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From Classrooms to Clicks: Exploring Student Attitudes and Challenges in the Shift to Digital Learning in Higher Education

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Abstract

Aim/Purpose	This study is a cross-sectional survey that explores attitudes towards online classroom engagement, online assessments, exams, and challenges in digital learning.
Background	Educational institutions have adopted digital platforms with varying degrees of success. The COVID-19 pandemic has prompted researchers and academics to reflect on digital interventions and their impact on pedagogy, learning, and assessment. However, in the present circumstances, online teaching, learning, and assessment will require learners to bring their own ethics, unrestrained by external institutional rules.
Methodology	The sample consisted of 1,017 students in higher education across India. The researchers developed a tool, the Digital Learning Scale, which was built on three factors: attitude towards online classroom engagement, attitude towards online assessments, and challenges in digital learning. This tool was used to collect data.
Contribution	The study results prove the effect of online learning and online assessments in higher education institutions.

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Findings	The significant findings of this study are: (1) approximately 50% of the students prefer that there should be a balance between online and offline teaching, learning and evaluation; (2) there is significant positive high correlation between the last online exam and last offline exam scores; (3) there is significant positive correlations between attitudes towards online class engagement, attitude towards online assessments and exams and challenges in digital learning; (4) 65% of the students agree that digital learning increases social isolation; (5) 55% of the students agree that incidence of cheating by the students in online exams is evident.
Recommendations for Practitioners	Educational institutions should invest in robust strategies to promote academic integrity, provide technical support, and offer training programs that equip students with the necessary digital skills for achieving successful learning outcomes.
Impact on Society	There is a pressing need to prioritise digital literacy and integrity initiatives.
Future Research	Five years post-pandemic, research should be conducted in higher education institutions on the impact of online learning.
Keywords	digital learning, higher education, online classroom engagement, online assessments

INTRODUCTION

The outbreak of COVID-19 has led to a re-evaluation of practices of higher education across the world. All educational institutions, whether schools, colleges, or universities, have faced the challenges of limited digital infrastructure, the need to upskill faculty in the digital teaching/learning process, and adapting offline curricula to online platforms. These challenges have prompted educational institutions to consider infrastructure, technology, pedagogy, and assessment not just as policy on paper, but as translated into practical action. While administrators battle with the policies, faculty has wondered about pedagogy, assessment, and learners' attitudes towards their studies over the past two years. Data-driven articles (Aslam et al., 2021; Cheng, 2020; Czerniewicz, 2020; Lovón & Cisneros, 2020), policy papers, and reflective entries have been written about the changed educational scene in the past two years. Acknowledging the existing literature, we, as practicing teachers at a higher educational institution in a cosmopolitan setting, attempted to understand learners' attitudes towards digital learning and the ethical approach to assessment. Digital learning is learning facilitated by technology that gives learners some element of control over time, place, path and/or pace, which includes online classes, attendance being tracked digitally, teaching modes that include videos, PPTs, Interactive Whiteboards, polls (Webex), submission and evaluation of CIAs on LMS (Moodle), and online – proctored exams and online correction/evaluation. At the same time, online learning refers to the delivery of instruction electronically via various multimedia and Internet platforms and applications. Online learning is synonymous with web-based, e-learning, computer-assisted instruction, or internet-based learning.

LEARNERS' ATTITUDE AND ENGAGEMENT TOWARD DIGITAL LEARNING

Before the pandemic, when teaching in a traditional classroom, teachers had the opportunity to observe learners' attitudes and engagement with learning. The highly interactive space of a physical classroom was not limited to the transmission of knowledge; rather, skills, values, and moral conduct were integral to the classroom interaction (Salas-Pilco et al., 2022). Various activities, such as debates, group projects, and discussions, help in the teaching-learning process. There is scope for teachers to pay individual attention and understand learners' difficulties. Traditional classroom instruction is often described as teacher-centred and requires learners to engage in passive learning (Paul & Jefferson, 2019). In an online classroom, instruction is learner-centered and requires active learning from the learners. In this mode, urban learners must process information independently, construct questions, and ask for clarifications (Salcedo, 2010). Learners' participation determines the classroom dynamics. The transition from traditional classroom learning to digital learning in higher education during the pandemic has been a challenging experience for learners worldwide.

Negotiating Digital Teaching and Learning

There is a big difference between urban, semi-urban, and rural areas in India. Learners have struggled to engage in digital learning and access online classes and digital content. An inevitable shift to digital learning forced learners to adapt to a different learning mode. The lack of choice may also have a psychological bearing on learning. A study by Muthuprasad et al. (2021) highlights that the situation is worse for those in remote areas. The findings highlight that India's digital divide between urban and rural areas, as well as the lack of equity in access to uninterrupted internet, poses a significant challenge for many learners. The social setting of a traditional classroom had the advantage of direct interaction. The faculty and the learner's physical presence helped them focus, and learning was more accessible, while teachers could resolve doubts immediately as the interaction was more open. Continuing with the narration of the divide, Muthuprasad et al. (2021) highlight that learners' physical presence on campus, in environments other than the classroom, such as the library, laboratory, study dens, or other places of comfort, helped them focus on their studies. Peer engagement and learning happened naturally. Earlier studies on student engagement, which predicts student satisfaction, retention, and success in traditional classrooms (Thomas, 2012), have shown that it is decreased in online or digital modes of teaching and learning (Bawa, 2016; Watts, 2016). The time spent on the campus helped them to overcome distractions. Attending in-person classrooms provided the support to focus more efficiently than attending the 'digital classroom' mode. In the digital mode, the onus is more on the learners, and their focus must be higher to ensure that they do not get carried away by online distractions, such as aimless browsing, surfing, playing games, and engaging in social media. Virtual submission of assignments and tasks lacked many in-person interactions and socialization, while increased screen time was physically and mentally tiring.

Another challenge is that individuals suffer from isolation, with no regular social interaction, especially learners from semi-urban and rural areas. The traditional classroom offers a variety of engaging learning activities. The absence of in-person interaction in the digital classroom with faculty and peers has demotivated them. Not all faculty members and students are tech-savvy, and they may need to use different modes to create learning activities. Muthuprasad et al. (2021) highlighted that students in the online mode felt that there was no face-to-face interaction between teachers and students, and it was only a one-way communication with no scope for interaction. Additionally, there was a specific time to attend classes in the traditional learning mode, as they were held on campus. Digital learning, on the other hand, emphasized 'any time, any place learning,' which led to many learners procrastinating. The need for greater discipline and self-motivation, as well as the requirement for online users to dedicate their time to learning, has become increasingly challenging. By the end of the day, it became tougher for many to attend to academic tasks, such as preparing notes and completing assignments.

An important factor to consider is that learners must be in a home environment that is conducive to learning. A learner used to a distance learning mode might be more focused and capable of effective time management. However, the pandemic forced the learner not just to adapt to a different learning mode but to learn under traumatic conditions, in a shared space, with limited learning resources. Ünal (2021) found, in a study of the habits of higher education students during the pandemic, a lack of interest in digital classes, as students were provided with recordings. The students thought they could listen to the recorded classes later and leave the class, leading to procrastination, which affected their study habits. The low socio-economic conditions of the family led to an inability to access laptops, desktops, or good, effective mobile phones for online learning (Mishra et al., 2020). Learners struggled with poor or limited Internet connectivity and incompatibility with devices and applications used in digital learning. Many educational institutions and universities did not have financial resources. They could not afford to go online immediately in full force to enhance their learning platforms or provide opportunities to learners.

Writing examinations in a digital mode was another major challenge, giving rise to numerous situations and opportunities for malpractice. The learners attempted to circumvent the system, break the code of conduct, and copied directly from the internet or other sources. Ensuring that learners demonstrate ethical practices has been a significant challenge for educational institutions. Studies conducted during the pandemic have observed an increase in cheating among students (Khan et al., 2021; Lancaster & Cotarlan, 2021). Another important challenge is expecting faculty members in educational institutions to become tech-savvy quickly. On the other hand, many faculty members struggle to keep pace with technological changes, as they must understand and deploy various platforms and software. Although the majority of institutions were offering online classes, training their teachers, and providing them with online teaching materials and assignments, a study reveals that the real plight of teachers comes to the surface when 60% of them report having poor Internet connectivity (Jain et al., 2020).

In India, there are not enough universities that can offer a higher standard of teaching, let alone become digitally fast. Only limited options are available for prospective learners, and the COVID-19 pandemic has further complicated the problem. Additionally, most studies do not specify higher education in particular. Some of the newspaper articles and blogposts (Choudhary, 2020; Czerniewicz, 2020; DC Correspondent, 2020; Sudevan, 2020), reports (Lieberman, 2020; National Council of Educational Research and Training, 2020) that reflect upon the teaching – learning process focuses on transaction of teaching, support material for learners to facilitate learning, teacher attitude and expectations regarding learning rather than learners' engagement with the learning and assessment. Articles often dwell on school learning, and minimal research was conducted during or immediately after the pandemic in the higher education sector. A review of significant writing, both national and international, on the impact of the pandemic and subsequent lockdowns on education offers recurring themes. Educators and policymakers have examined the support offered to the faculty in adapting to online teaching and other forms of educational experiences and learner engagement. Studies focus on access issues, especially inequalities in digital infrastructure and disparities in supportive home environments. Scholars adopting an economic perspective have examined the learning gap, its impact on skill development, and its effect on economic growth and productivity in the post-pandemic context. Research studies have examined these phenomena separately, but no single study encompasses all these aspects. Hence, it is imperative that research be conducted to determine whether higher education learners are engaged during online classroom teaching and what their attitude towards online learning is. Do the learners profess any ethics in online assessments and examinations? What are the challenges learners face in digital learning? These are the research questions raised in this study.

As teacher practitioners in higher education, we need to understand learners' commitment to learning in complex situations, particularly when using unfamiliar learning modes. We practitioners witnessed institutional investment in upskilling teachers, upgrading infrastructure, and teacher commitment to improve the learning experience every day. However, there was rarely any discussion about learners' ethical engagement with learning and assessment. Teachers shared anecdotal evidence during informal conversations and formal meetings about learners resorting to unethical means to succeed in examinations. In response to the lack of information about learners' attitudes towards engagement with learning and assessment, we explored the anecdotal and intuitive scepticism among practitioners about learners' ethical engagement with learning and assessment. An empirical study involving learners would contribute to the conversation about online teaching during the lockdown, aiming to understand learner engagement, remove preoccupations with infrastructure, teacher readiness, and bridge the learning gap.

While acknowledging the existing literature, this research explores the relationships between attitudes towards online classroom engagement, attitudes towards online assessments and examinations, and challenges in digital learning. The three objectives of the study include the examination of:

1. The learners' attitude towards online classroom engagement, online assessments and examinations, and challenges in digital learning.
2. The correlation between the attitude towards online classroom engagement, online assessments and examinations, and challenges in digital learning.
3. The differences in attitudes and challenges in digital learning among UG and PG learners

REVIEW OF LITERATURE

Pedagogical challenges and student attitude

The background outlined highlights the challenges facing higher education due to the digital learning mode, both in learning and assessment. Challenges such as unpreparedness for the sudden demand to go online have put faculty and students out of gear to use digital platforms, digital gadgets, and application software, which has also led to unethical means of obtaining marks by students during examinations. A survey conducted among 800 university professors worldwide found that 93% of students have more opportunities to engage in malpractices and cheating during online examinations, to a great extent, during the pandemic (Comas-Forgas et al., 2021). Batool et al.'s (2023) study has explored the differences between the traditional and digital modes in the classroom. The closing of educational institutions and universities has disrupted the networking of students and faculty, leading to low performance. In their study, Gopal et al. (2021) observed that the online learning method is relatively new, and faculty and students are not well-versed in online methodologies. Henriksen et al. (2020) highlighted the challenges faced by faculty members when transitioning from offline to online teaching modes. In Nepal, Upadhyay et al. (2021) highlight the attitudes of university students towards digital learning. The study's outcome shows mixed results, with more than one-third of the students finding online classes effective only for theoretical subjects, rather than for numerical and practical ones. More than 70% of students agreed that digital learning should be considered an alternative source of learning in the future.

In comparison, more than 50% of the students faced the challenge of studying in a digital or virtual learning mode. Students' attitude towards the less structured digital learning has impacted their performance. Another fact is the faculty's preparedness to deploy new technologies and engage students. Makoe (2012) noted almost a decade ago that faculty need to be trained to use these new e-devices and integrate them into their teaching methods. The speedy migration to digital mode also meant that students could not participate in many clubs and societies that are vital to the higher education experience, where they learn the professional and soft skills that shape them to be "job-ready". Educational institutions and universities' preparedness had to be geared up regarding the blending of technology and academics to a greater extent. Despite the genuine efforts of faculty to provide unbiased and valuable learning experiences for all students, regardless of the digital mode, many faculty members feel uneasy. They are not equipped to teach via wholly online resources, particularly as they may still be learning to use some of the platforms (Jaques & Salmon, 2007; Rucker & Downey, 2016; Schmidt et al., 2016). According to Bates (2019), a high-quality design is characterized by clear learning objectives, carefully structured content, manageable workloads for both faculty and students, integrated media, relevant student activities, and assessments closely tied to the desired learning outcomes.

Hurdles in teaching, learning, and assessment

Students recognised numerous hurdles in implementing examinations, concerning security, validity, and impartiality (Khan et al., 2021). Educational institutions had to undergo many struggles before they became tech-savvy, enabling a digital mode of teaching and learning. A study by Cheng (2020) states that, according to directives from the Ministry of Education, China, all universities were required to adopt an online teaching model during the pandemic. Emergency management has significantly increased the use of digital learning. During the COVID-19 pandemic, the use of online learning has increased significantly; however, the actual effectiveness and completion rates have not improved (Liu et al., 2020; Yang et al., 2021), which highlights that digital learning during the pandemic was not implemented effectively. The short transition time from traditional to digital learning has led to low accountability in academic evaluation and testing (Huber & Helm, 2020). The results of a Jordanian research study conducted by Almseidein and Musa (2020) indicate that undergraduate students should be fully knowledgeable about ethical issues to avoid unethical behavior while using the e-learning system. They reiterate that ethical values are part of the course within the students' academic plan.

Online learning, when asynchronous, emphasises that students are not required to be online simultaneously and is facilitated by emails and discussion boards (Hrastinski, 2008). However, the flexible nature of asynchronous online learning often results in a lack of opportunities to interact with peers and teachers in real-time. Another aspect is that many students from less advantaged families must complete their academics in a small space shared with other family members (Di Pietro et al., 2020). The study also discussed a student's learning ability, which was conditioned to follow a particular way of learning but was forced to shift to a different mode during the pandemic. The unpreparedness of most educational institutions and universities to plunge into digital learning also led to a significant challenge. In their article, Gallagher and Palmer (2020) stated that, just before the pandemic hit the US territory, only about 5% of the budget was allocated to information technology. Only one-third of university students had the experience of an online course as part of their curriculum. The remaining two-thirds of universities held traditional classroom lectures. In India, the "chalk and talk" technology is more popular, and the deployment of modern and digital technology in classroom delivery remains far-fetched (Chatwal, 2019). Additionally, catering to a vast student population was a significant challenge.

However, with digital learning becoming the default in 2020, most educational institutions and universities resorted to simple Zoom-based lectures. They could not deploy online platforms and install software to make digital learning seamless. Pandit and Agrawal (2021) highlight the technical issues of online learning, including the loss of interaction, lack of access to study materials, loss of learning, and inadequate infrastructure. Lakshman Naik et al. (2021) evidenced that although current generation students are more adapted to advanced technologies, they are still keen to learn through traditional methods, which might be due to a lack of high-speed Internet access, limited network data per day, power supply, and technological gadgets (laptops, android sets, microphones). However, 120 members (13.7% of participants) recommended online teaching, and approximately 90% of them are from urban areas, which suggests that urban-based participants have sufficient access to technical tools and facilities. Many students log in from their smartphones, and few own computers or laptops, which contributes to the learning loss. Even if they do, they must share with other family members – siblings who are studying and parents who work remotely. This aspect is more pronounced in India; however, research in other countries has also found that the barriers to e-learning include insufficient and unstable Internet connectivity, inadequate computer labs, a lack of computers and laptops, and technical problems that pose the biggest challenges for adapting to e-learning (Zalat et al., 2021). Muthuprasad et al. (2021) reported that many participants in their research study identified technological constraints, distractions, instructors' incompetence, learners' inefficiency, and health issues as challenges in their online learning experience.

Impact on mental and social health

In an academic context, students who learn remotely feel they have an active choice in shaping their learning process. The need for competence has led to the feeling of being effective in one's actions. The expectation to change and adapt to the digital learning mode has placed immense stress and strain on the student population. Social interactions play a critical role in the learning context. Remote learning, when paired with physical and social distancing, leads to dissatisfaction with fundamental needs and lower intrinsic motivation and learning. The need for social relatedness refers to the feeling of being connected to and accepted by others – a claim that has been supported by numerous studies and various learning contexts (Ryan & Deci, 2000). Pelikan et al. (2021) have illustrated that social relatedness influences intrinsic motivation for learning. In a qualitative study at Qassim University, Saudi Arabia, despite online or digital learning, it was well received by medical students. There were methodical content, perception, technical, and behavioural challenges during online class sessions and exams (Khalil et al., 2020).

In continuation of these findings, the present study tests:

> **Hypothesis 1:** There is a significant correlation between the attitude towards online classroom engagement, attitude towards online assessments and examinations, and challenges in digital learning.
>
> **Hypothesis 2:** There is a significant difference in the means of attitude towards online classroom engagement and online assessments, examinations, and challenges in digital learning concerning undergraduate and postgraduate learners.

METHODOLOGY

This study is a cross-sectional survey. Cross-sectional survey studies play a crucial role in analysing data at a single point in time. The study explored the levels of learners' attitudes towards online classroom engagement, online assessments and examinations, and challenges in digital learning. Furthermore, the study examined significant differences in attitudes towards online classroom engagement, online assessments and examinations, and challenges in digital learning among undergraduate and postgraduate learners.

POPULATION AND SAMPLE

The All-India Survey on Higher Education (AISHE) report for 2019-20 listed 396 private universities and reported 33.8 million students enrolled in programs at the undergraduate and postgraduate levels from both public and private universities. The sampling framework of this study includes private higher educational institutions (HEIs) in urban localities. Studying Indian students provides valuable insights into the experiences and perspectives of students in one of the world's largest and most diverse higher education systems. This study has a sample of 1,017 learners. A purposive sampling method was adopted to collect data. Data has been collected since March 2021 from learners who fulfilled three inclusion criteria: (1) learners who had undergone regular online teaching and learning for at least two semesters from January 2020 to May 2021 in any of the HEIs in India; (2) learners who had at least one semester of online assessments and exams from January 2020 to May 2021; and (3) learners who had the results of the online assessments and exams of at least one semester.

Learners were contacted through email to participate in the survey. A total of 1370 forms were sent, and 1017 valid responses were received, accounting for a 74.51% response rate. Further, consent forms were obtained from the participants, and the data collection process began voluntarily. Details of the sample profile are given in Table 1. There is a proportionate representation of gender, undergraduate and postgraduate learners, and graduates from different disciplines in HEIs.

Table 1. Sample profile

Demographic	Categories	Count	Percent
Gender	Female	678	66.7%
	Male	339	33.3%
Graduation	Undergraduate (UG)	592	58.2%
	Postgraduate (PG)	425	41.8%

Demographic	Categories	Count	Percent
Disciplines of Graduation	Arts and Humanities	280	27.5%
	Sciences	140	13.8%
	Commerce and management	103	10.1%
	Social sciences	283	27.8%
	Engineering and medicine	211	20.7%

MEASUREMENT TOOL

In this study, digital learning is defined as learners' attitudes towards their engagement in online classes, ethical considerations in online assessments and examinations, and the challenges associated with online learning. Following the first wave of the COVID-19 pandemic in India, higher education educators noted a decline in classroom engagement during online classes and a lack of integrity in submissions of online assignments and examinations (Almseidein & Musa, 2020). The authors conducted a two-hour focused group discussion with five higher education educators who have witnessed online classes and examinations. The objective of the focus group discussion was to gather insights from educators' experiences on learner engagement during online classes, integrity in continuous internal online assignment submissions, moral ethics in online examinations proctored by faculty, and possible challenges in online learning. The outcome of the discussion led the authors to formulate 45 items for tools to measure digital learning. The tool was administered to pilot respondents of 102 learners in higher education institutions. The pilot data collected were analysed for reliability and subjected to exploratory factor analysis (EFA). EFA is employed to reduce data complexity and highlight essential dimensions that explain the variance in the dataset, helping researchers understand the structure of relationships within the data and aid in constructing a meaningful construct. Thirteen items either had very low reliability (Cronbach's alpha <.50), cross-loaded in EFA, or did not appear to correlate with any of the other items in EFA; hence, they were discarded from the tool. The final tool developed by the authors, named the Digital Learning Scale, consisted of three factors, namely: (1) attitude towards online classroom engagement (14 items), (2) attitude towards online assessments (7 items), and (3) challenges in digital learning (11 items). There were 32 items, marked on a 5-point scale, ranging from "strongly agree" to "strongly disagree." Particulars of the items are listed in Table 3. An institutional review board certificate and official permission to implement the research tool were obtained.

The digital learning scale with the demographic details was translated into Google Forms and sent to the learners via email and WhatsApp. Responses were recorded in Excel sheets. The reliability analysis of the scale is given in Table 2. All values of Cronbach's alpha are >.60, which is acceptable as reliable. Skewness and Kurtosis values were computed to establish the data's normality. It was found that all values, skewness, and kurtosis are <1.96, indicating that the data do not deviate from normality.

Table 2. Reliability analysis

Variable	Number of items	Cronbach's alpha	Skewness	Kurtosis
Attitude towards online classroom engagement	14	.910	-.229	.297
Attitude towards online assessments and exams	7	.626	-.633	1.628
Challenges in digital learning	11	.836	-.755	1.558

Analysis and Results

Descriptive and inferential statistics were employed to test the hypothesis using SPSS v. 20. Frequency and percentage analyses were computed for the variables of the study. Pearson's correlation and t-test values were computed to test significant mean differences.

Percentage analysis

The responses (Table 3) noted that 46 to 53.6% of the learners preferred a blend of offline and online teaching, learning, and assessment. While 46.9% preferred offline teaching, 38.9% preferred offline learning, and 36.9% preferred offline assessment. 7% wanted only online teaching and learning, and 14.6% preferred online assessments.

Table 3. Percentage analysis

Items	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Attitude towards online classroom engagement					
I appreciate digital learning in the present times.	4.6	8	27.4	39.4	20.6
I can learn collaboratively through online/digital platforms.	4.7	12.4	29	35.6	18.3
Digital learning increases learners' social isolation.	3.9	8.5	23.2	33.4	31
Digital learning increases learners' social interaction.	17.5	31.3	26.5	16.9	7.9
Using digital learning platforms will improve the quality of studies.	10.7	21.9	35.8	22.1	9.4
Digital learning will provide better learning opportunities.	8.8	16	35.5	28.6	11
I get peer support to overcome the challenges in digital learning.	9	13.4	28.6	35.7	13.3
Digital classroom enables integration of views with others while learning the course materials.	7.2	17.5	38.2	28.1	9
Digital classroom provides scope to interact with the faculty.	10	23.3	31.8	26.5	8.5
Digital platforms help students get objective feedback instantly.	7.9	17.1	31.7	30.8	12.6
One can understand complex concepts in a digital learning platform.	13.2	22.8	34.2	21.3	8.5
Digital classroom provides a larger space to participate in learning activities.	9.7	20.7	34.5	25.5	9.5
Digital classroom helps students to be self-regulated and disciplined.	15.8	24	29.8	21	9.3
Digital classrooms provide technology-based tools to interact and collaborate with classmates.	5.3	12.1	33.6	37.7	11.3
Attitude towards online assessments and examinations					
I appreciate digital examinations in the present times.	7	8.9	29	34.1	20.9

Items	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Digital examinations have more advantages, e.g., the answers are more objective.	7.6	12.5	31.9	31.5	16.6
Digital examinations are as successful as traditional ones.	15.7	21.6	30	20.1	12.6
Digital examinations play an important role in higher education.	8.3	17	31.5	29.5	13.8
I will not indulge in cheating in a digital exam.	4.4	5.9	16.6	23.5	49.6
The incidence of cheating by students in digital examinations is evident.	5.3	10.2	30.1	32	22.4
One loses concentration while responding during digital examinations.	8.5	13.9	25.5	29.1	23.1
Challenges in digital learning					
Digital learning technologies are challenging to use.	16.4	27.6	34.5	14.9	6.5
Peer support in a digital learning environment is difficult.	8.4	26.3	29.4	23.8	12.2
One needs to be skilful in the use of digital learning tools.	4.9	10.1	26.4	41.3	17.3
Collaboration and interaction with peers in a digital classroom is strenuous.	4.7	11.2	36.7	32.4	15
Interaction with faculty in digital classrooms is challenging.	6.3	15.6	28.1	33	16.9
The digital exam platform is challenging for learners.	5.8	14	33.7	33.1	13.4
Students might not have access to digital learning hardware & software.	4.3	6.6	27.1	36	26
Added skills are required to overcome any glitches in digital learning.	3.5	7.9	29.4	40.2	19
Support from faculty to ensure learning in a Digital Classroom is missing.	9.4	22.7	35.2	21.8	10.8
The availability and quality of Internet connection are a challenge in digital learning.	3.3	4.5	15.7	30.9	45.5
Responding to continuous internal assessments is challenging in digital learning.	4.7	9	25.1	31.7	29.5

To sum up objectively, we can say that about 60% of the learners surveyed appreciated digital learning and digital examinations during the present times; 65% of learners agree that digital learning increases social isolation; 55% of learners agree that incidence of cheating by learners in digital examinations is evident and in contrast 73.1% agree that they will not indulge in cheating; 60% of the learners agree that added skills are required to overcome any glitches in digital learning. Furthermore, it is evident that a substantial portion of the respondents remain undecided or neutral on taking a clear stance, which diminishes the strength of the conclusions.

Testing the two hypotheses of the study

The correlation analysis revealed a significant positive correlation between attitudes towards online class engagement and attitudes towards online assessments and examinations. Additionally, there was a significant positive low correlation between attitudes towards online class engagement and challenges in digital learning. There is a significant, moderate correlation between attitudes towards online assessments and examinations and challenges in digital learning (Table 4). These results support Hypothesis 1.

Table 4. Correlation analysis

	Attitude towards online classroom engagement	Attitude towards online assessments and examinations
Attitude towards online assessments and examinations	.630**	
Challenges in digital learning	.069*	.340**

Note: *significant at .05 level; ** significant at .01 level

An independent samples t-test was used to test Hypothesis 2. The results indicate significant differences in the attitudes towards online classroom engagement, online assessments, examinations, and challenges in digital learning among undergraduate and postgraduate learners (Table 5). The means of PG learners are higher than those of UG learners for all three variables. These results support Hypothesis 2.

Table 5. Independent sample t-test analysis

	Graduation	N	Mean	Std. deviation	F	Sig.	t	Sig. (2-tailed)
Attitude towards online classroom engagement	UG	592	3.1267	.79575	7.997	.005	-2.862	.004
	PG	425	3.2627	.67402				
Attitude towards online assessments and examinations	UG	592	3.4013	.69707	12.222	.000	-2.792	.005
	PG	425	3.5150	.55152				
Challenges in digital learning	UG	592	3.3498	.69547	2.617	.106	-4.121	.000
	PG	425	3.5221	.60119				

Discussions and Implications

The study results reveal the learners' approach to online learning and the new responsibilities that HEIs must recognize. Data from the present study include learners from all undergraduate and postgraduate classes, belonging to science, social sciences, humanities, commerce, management, and engineering disciplines. Our goal was to collect comprehensive data for analysis and determine whether learners from different disciplines and age groups offer significantly different perspectives on online learning and assessments. Other focused studies by Muthuprasad et al. (2021) in the context of agricultural sciences and Aslam et al. (2021) regarding library and information science learners in central universities yield similar results to the present study.

The research outcome highlights a positive result, indicating flexibility in the learner's approach to transitioning from offline to online learning and assessments; it has opened up opportunities to explore avenues that enhance their learning agility – redefining the concept of learning. The unexpectedness and unpredictability of the situation have led learners to find stability in their engagement with higher education. Educational institutions should consider adopting a hybrid approach that integrates both online and offline modalities. This approach could cater to diverse learning preferences while leveraging the advantages of digital learning tools and in-person interactions. While reviewing student engagement in Latin American higher education institutions, Salas-Pilco et al. (2022) found a positive engagement and appreciation for digital learning, a result similar to the present study's findings. A survey focused on learners' demographics and economic or social positions reveals a preference for in-person learning due to a lack of access to technical infrastructure (Goswami et al., 2021). Hence, it is essential to be cautious of this appreciation, as the COVID-19 pandemic prompted the shift to digital learning and assessment from the traditional classroom environment.

Learners' active suggestions in the survey to adapt blended learning are a clear indicator to consider digital learning experiences as an opportunity, especially as universities in India implement the New Education Policy (NEP) 2020 in the coming years. The NEP emphasises blended learning and learner-centred processes. Student perceptions regarding the online learning process are not limited to the demand for increased access to better infrastructure. A comprehensive survey based on global data by Turnbull et al. (2021) suggests that blended learning is the way forward for most higher education institutions. Drea (2021) invites faculty to adopt creative processes in their classroom ideas, rather than compartmentalizing them as in-person or online teaching. Another outcome or contribution from the present study is that visualising a blended learning pedagogy and curriculum is crucial for higher education institutions. In the coming years, it is important to consider the limited social interaction resulting from digital learning.

Further results of the survey report that 65% of the learners agree that digital learning increases social isolation. Stress and anxiety stemming from social isolation will result in limited classroom engagement. Classrooms foster a unique community of learners, facilitating interaction and communication that leads to productive learning (Tsang et al., 2021). Other surveys, as reviewed by Salas-Pilco et al. (2022) in different educational contexts, reveal the impact of isolation, stress, and anxiety on learning (Lovón & Cisneros, 2020; Mendoza-Lizcano et al., 2020; Rodríguez & Mesa, 2021; Santos et al., 2021). Therefore, the importance of learning in a social environment emphasizes blended learning, rather than assuming that digital classroom engagement can replace traditional classrooms. Higher education institutions can consider blended learning as they have matured, become focused, and are motivated to learn in a digital environment, compared to those in primary or secondary schools.

Moving from learning to assessment results indicated that 55% of the learners agree with the incidents of cheating. Learners have perceived that cheating is inevitable; however, most of them may not indulge in cheating. Online assessment was inevitable during the COVID-19 pandemic due to the government's declared lockdowns and learners' safety. However, the acceptance of unethical practices that learners use prompts a debate about online assessment among the faculty. Boitshwarelo et al. (2017) consider cheating a significant challenge in online assessments. Their conclusion is based on a literature review that utilizes data on online assessment, learner perceptions of online assessment, and the advantages of the assessment mode. A significant point to note in their report is that the faculty conducted the online assessment as a choice. Consequently, the challenges could be addressed systematically. However, during the pandemic, online assessment was the preferred mode, not a choice; very rarely could the learners and faculty be trained to use the online assessment methods effectively.

Hence, unethical practices need to be understood and addressed within the context of the COVID-19 pandemic and the practices adopted by the HEIs. There is a pressing need to prioritise digital literacy and integrity initiatives. Educational institutions should invest in robust strategies to promote academic integrity, provide technical support, and offer training programs that equip students with the necessary digital skills for achieving successful learning outcomes in online environments (Zakir et al., 2025). Furthermore, the study's results suggest that HEIs must foster a responsible atmosphere tailored to learners' needs and create spaces that nurture ethical learning communities. The assessment methods adopted during the pandemic are beyond the scope of this study. However, there is a profound reflection available regarding pedagogy and assessment (Roy & Brown, 2022). They draw our attention to the connection between pedagogy and assessment. Most of the HEIs adopted assessment methods based on the University Grants Commission's guidelines. However, our survey reveals a lack of training in writing open-book exams or being responsible for one's own performance when there is minimal surveillance during examinations.

The correlation results provide insights into engagement in online classes and performance in examinations. The results suggest that learners do not find online classes challenging to engage in. However, coping with online assessment was a challenge for the learners. Additionally, the survey revealed that learners lacked the necessary skills to cope with the technical glitches encountered during the assessment. T-test results indicated significant differences in the means of attitudes towards online classroom engagement and online assessments, as well as examinations and challenges in digital learning, among undergraduate and postgraduate learners. These results suggest that postgraduate learners are more independent and motivated than their undergraduate counterparts. HEIs must consider the difference in engagement and work more actively with undergraduate learners to create an inclusive, psychologically safe learning environment. Perhaps helping undergraduates to learn, rather than merely sitting in class, will help them engage positively with the learning. For policymakers, educators, administrators, parents, and learners, the key preoccupation has been ensuring the continuity of learning during the lockdown. There is minimal engagement by the student community to examine the learning experience.

CONCLUSION

We taught at an institution that responded swiftly to maintain the continuity of education amid the challenges posed by the COVID-19 pandemic. Before this situation, neither the faculty nor the institution had experience in complete online teaching and learning. The institution invested in upskilling the faculty and provided a dedicated technical support team to ensure continuity of academic support and address the challenges of digital teaching. However, as experienced educators, we began to question the implications of this transition. Despite regular attendance during synchronous hours and consistently high assessment scores, doubts emerged regarding the learners' genuine involvement in learning. These concerns provided the impetus for the present study, which seeks to understand learners' attitudes towards learning and assessment, probing beyond surface indicators of success. The article is situated within the broader debates about learner engagement, learning outcomes, and the validity of assessment in a digital environment during the COVID-19 pandemic. This study contributes to a critical conversation about long-term implications regarding digital learning in an emergency.

The research yielded interesting results about the learners' engagement with online learning and assessment. Learners prefer a blended mode of learning over traditional classroom settings or complete reliance on technology. However, the study reports that learners did not find online classes challenging. The learners acknowledge that dependence on online learning can lead to increased social isolation, suggesting that learning is not merely an intellectual activity in isolation, but a social process achieved through dialogue and communication in a classroom setting. During the assessment, learners accept that they have resorted to unethical means to complete the assessment. This result, understood within the context of the pandemic, suggests that designing online assessments under challenging circumstances is a complex task that requires careful consideration of social and emotional issues without compromising academic integrity.

The noted limitations and suggestions for further study are as follows. The study does not consider the learner's attitude towards specific subjects or fields. Hence, future research can focus on learners' attitudes towards specific subjects. The study also does not consider whether the faculty knew the learner's engagement intuitively and whether they adopted any measures to test their intuitive understanding. Research on the learner's engagement with specific subjects and the faculty's understanding of this engagement would contribute to the understanding of the online classroom, as hybrid teaching and virtual classrooms may not be a temporary phenomenon due to the pandemic. Furthermore, purposive sampling introduces researcher bias, as the sample is selected based on the researcher's judgment, limiting generalizability to a broader population.

REFERENCES

Almseidein, T. A., & Musa, O. (2020). Awareness of ethical issues when using an e-learning system. *International Journal of Advanced Computer Science and Applications*, *11*(1). https://doi.org/10.14569/ijacsa.2020.0110116

Aslam, S., Sonkar, S. K., & Owan, V. J. (2021). Changes in teaching and learning in higher education during COVID-19 lockdown: A study of LIS students in India. *Library Philosophy and Practice,* Article 5223. https://doi.org/10.2139/ssrn.3870575

Bates, A. W. (2019). *Teaching in a digital age* (2nd ed.). British Columbia/Yukon Pressbooks. https://pressbooks.bccampus.ca/teachinginadigitalagev2/

Batool, S., Mehrukh, N., & Waseem, M. (2023). Comparing the impact of online learning platforms and traditional classroom settings on student performance and satisfaction. *Global Educational Studies Review, VIII*(II), 343–354. https://doi.org/10.31703/gesr.2023(viii-ii).31

Bawa, P. (2016). Retention in online courses: Exploring issues and solutions – A literature review. *SAGE Open*, *6*(1). https://doi.org/10.1177/2158244015621777

Boitshwarelo, B., Reedy, A. K., & Billany, T. (2017). Envisioning the use of online tests in assessing twenty-first century learning: A literature review. *Research and Practice in Technology Enhanced Learning*, *12*, Article 16. https://doi.org/10.1186/s41039-017-0055-7

Chatwal, T. (2019). Digitalisation of higher education in India: A boom or a bane. *Research Journal of Humanities and Social Sciences*, *10*(4), 1083-1088. https://doi.org/10.5958/2321-5828.2019.00178.5

Cheng, X. (2020). Challenges of "school's out, but class's on" to school education: Practical exploration of Chinese schools during the COVID-19 pandemic. *Science Insights Education Frontiers*, *5*(2), 501-516. https://doi.org/10.15354/sief.20.ar043

Choudhary, R. (2020). *COVID-19 pandemic: Impact and strategies for education sector in India*. The Economic Times Business Verticals. https://government.economictimes.indiatimes.com/news/education/covid-19-pandemic-impact-and-strategies-for-education-sector-in-india/75173099

Comas-Forgas, R., Lancaster, T., Calvo-Sastre, A., & Sureda-Negre, J. (2021). Exam cheating and academic integrity breaches during the COVID-19 pandemic: An analysis of internet search activity in Spain. *Heliyon, 7*(10), e08233. https://doi.org/10.1016/j.heliyon.2021.e08233

Czerniewicz, L. (2020, March 15). *What we learnt from 'going online' during university shutdowns in South Africa*. On EdTech Newsletter. https://onedtech.philhillaa.com/p/what-we-learnt-from-going-online-during-university-shutdowns-in-south-africa

DC Correspondent. (2020, June 13). *What online education when 56 per cent of children have no access?* Deccan Chronicle. https://www.deccanchronicle.com/technology/in-other-news/130620/what-online-education-when-56-per-cent-of-children-have-no-access.html

Di Pietro, G., Biagi, F., Costa, P., Karpiński, Z., & Mazza, J. (2020). *The likely impact of COVID-19 on education: Reflections based on the existing literature and recent international datasets.* Publications Office of the European Union. https://data.europa.eu/doi/10.2760/126686

Drea, J. (2021, March 19). *Online? In person? The Power of letting students choose.* Harvard Business School Publishing. https://hbsp.harvard.edu/inspiring-minds/online-in-person-the-power-of-letting-students-choose

Gallagher, S., & Palmer, J. (2020, September 29). *The pandemic pushed universities online. The change was long overdue.* Harvard Business Review. https://hbr.org/2020/09/the-pandemic-pushed-universities-online-the-change-was-long-overdue

Gopal, R., Singh, V., & Aggarwal, A. (2021). Impact of online classes on the satisfaction and performance of students during the pandemic period of COVID 19. *Education and Information Technologies*, *26*, 6923-6947. https://doi.org/10.1007/s10639-021-10523-1

Goswami, M. P., Thanvi, J., & Padhi, S. R. (2021). Impact of online learning in India: A survey of university students during the COVID-19 crisis. *Asian Journal for Public Opinion Research*, *9*(4), 331-351.

Henriksen, D., Creely, E., & Henderson, M. (2020). Folk pedagogies for teacher transitions: Approaches to synchronous online learning in the wake of COVID-19. *Journal of Technology and Teacher Education*, *28*(2), 201-209. https://doi.org/10.70725/410492lqewwm

Hrastinski, S. (2008). *Asynchronous and synchronous e-learning*, *EDUCAUSE Quarterly*, *31*(4), 51-55. https://er.educause.edu/articles/2008/11/asynchronous-and-synchronous-elearning

Huber, S. G., & Helm, C. (2020). COVID-19 and schooling: Evaluation, assessment and accountability in times of crises – Reacting quickly to explore key issues for policy, practice and research with the school barometer. *Educational Assessment, Evaluation and Accountability*, *32*, 237-270. https://doi.org/10.1007/s11092-020-09322-y

Jain, S., Lall, M., & Singh, A. (2020). Teachers' voices on the impact of COVID-19 on school education: Are Ed-Tech companies really the panacea? *Contemporary Education Dialogue*, *18*(1), 58-89. https://doi.org/10.1177/0973184920976433

Jaques, D., & Salmon, G. (2007). *Learning in groups: A handbook for face-to-face and online environments* (4th ed.). Routledge.

Khalil, R., Mansour, A. E., Fadda, W. A., Almisnid, K., Aldamegh, M., Al-Nafeesah, A., Alkhalifah, A., & Al-Wutayd, O. (2020). The sudden transition to synchronised online learning during the COVID-19 pandemic in Saudi Arabia: A qualitative study exploring medical students' perspectives. *BMC Medical Education*, 20, Article 285. https://doi.org/10.1186/s12909-020-02208-z

Khan, M. A., Vivek, V., Khojah, M., Nabi, M. K., Paul, M., & Minhaj, S. M. (2021). Learners' perspective towards e-exams during COVID-19 outbreak: Evidence from higher educational institutions of India and Saudi Arabia. *International Journal of Environmental Research and Public Health*, *18*(12), 6534. https://doi.org/10.3390/ijerph18126534

Lakshman Naik, G., Deshpande, M., Shivananda, D. C., Ajey, C. P., & Manjunath Patel, G. C. (2021). Online teaching and learning of higher education in India during COVID-19 emergency lockdown. *Pedagogical Research*, 6(1), em0090. https://doi.org/10.29333/pr/9665

Lancaster, T., & Cotarlan, C. (2021). Contract cheating by STEM students through a file sharing website: A Covid-19 pandemic perspective. *International Journal for Educational Integrity*, 17, Article 3. https://doi.org/10.1007/s40979-021-00070-0

Lieberman, M. (2020). *COVID-19 & remote learning: How to make it work*. Education Week. https://www.edweek.org/technology/covid-19-remote-learning-how-to-make-it-work/2020/07

Liu, X., Zhou, J., Chen, L., Yang, Y., & Tan, J. (2020). Impact of COVID-19 epidemic on live online dental continuing education. *European Journal of Dental Education*, *24*(4), 786-789. https://doi.org/10.1111/eje.12569

Lovón, M., & Cisneros, S. (2020). Impact of virtual classes on university students in the context of the COVID-19 quarantine: The case of PUCP. *Propósitos y Representaciones*, *8*(SPE3), e588. https://doi.org/10.20511/pyr2020.v8nSPE3.588

Makoe, M. (2012). Teaching digital natives: Identifying competencies for mobile learning facilitators in distance education. *South African Journal of Higher Education*, *26*(1), 91-104. https://doi.org/10.20853/26-1-152

Mendoza-Lizcano, S. M., Alvarado, P. W., & Delgado, M. B. (2020). Influence of COVID-19 confinement on physics learning in engineering and science students. *Journal of Physics: Conference Series*, *1671*, 012018. https://doi.org/10.1088/1742-6596/1671/1/012018

Mishra, L., Gupta, T., & Shree, A. (2020). Online teaching-learning in higher education during lockdown period of COVID-19 pandemic. *International Journal of Educational Research Open*, *1*, 100012. https://doi.org/10.1016/j.ijedro.2020.100012

Muthuprasad, T., Aiswarya, S., Aditya, K. S., & Girish, K. J. (2021). Students' perception and preference for online education in India during covid-19 pandemic. *Social Sciences & Humanities Open*, *3*(1), 100101. https://doi.org/10.1016/j.ssaho.2020.100101

National Council of Educational Research and Training. (2020, August). *Students' learning enhancement guidelines. Government of India.* https://ncert.nic.in/pdf/announcement/Learning_%20Enhancement_Guidelines.pdf

Pandit, D., & Agrawal, S. (2021). Exploring challenges of online education in COVID times. *FIIB Business Review*, *11*(3), 263–270. https://doi.org/10.1177/2319714520986254

Paul, J., & Jefferson, F. (2019). A comparative analysis of student performance in an online vs. face-to-face environmental science course from 2009 to 2016. *Frontiers in Computer Science*, *1*, 7. https://doi.org/10.3389/fcomp.2019.00007

Pelikan, E. R., Korlat, S., Reiter, J., Holzer, J., Mayerhofer, M., Schober, B., Spiel, C., Hamzallari, O., Uka, A., Chen, J., Välimäki, M., Puharić, Z., Anusionwu, K. E., Okocha, A. N., Zabrodskaja, A., Salmela-Aro, K., Käser, U., Schultze-Krumbholz, A., Wachs, S., … Lüftenegge, M. (2021). Distance learning in higher education during COVID-19: The role of basic psychological needs and intrinsic motivation for persistence and procrastination – a multi-country study. *PLoS ONE*, *16*(10), e0257346. https://doi.org/10.1371/journal.pone.0257346

Rodríguez, M. Z., & Mesa, M. L. C. (2021). The school sense in front of COVID-19. The perception of students from public universities in Hidalgo. *Revista Conrado, 17*(78), 46-53. https://pesquisa.bvsalud.org/global-literature-on-novel-coronavirus-2019-ncov/resource/en/covidwho-1156343

Roy, S., & Brown, S. (2022). Higher education in India in the time of pandemic, sans a learning management system. *AERA Open*, *8*. https://doi.org/10.1177/23328584211069527

Rucker, R., & Downey, S. (2016). Faculty technology usage resulting from institutional migration to a new learning management system. *Online Journal of Distance Learning Administration*, *19*(1). https://ojdla.com/archive/spring191/rucker_downey191.pdf

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, *55*(1), 68-78. https://doi.org/10.1037/0003-066x.55.1.68

Salas‐Pilco, S. Z., Yang, Y., & Zhang, Z. (2022). Student engagement in online learning in Latin American higher education during the COVID‐19 pandemic: A systematic review. *British Journal of Educational Technology*, *53*(3), 593-619. https://doi.org/10.1111/bjet.13190

Salcedo, C. S. (2010). Comparative analysis of learning outcomes in face-to-face foreign language classes vs. language lab and online. *Journal of College Teaching and Learning*, *7*(2), 43-54. https://doi.org/10.19030/tlc.v7i2.88

Santos, L. M., Grisales, D., & Suero Rico, J. (2021). Perception and technological accessibility of university students in southwest of the Dominican Republic during Covid-19. *International Journal of Education for Social Justice*, *10*(1), 145-165. https://doi.org/10.15366/riejs2021.10.1.009

Schmidt, S. W., Tschida, C. M., & Hodge, E. M. (2016). How faculty learn to teach online: What administrators need to know. *Online Journal of Distance Learning Administration*, *19*(1). https://ojdla.com/archive/spring191/schmidt_tschida_hodge191.pdf

Sudevan, P. (2020, May 11). *Why e-learning isn't a sustainable solution to the COVID-19 education crisis in India*. The Hindu. https://www.thehindu.com/sci-tech/technology/why-elearning-is-not-a-sustainable-solution-to-the-covid19-education-crisis-in-india/article31560007.ece

Thomas, L. (2012). *Building student engagement and belonging in Higher Education at a time of change.* Paul Hamlyn Foundation. https://s3.eu-west-2.amazonaws.com/assets.creode.advancehe-document-manager/documents/hea/private/what_works_final_report_1568036657.pdf

Tsang, J. T. Y., So, M. K. P., Chong, A. C. Y., Lam, B. S. Y., & Chu, A. M. Y. (2021). Higher education during the pandemic: The predictive factors of learning effectiveness in COVID-19 online learning. *Education Sciences*, *11*(8), 446. https://doi.org/10.3390/educsci11080446

Turnbull, D., Chugh, R., & Luck, J. (2021). Transitioning to e-learning during the COVID-19 pandemic: How have higher education institutions responded to the challenge? *Education and Information Technologies*, *26*(5), 6401-6419. https://doi.org/10.1007/s10639-021-10633-w

Ünal, P. D. (2021). Factors affecting study habits in higher education during the COVID-19 pandemic. *Anatolian Journal of Education*, *6*(2), 109-124. https://doi.org/10.29333/aje.2021.629a

Upadhyay, H. P., Koirala, P., & Sedain, P. (2021). University student's attitude towards virtual learning during COVID-19 pandemic in Nepal. *Journal of Chitwan Medical College*, *11*(3), 11-15. https://doi.org/10.54530/jcmc.496

Watts, L. (2016). Synchronous and asynchronous communication in distance learning: A review of the literature. *The Quarterly Review of Distance Education*, *17*, 23-32. https://api.semanticscholar.org/CorpusID:56803102

Yang, X., Li, D., Liu, X., & Tan, J. (2021). Learner behaviors in synchronous online prosthodontic education during the 2020 COVID-19 pandemic. *The Journal of Prosthetic Dentistry*, *126*(5), 653-657. https://doi.org/10.1016/j.prosdent.2020.08.004

Zakir, S., Hoque, M. E., Susanto, P., Nisaa, V., Alam, M. K., Khatimah, H., & Mulyani, E. (2025). Digital literacy and academic performance: the mediating roles of digital informal learning, self-efficacy, and students' digital competence. *Frontiers in Education*, *10*, Article 1590274. https://doi.org/10.3389/feduc.2025.1590274

Zalat, M. M., Hamed, M. S., & Bolbol, S. A. (2021). The experiences, challenges, and acceptance of e-learning as a tool for teaching during the COVID-19 pandemic among university medical staff. *PLoS ONE*, *16*(3), e0248758. https://doi.org/10.1371/journal.pone.0248758

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