	
Technological Equity and Access	% within Gender	5.30%	4%	4.74%
	% within challenges	63.64%	36.36%	
Overall Planning and Implementation	% within Gender	10.60%	14%	12.07%
	% within challenges	50%	50%	

Note: The range of difficulties shown in teachers' attitudes regarding online examinations

whereas computer and tablet was used by 12.07% and 6.04% teachers respectively (see Figure 2).

Qualitative Data Analysis (for RQ 2)

Here, the six (6) major challenges identified by the teachers were Examination administration and answer script management (25%), Ethical issues in Examination (21.12%), Invigilation and Evaluation (20.25%), Network Connectivity (16.81%), Overall Planning and Implementation (12.08%) and Technological Equity and Access (4.74%) (see Figure 3).

Qualitative Data Analysis (for RQ3)

Among the identified challenges, male teachers perceived Network connectivity and Technological equity and access as main challenges, 66.67% and 63.64% respectively. This result reflects that besides perceiving challenges for themselves, male teachers also feel the same problem from the students' perspectives. They were very much empathetic towards their students.
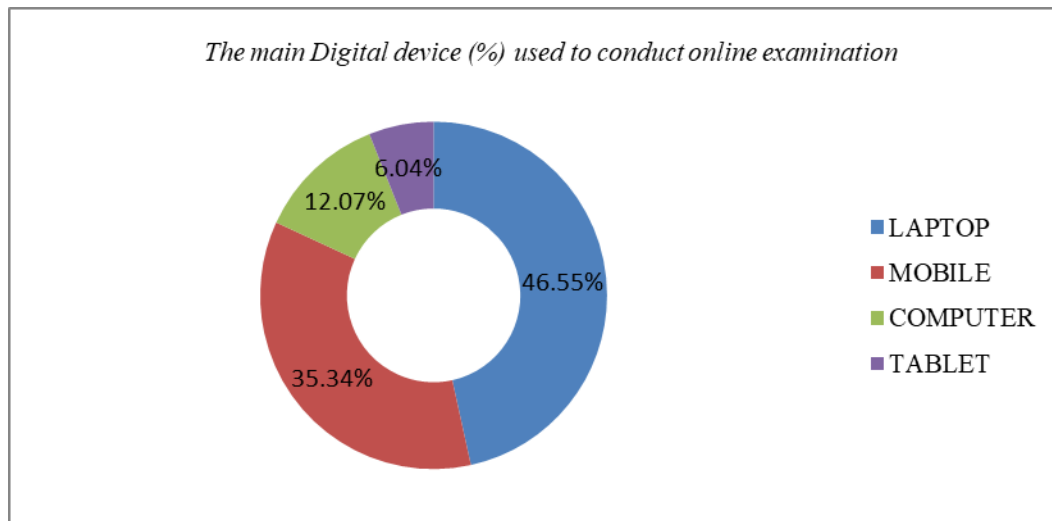

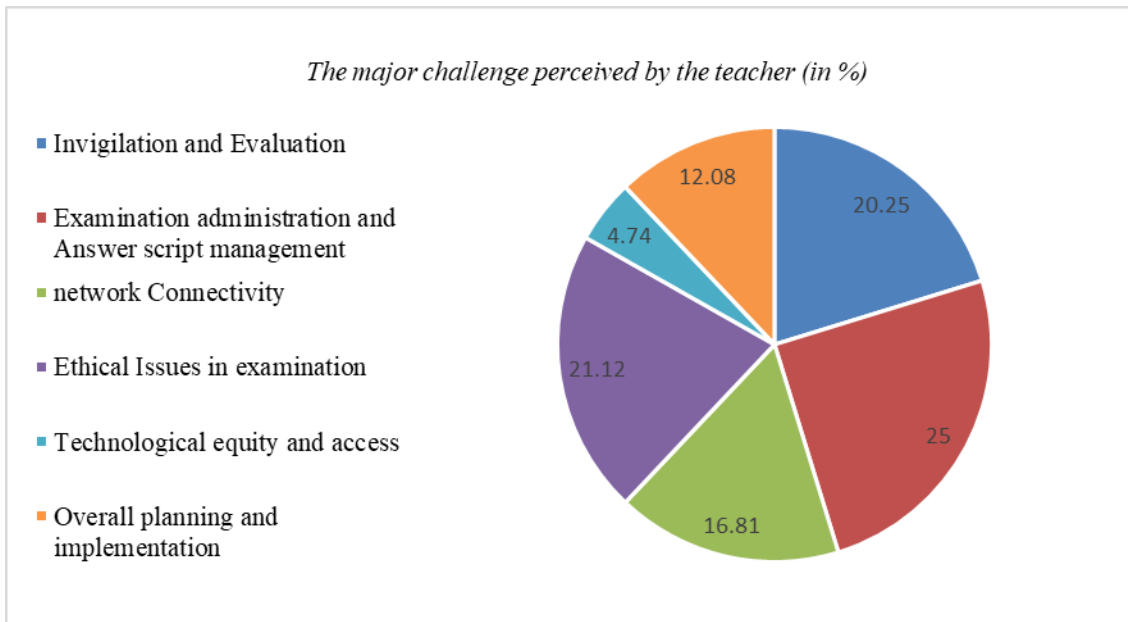Figure 2. The main Digital device (%) used to conduct Online Examination.

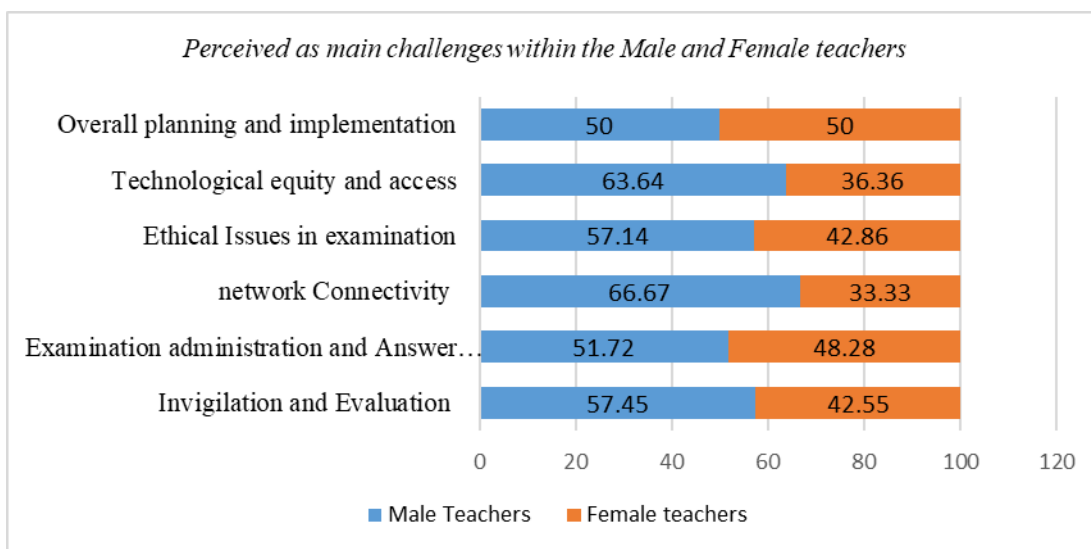Figure 3. The major challenge perceived by the teacher (in %).

Figure 4. Perceived as main challenges within the Male and Female teachers.

This breaks the stereotype and shows that male teachers are more sensitive than female teachers in this context (see Figure 4).

After analysing the data, it was found that 51.72% Male and 48.28% Female teachers mentioned examination administration and answer script management issue as the foremost challenge. Considering the challenge Ethical issues in examination, 57.14% Male and 42.86% Female teachers raise their doubts regarding this issue. According to them who is giving the examination or with the help of whom or coping from books, online resources while writing on examination – all these issues are very critical to find out or to

control. 57.45% Male and 42.55% Female teachers pointed out Invigilation and evaluation as third main challenge (see Figure 4).

Qualitative Data Analysis (for RQ4)

Perceived as main challenges (given in Figure 5) within the Male and Female teachers it was found that among 67 male and 49 female respondents almost equal percentage of Male (21.21%) and Female (21%) teachers pointed out Ethical issues in examination as perceived challenge. The data also revealed that 21.26% male and 20% female teachers marked as perceived challenge (see Figure 5).
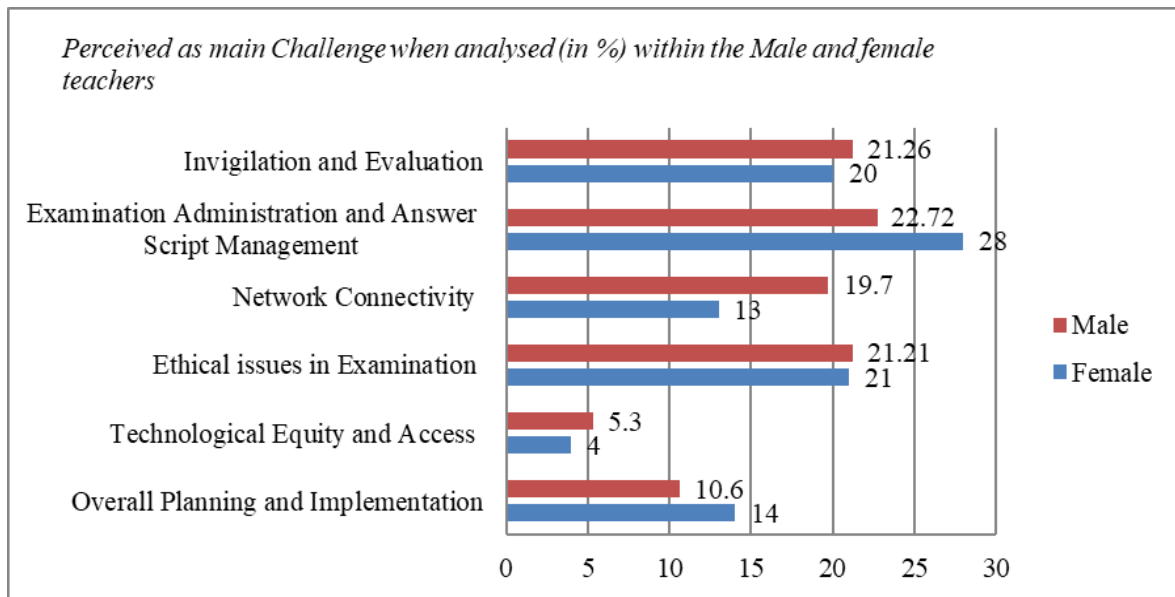
Figure 5. Perceived as main Challenge when analysed (in %) within the Male and female teachers.

Due to the abundance of platforms and online learning resources, both educators and students frequently have technical difficulties when using or referring to these resources. Locally, teachers are actively working together to enhance online teaching techniques. There are incomparable opportunities for collaboration, original thinking, and openness to pick up knowledge from others. The COVID-19 pandemic has shown us that teachers and students/learners need to be trained on how to use a variety of online educational resources. Teachers and students should be encouraged to continue using such online tools to improve teaching and learning after the COVID-19 epidemic when regular classes begin.

Discussion

The development of technology has traditionally been regarded as a key factor in determining civilisation and as a major engine for cultural, economic, and educational transformation. Online education is the only other option available in this context of worldwide pandemic to keep the teaching-learning process moving. It is now the best possible approach to continue the flow of the dynamic process of education. But, the use of online learning and assessment process are not so smooth and flawless. Although online exams were utilised prior to the COVID-19 epidemic, they were made mandatory during the pandemic for practically all courses worldwide. The previous researches outlined and endorsed the prevalence issues and challenges faced by faculty/teacher (Bao, 2020; Sahito, Shah, & Pelser, 2022). The technology may not be friendly among teachers in dealing with lessons and its transaction (Arthur-Nyarko & Kariuki, 2019; Bao, 2020;

Sahito, Shah, & Pelser, 2022; Sahito & Chachar, 2021).

The present study attempted to explore all such challenges confronted by the teachers of different higher education institutions in conducting online examination. Data was collected from 116 teachers from 51 different Higher Education Institutions across West Bengal. From their responses, six major challenges i.e., Examination administration and answer script management (25%), Ethical issues in examination (21.12%), Invigilation and Evaluation (20.25%), Network connectivity (16.81%), Overall planning and implementation (12.07%) and lastly Technological equity and access (4.74%) are identified. The findings are complimenting Tuah & Naing (2021) that stressed upon the authenticity, security, and flexibility as principal components of any online examination.

Insufficient knowledge of students about online examination, lack of proper monitoring and invigilation during examination, overloaded mailbox with the answer scripts, tedious evaluation process and lack of proper assessment for descriptive type questions were the most serious issues for the teachers. The results are favorable, Rayan (2020) have discovered several obstacles, including inadequate motivation and interaction, network and infrastructure issues, and security and privacy of data. Numerous tactics have been proposed by academics to lessen the negative effects of distant learning, including encouraging introverted students to participate and raising their attendance in online courses (Kapasia et al., 2020).

Ethical issues were also a serious concern to ignore. It was challenging for teachers to maintain control over students who could conceal

their identities, interact with others on social media while taking an exam, ask for help from others, or look up the answers on a different device. Previous researchers have expressed their concern regarding the ethical code of conduct of the students during online evaluation (Mukhtar et al., 2020). Some universities were able to control such unethical activities by including web cameras during online examination. Also, it is possible to detect whether students are browsing other webpages from their devices. Institutions may adopt some feasible measures to eradicate such unethical issues.

Another major concern was internet connectivity and speed. Numerous academics have highlighted infrastructure, computers, internet access, and infrastructure network maintenance as the key obstacles to participating in online education (Siddiquei and Kathpal, 2021). Students occasionally are unable to download the question paper in a timely manner. Due to the sluggish internet bandwidth, uploading the scanned copies of the answer scripts within the allotted time is also a difficult task. For individuals from remote areas, the situation is even worse.

Conclusion

The result of the study amply depicts that India's digital divide and lack of equity in access to uninterrupted internet browsing is a hassle to many students. Data limit and data cost is also a constraint. There were some limitations in this research. This study did not examine whether or not the teachers who took the online examination on their mobile phones were forced to do so because of financial shortcoming. Need not to mention, India is a linguistic and multicultural Nation, therefore if the information was gathered from other institutions throughout the Country, considerably more diversified challenges might be identified. Initiatives are needed to address these issues from the Government. Transparency and sanctity of the online examination process should be maintained by the institutions. Innovative solutions like 3D virtual laboratory are being used to conduct the practical classes. Various interactive online platforms are being launched to make the online mode of education more live and comprehensive.

In terms of the scope of future research in this area, a similar type of study can be repeated later and results can be generalised to many locations or countries. Future research will therefore need to be more in-depth and may involve qualitative or mixed-methods studies. Life after a pandemic is different, even when lockdown is invoked. In the form of blended mode or hybrid mode, online learning and assessment have been integrated with conventional offline classes. This procedure must therefore be more efficient, fruitful, bug-free, and user-friendly.

References

Adnan, M., & Anwar, K. (2020). Online learning amid the COVID-19 pandemic: Students' perspectives. Journal of Pedagogical Sociology and Psychology, 2(1), 45– 51. https://doi.org/10.33902/JPSP.2020261309

Almahasees, Z., Mohsen, K. & Amin, M.O. (2021). Faculty's and Students' Perceptions of Online Learning During COVID-19. Frontiers in Education. 6:638470. doi: 10.3389/feduc.2021. 638470

Arthur-Nyarko, E., & Kariuki, M. G. (2019). Learner access to resources for eLearning and preference for eLearning delivery mode in distance education programs in Ghana. Int. J. Educ. Technol. 6, 1–8. doi: 10.18415/ijmmu.v4i3.73

Ayo, C. K., Akinyemi, I. O., Adebiyi, A. A., & Ekong, U. O. (2007). The prospects of e-examination implementation in Nigeria. Turkish Online Journal of Distance Education, 8(4), 125-134.

Bao, W. (2020). COVID-19 and online teaching in higher education: a case study of Peking University. Human. Behaviour and Emerging Technologies. 2, 113–115. doi: 10.1002/hbe2.191

Bdair, I. A. (2021). Nursing students' and faculty members' perspectives about online learning during COVID-19 pandemic: A qualitative study. Teaching and Learning in Nursing, 16, 220– 226.

Bhowmik, S., & Bhattacharya, M. D. (2021). Factors influencing online learning in higher education in the emergency shifts of covid 19. The Online Journal of Distance Education and e-Learning, 9(1), 74-83.

Gupta, A., & Golplani. M. (2020). Impact of Covid -19 on Educational Institutions in India. The Online Journal of Distance Education and e-Learning. Purakala, 31(21), 661–671.

Gupta, A., & Tiwari, R. (2020, June 5). Post COVID-19: Indian online education industry - Boon or bane for students. http://bweducation.businessworld.in/article/Post-COVID-19-Indian-Online-Education-Industry-Boon-Or-Bane-For-Students/05-06-2020-194412/

Kapasia, N., Paul, P., Roy, A., Saha, J., Zaveri, A., Mallick, R., ... & Chouhan, P. (2020). Impact of lockdown on learning status of undergraduate and

postgraduate students during COVID-19 pandemic in West Bengal, India. Children and youth services review, 116, 105194.

Kisanga, D. (2016). Determinants of Teachers' Attitudes Towards E-Learning in Tanzanian Higher Learning Institutions. The International Review of Research in Open and Distributed Learning, 17(5). Athabasca University Press. https://www.learntechlib.org/p/174337/.

Kumar, K., & Pande, B. P. (2021). Rise of online teaching and learning processes during COVID-19 pandemic. Predictive and preventive measures for COVID-19 pandemic, 251-271.

Lapitan Jr, L. D., Tiangco, C. E., Sumalinog, D. A. G., Sabarillo, N. S., & Diaz, J. M. (2021). An effective blended online teaching and learning strategy during the COVID-19 pandemic. Education for Chemical Engineers, 35, 116-131.

Martinez, J. (2020). Take this pandemic moment to improve education. EduSource. https://edsource.org/2020/take-this-pandemic-moment-to-improve-education/633500

Mishra, L., Gupta, T., & Shree, A. (2020). Online teaching-learning in higher education during lockdown period of COVID-19 pandemic. Int. J. Educ. Res. Open 1:100012. doi: 10.1016/j.ijedro.2020.100012.

Mishra, P., & Shukla, S. (2021). Online Teaching in India during COVID-19: Opportunities and Challenges. Mishra, P., & Smita, (2021). Online Teaching in India during Covid, 19, 20-28.

Mukhtar, K., Javed, K., Arooj, M., & Sethi, A. (2020). Advantages, Limitations and Recommendations for online learning during COVID-19 pandemic era. Pak. J. Med. Sci. 36, S27–S31. doi: 10.12669/pjms.36.COVID19-S4.2785

Ocak, G., & Karakuş, G. (2021). Undergraduate students' views of and difficulties in online exams during the COVID-19 pandemic. Themes in eLearning, 14, 13-30.

Pandita, S., Mishra, H. G., & Chib, S. (2021). Psychological impact of covid-19 crises on students through the lens of stimulus-organism-response (SOR) model. Children and Youth Services Review, 120, 105783.

Panisoara, I. O., Lazar, I., Panisoara, G., Chirca, R., & Ursu, A. S. (2020). Motivation and continuance intention towards online instruction among teachers during the COVID-19 pandemic: The mediating effect of burnout and Technostress. International Journal of Environmental Research and Public Health, 17(21).

Pokhrel, S., & Chhetri, R. (2021). A Literature Review on Impact of COVID-19 Pandemic on Teaching and Learning. Higher Education for the Future, 8(1), 133–141.https://doi.org/10.1177/2347631120983481.

Rawat, D., Dixit, V., Gulati, S., Gulati, S., & Gulati, A. (2021). Impact of COVID-19 Outbreak on Lifestyle Behaviour: A Review of Studies Published in India. Diabetes & Metabolic Syndrome: Clinical Research & Reviews, 15 (2021), 331-336.

Rayan, P. (2020). E-learning: The advantages and Challenges. Entrepreneur India. Available online at:https://www.entrepreneur.com/article/351860.

Sahito, Z., & Chachar, G. B. (2021). COVID – 19 and the educational leadership & management. In: Emerging Trends and Strategies for Industry 4.0: During and Beyond COVID – 19, (eds B. Akkaya, K. Jermsittiparsert, M. A. Malik, and Y. Kocyigit), Warsaw: Sciendo Publishers, 117–128. doi: 10.2478/9788366675391-003

Sahito, Z., Shah, S.S., & Pelser, A. M. (2022). Online Teaching During COVID-19: Exploration of Challenges and Their Coping Strategies Faced by University Teachers in Pakistan. Frontiers in Education, 7. DOI: 10.3389/feduc.2022.880335

Saldana, J. (2013). The Coding Manual for Qualitative Researchers (2nd ed.). London: Sage.

Sepulveda-Escobar, P., & Morrison, A. (2020). Online teaching placement during the COVID-19 pandemic in Chile: challenges and opportunities, European Journal of Teacher Education, 43(4), 587-607. DOI: 10.1080/02619768.2020.1820981

Siddiquei, M. I., & Kathpal, S. (2021). Challenges of online teaching during COVID-19: An exploratory factor analysis. Human Behaviours and Emerginging Technologies, 3(5), 811-822. https://doi.org/10.1002/hbe2.300

Tuah, N. A. A., & Naing, L. (2021). Is online assessment in higher education institutions during COVID-19 pandemic reliable?. Siriraj Medical Journal, 73(1), 61-68.

UNESCO (2020). UNESCO Report, 'National Learning Platforms and Tools. Available online at: https://en.unesco.org/covid19/educationresponse/