

Perceptions of Faculty and Students in Online Learning: Lessons From the COVID-19 Pandemic

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The COVID-19 pandemic significantly changed how universities provide education -- teachers switched to online teaching methods, while students quickly adapted to the online learning environment. This study adopts the Community of Inquiry (CoI) framework to examine differences in student and faculty perceptions of online learning due to the impact of the COVID-19 pandemic. Student and faculty perceptions can be used to evaluate and ultimately improve the quality of education. This study used survey methods and data collection instruments with a Likert scale sample of 150 students and 150 faculty from a US university. This study's results indicate a significant difference between perceptions of pedagogy, technology challenges, and difficulties in online Zoom courses. Furthermore, the authors provide practical implications for educators and administrators to navigate the rapid growth in online learning.

Keywords: online education, traditional learning, online learning, student learning, student engagement, Zoom

INTRODUCTION

Understanding students' perspectives on the online learning mode and making changes in the teaching-learning process to improve students' satisfaction and learning preferences. Research shows that students' satisfaction with learning experiences can influence their learning. Students' satisfaction often translates into higher engagement, improved performance, and greater perseverance, ultimately leading to better academic results. Satisfaction, in this sense, is not merely about the joy of learning; it extends to aspects such as the comprehensibility of the subject matter, relevance to the field of study, and the effectiveness of the instructional methods used (Ramsden, 1991). Given the transformative power of technology in education, particularly online teaching and learning, there is a pressing need for more extensive and thorough research in this domain (Sengupta & Vaish, 2023; Alavi and Leidner, 2001).

It is documented that the transition to exclusive online learning can highly affect the educational process and students' perception of using the online environment. The paradigm shift towards online teaching made

it crucial and necessary to analyze whether students have adapted to online learning and whether they are satisfied with this exclusive online experience. Therefore, it becomes essential to explore questions such as: What are students' preferences regarding content delivery and presentation mode? Which is the students' preferred multimedia platform? What factors make the learning experience enjoyable, meaningful, and supportive for student learning? What are the students' perceived advantages and disadvantages of online learning? Would students' preferences align with instructors' perspectives regarding the above questions? How can teachers improve active student involvement? How can teachers create an effective environment that triggers the appropriate mental and emotional state for learning?

Similarly, what are faculty perceptions regarding online teaching, and do teacher and student perceptions match? Answers to these questions help instructors align course material and delivery with students' needs and preferences to make learning efficient and enjoyable. Proper assessments and timely feedback to online learners are essential to online learning and are challenging for educators and the education system (Doucet et al., 2020).

The structure of this paper is as follows: in section 2, we examine the significant viewpoints within the literature about traditional versus online education. Section 3 is dedicated to the review of online technologies employed in online education. The data-gathering methods and methodology are detailed in Section 4. Section 5 highlights the results and discusses our findings. Section 6 offers a concise recapitulation and concludes. Lastly, section 7 puts forward practical implications based on our study, while section 8 discusses the limitations and future research.

LITERATURE REVIEW

Theoretical Lens

To explain the differences in the use of technology in the learning process between students and faculty, the Community of Inquiry (CoI) framework (Garrison, Anderson, and Archer, 2001) can be a useful theoretical perspective. The CoI framework focuses on three key components of online learning: cognitive presence, social presence, and teaching presence.

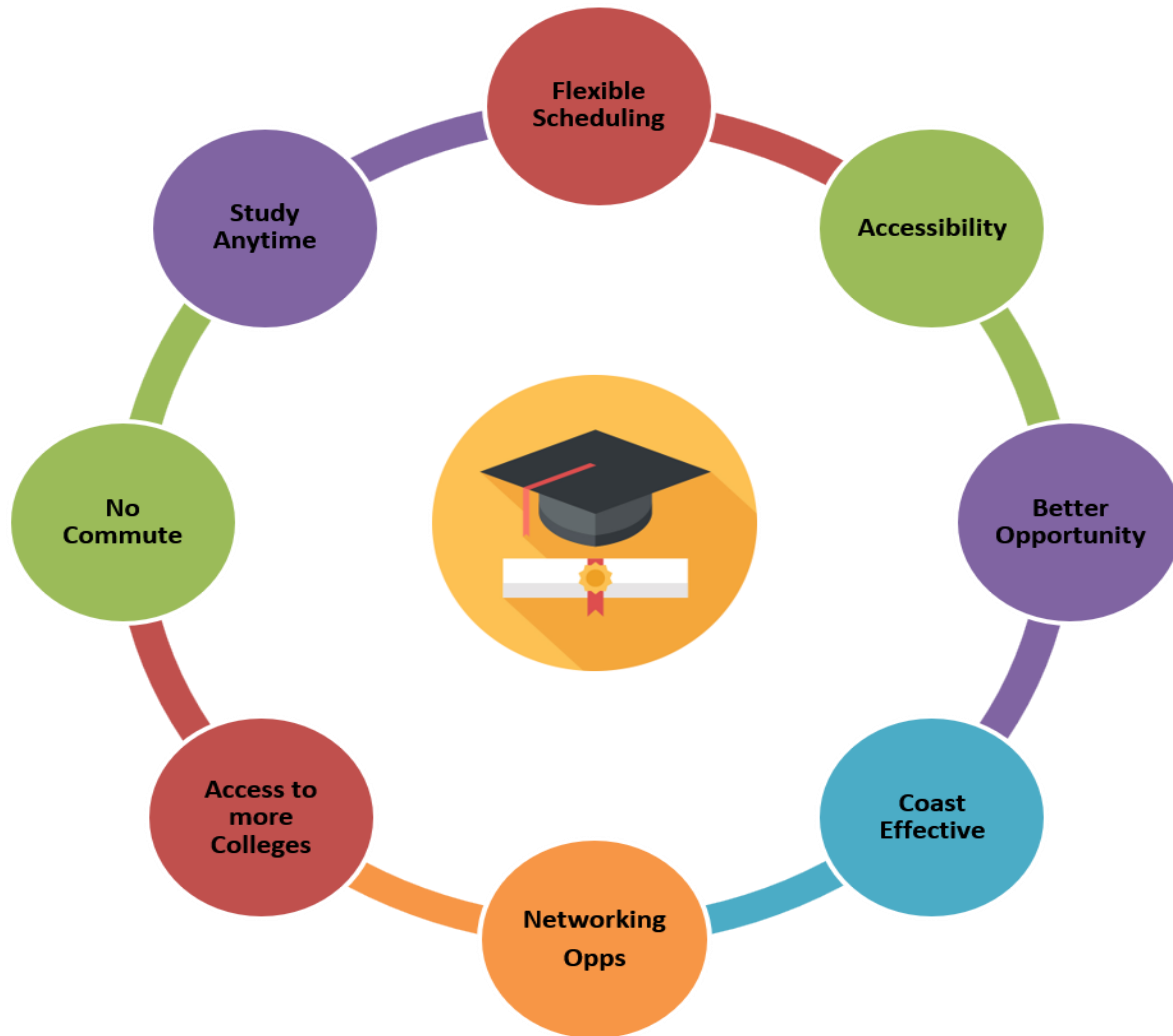
Cognitive presence refers to the extent to which learners are able to construct and confirm meaning through sustained reflection and discourse. Students and faculty may have different levels of comfort and strategies for using technology to support cognitive presence. For example, students might rely more on online discussion forums or collaborative platforms to engage in discussions, while faculty might use technology to deliver instructional content, provide resources, or facilitate meaningful learning activities.

Social presence refers to the ability of learners to project themselves socially and emotionally in a learning community. Students and faculty may have different preferences and approaches to using technology for social presence. Students may interact through social media, online forums, or video conferencing tools to connect with peers and build relationships. On the other hand, faculty may use technology to foster social presence by providing feedback, facilitating online discussions, or creating opportunities for collaboration.

Teaching presence refers to designing, facilitating, and directing online learning experiences. Faculty play a significant role in orchestrating technology use within the learning process. They may design and implement various technological tools and resources to support instruction, assessment, and feedback. Students, as learners, interact with these technological tools and resources provided by faculty, but their role in using technology for teaching presence is typically more limited.

These components can help shed light on the differences in perceptions about the online learning environment and its technological opportunities and challenges.

FIGURE 1
BENEFITS OF ONLINE EDUCATION



Online Education vs Traditional Education

Before the growing popularity of online learning, on-campus learning was students’ most common learning format. Traditional education’s numerous perks make it impossible to be entirely replaced by any other learning format. Students benefit from traditional learning, including improving their social skills while interacting with their teachers and classmates (University of the Potomac, 2022). These interactions create meaningful relationships that will last for years. Students can also maintain interpersonal relationships by joining clubs and group meetings to share notes and study for exams. Attending on-campus classes enables retaining those relationships, whereas sustaining relationships poses challenges in online learning (University of the Potomac, 2022). Moreover, traditional classroom teaching delivers lab or clinical practice courses more appropriately, where students can access equipment and materials. Finally, access to the library and research materials held by the university help students realize their full capability with in-depth study in a particular field. Other advantages of traditional education include immediate feedback, fostering competition, and requiring fewer disciplines (University of the Potomac, 2022).

Online and distance learning has become popular among college students in recent years. A key benefit of online education is flexibility- allowing students more freedom in their schedules (Canaran and Mirici, 2020). However, the increased flexibility requires students to be highly self-motivated and disciplined to

keep up on the assignments needed and manage their time accordingly. Therefore, traditional education does have an advantage over online education when it comes to discipline and motivation. On the other hand, online learning requires digital literacy and tech-savviness (Rodriguez, Ooms, and Montanez, 2008).

Online education offers many advantages for learners, as summarized in Figure 1. They include flexibility, accessibility, better opportunities, cost savings, unlimited access to knowledge, and a positive influence on student performance (Basilaia and Kvavadze, 2020; Burac et al., 2019; Smith&Limniou,2010; Singh, O'Donoghue & Worton 2005; Holley & Taylor, 2008; sit et al., 2005; Womble, 2008).

Some aspects of online learning might be considered obstacles in students' process of learning. They include delayed feedback or help due to the unavailability of teachers when students may need assistance while learning and feelings of isolation due to classmates' lack of physical presence (Yusuf et al., 2013). There are also specific requirements for making online education accessible and worthy to students of all ages. Both teachers and students should be able to navigate, evaluate, and erect information using various online technologies. They must adapt to emerging software applications and information management trends and be prepared for the dynamic technical environment. The role of the instructor in online teaching changes from dominant authority to a mentor who guides on the side and leads the learning process (Nycz and Cohen, 2007). Students experience a one-on-one, tailored instruction-a shift from a curriculum-centered to a lecture-centered environment (Gallie and Joubert, 2004). Lack of comprehensibility of the concept and guidance for online platform uses hinders online student learning (Hasan and Hassan Khan, 2020). Reduced contact hours for learners and a lack of consultation with teachers when facing difficulties in learning/understanding may lessen the student's academic performance (Sintema, 2020).

In addition, students are questioning whether it is worthwhile to pay for on-campus experience when the instruction has been primarily remote. Academic integrity challenges of online education also need to be considered. For example, it is believed that cheating is more common online than in traditional in-person courses (Watson and Sottile, 2010). Therefore, the question of the greater rate of students cheating in online classes needs to be considered in evaluating the reliability of online education (Holden et al., 2021). Most importantly, students have raised issues with online proctoring or surveillance software, such as Respondus lock-down browser, related to privacy issues, bandwidth requirements, and feelings of distrust (Macnish, 2017). Finally, students with special educational needs, such as hearing impairment, visual impairment, and mobility disabilities, require additional training with support and guidance for online learning. Unfortunately, many caregivers and parents at home cannot attend to such needs; therefore, there is a need to invest time and resources to explore and research the best alternatives for the special educational needs of these learners (Pokhrel and Chherti, 2021). Table 1 highlights the advantages and disadvantages of traditional and online learning (Dumford and Miller, 2018; Davis, 2017; Alsaaty et al., 2016).

The Challenges and Opportunities of Online Teaching During COVID-19

Several colleges and universities discontinued face-to-face teaching within the pandemic and were forced to carry out student activities exclusively online (Dhawan, 2020).

Researchers have studied the issues and challenges of successful online teaching (Marks et al., 2005; Kebritchi et al., 2017; Nel et al., 2017). For example, a recent study conducted a qualitative survey of 408 students at a few colleges in India to uncover their perspectives on online learning. Results indicated that students enjoyed online learning and the flexibility of online classes. On the other hand, students named poor network connectivity, lack of interactions, distractions, and one-sided learning as disadvantages of online learning (Hasan and Hassan Khan, 2020).

Another study found the weakness of online teaching infrastructure, the information gap, teachers' limited knowledge in online teaching, and the non-conducive environment for learning at home as significant issues impeding effective online teaching and learning (Pokhrel and Chhetri, 2021). Another research paper studied the critical success factors in teaching online courses through the Zoom platform in Brazil (Joia and Lorenzo, 2021). The results identified teachers' digital competence in the platform technology and the support available in the digital environment as significant factors for achieving course pedagogical objectives. The study further revealed that soft skills courses are more likely to achieve their online teaching goals than hard skills from the student's perspective (Joia and Lorenzo, 2021). Another

study of online teaching and learning of Romanian students identified technical issues followed by teachers' lack of technical skills and teaching style as prominent disadvantages of online learning (Coman et al., 2020).

TABLE 1
TRADITIONAL VS ONLINE LEARNING

Learning Type	Advantages	Disadvantages
Traditional Learning	<ul style="list-style-type: none"> * Immediate feedback * Direct contact with students and instructors * Instructor-led learning process * Access to campus services and activities * Instructor generated motivation 	<ul style="list-style-type: none"> * Instructor-centered * One-time instruction * Restricts available time * Rigid deadlines * Participants limited to availability of resources * More expensive to deliver
Online learning	<ul style="list-style-type: none"> * Learner-centered and self-study * Unlimited access to knowledge * Time and location flexibility * Unlimited repetitive instructions * Available to a global audience * Cost-effective for learner * Individually generated motivation * Could encourage the development of competencies and confidence * Allows physically challenged students with more options 	<ul style="list-style-type: none"> * Lack of availability of all majors * Networking challenges * Could be more frustrating and confusing * More preparation time for the instructor

Unlike the teaching and learning experiences in the standard classroom setting, online and distance learning provide the opportunity to teach and learn innovatively (Pokhrel and Chherti, 2021). In the face of the pandemic that forced remote learning, instructors have used various online proctoring tools to mimic in-person testing conditions and uphold testing integrity, knowing that cheating occurs more often in online courses (Holden et al., 2021). However, all seems not to be going well for students in these remote learning and testing environments. For example, students have raised issues with adapting themselves to online learning, including having proper access to the Internet, managing their time and organizing their homework, Respondus lockdown browser, privacy issues, bandwidth requirements, and feelings of distrust (Almahasees, et al., 2021).

Students' Perspectives on Online Teaching

Higher education institutions are faced with the challenges of making learning accessible and worthy for students of all ages. Understanding students' preferred online learning methods help faculty align technology and pedagogy in tune with students' interest and learning preferences. The idea that students have clearly defined and robust preferences towards technology use is invalid. Some students may be

indifferent or may resist technology adoption (Sanford & Oh, 2010). Quality teaching and learning in an online environment is an essential factor in students' satisfaction with online classes (Thurmond et al., 2002). Studies support flexible study time and multiple media sources to supplement instruction as another factor that affects students' online learning (Thurmond et al., 2002; Dawyer, 2003; Rodriguez, Ooms & Montanez, 2008).

Similarly, Interactive and engaging course design also influences students' satisfaction with online learning (Song et al., 2004). Other studies show that improved interaction between students and instructors might increase students' satisfaction and online learning performance (Friesen and Kuskis, 2013). Research has shown that students' learning ability is positively influenced by their teachers' support and their own computer self-efficacy (Liu et al., 2023). Finally, the weakness of online teaching infrastructure and the limited exposure of teachers to online teaching could impede the quality of education and learning in the classroom (Pokhrel and Chherti, 2021, Aboagye, et al. 2020; SchoolEducationGateway, 2020). While adapting to the new online technologies, teachers' and students' readiness needs to be gauged and supported accordingly (Ducet et al., 2020).

Researchers have identified several other factors influencing students' satisfaction with online teaching. The absence of these factors may cause anxiety and impair learning (Pokhrel and Chherti, 2021; Hasan and Hassan Khan, 2020; Roberts et al., 2005; Motteram & Forrester 2005; Rodriguez, Ooms & Montanez, 2008).

- Interaction with teachers and other students
- Course content and delivery method
- Technical support and services
- General knowledge of computer and Internet technologies
- Accessibility and affordability of computers
- The non-conducive learning environment at home
- Stable internet connection with good speed

As discussed earlier in this paper, researchers identified some elements that might be considered obstacles in students' online learning process (Peper et al., 2021, Almahasees et al., 2021, Fadhilah et al., 2021, Gallis and Krull, 2020, Dumford, and Miller, 2018, Davis, 2017). However, these obstacles can be overcome when teachers adapt their teaching strategies to the needs of students with experience and knowledge about teaching in the online environment (Peper et al., 2021). Thus, we hypothesize that:

Hypothesis #1: There are significant differences between faculty and students' perceptions of online classroom learning.

Online Technologies for Online Education

Educational institutions use various technologies such as Zoom, Teams, and Google Classroom to conduct synchronous classes and give students an experience of an "in-person" course. In addition, LMS (Learning Management Systems) such as Canvas and Blackboard are being used for uploading recorded lectures, administering exams, collaborations, and other activities, and online platforms offered by book publishers are used for a smooth online teaching and learning experience. Online tools such as Second Step and voice chat have been added to make group and classroom discussions more engaging and successful (Nussli & Oh, 2018; Dugartysrenova & Sardegna, 2019). Video conferencing platforms such as ZOOM, WebEx, Google Meet, Microsoft Teams, and learning management systems like Moodle, Blackboard, and Canvas have been utilized to support students' learning in all possible manners during the lockdown.

Video/voice content is commonly used to support flipped instruction, providing learning resources such as articles, pre-recorded videos, and YouTube links before the class (Ducet et al., 2020; Tuna et al., 2018). Text-rich discussions involve students in either synchronous, real-time chatting about course content or asynchronous postings that resemble blog entries on emerging topics (Herring, 2001). Synchronous text-based tools enable a "live" online discussion about ideas and questions on course topics during class time (Zengilowski & Schallert, 2020). Synchronous discussions among students offer an alternative that allows

students to engage peers and their teachers in intellectual conversation. These tools can be explored further after resuming face-to-face classes and providing tailored resources and coaching for learners (Pokhrel and Chherti, 2021). However, these tools might not be as effective in teaching as promoted by vendors. Therefore, educational researchers and practitioners must turn a critical eye to such learning activities to determine when and how they are practical and can tweak their use to make them more beneficial to students (Gillett-Swan, 2017).

Online Teaching via Zoom

Zoom is the most popular tool providing quality audio, video, and screen sharing and has been used for virtual conferences, online lectures, meetings, webinars, etc. In addition, faculty are using the different features of Zoom to create interactive learning environments, including a virtual whiteboard with breakout rooms to create small collaborative group work, polls for students' feedback, and chats to facilitate class discussions. Moreover, zoom can record meetings and make them available for future reference (Serhan, 2020).

Several recent studies examined whether online classes are practical and the challenges instructors and students face during Zoom classes (Spathis and Dey, 2021; Gillis and Krull, 2020; Serhan, 2020). One study showed that some students have difficulty learning online via Zoom classes and offered students enhanced learning suggestions (Gillis and Krull, 2020). Another study found no apparent relationship between the students' attention as measured by Zoom and their performance (Spathis and Dey, 2021). A recent study analyzed the differences in communication between live and computer communications, student concerns, facial expressions, auditory processing, and educator issues classes (Peper et al. 2021). The study found that nearly 94 percent of students had moderate to considerable difficulty with online learning. The study concluded that instructors could improve online learning by staying current on methods that keep students' attention. Zoom. Additionally, instructors must create an environment that triggers the appropriate mental and emotional state for student learning, optimizes arousal, and regenerates vision (Peper et al., 2021).

Another study investigated students' views toward using Zoom in remote learning and their impressions of its effects on their learning and engagement compared to face-to-face learning (Serhan, 2020). The objectives were to measure student attitudes about the usage of Zoom learning, how students view the impact of Zoom on their learning, and the student's impressions of their classroom involvement while using Zoom. The study concluded that students were dissatisfied with their learning experience during this transition period mainly due to several variables, such as technical issues (Serhan, 2020).

In a related study, the author examined whether Zoom is a better option for online classes in Pakistan (Minhas et al., 2021). The authors used a Likert-type questionnaire among bachelor's, postgraduate, and doctoral students from three Pakistani universities. The questionnaire was designed to determine Zoom's effectiveness, video/audio quality, sharing material/screen, recording lectures, general interface, overall class management via Zoom, ease of use, and teacher-student interaction. The study found that students were satisfied with class management, the Zoom application interface, screen sharing, and lecture recording (Minhas et al., 2021).

Finally, another recent study used classroom observations and a Likert scale questionnaire to examine students' experience and perception of the implementation of synchronous e-learning through Zoom in Indonesia (Fadhilah et al., 2021). The results indicate that synchronous e-learning allows for easy contact between students and teachers and between students.

Given the above, we hypothesize that:

Hypothesis #2: *There are significant differences between faculty and students' perceptions of online classroom technology.*

DATA COLLECTION AND METHODOLOGY

This study intends to assess the online learning experiences of students and teachers in universities during the COVID-19 pandemic to improve and strengthen the online learning system. The goal is to

investigate the students' and teachers' views on online learning platforms and how these technologies help the learning process. Furthermore, the study attempted to identify the main difficulties students and teachers encountered in the online learning environment. Therefore, this study can improve the development of an effective online learning process by providing information such as effective use of technology, content design, and efficient delivery methods. More specifically, the authors seek to identify differences in perceptions of faculty and students in online learning via Zoom.

Methodology

A cross-sectional descriptive study was conducted using a questionnaire in September and October of 2021 for the students and faculty at a West Coast 4-year university in the United States to examine the online learning experience during COVID-19. The questionnaire included 41 questions about student and faculty perceptions of online learning, engagement, use of technology and various challenges and difficulties. The survey also included questions related to demographics. Answer choices included Likert scale responses (strongly disagree to strongly agree) to questions such as "Most students/I turn on their/my camera during Zoom lectures" and several open-ended questions.

The questionnaire was emailed to the participants for data collection. Written informed consent was also collected from the participants. Subjects were either students currently enrolled in the university or current faculty. In total, 150 undergraduate and graduate students and 150 faculty members' surveys were retained for this study. The details of the participants are shared in Table 2. This table reveals that more Females (n=166, 55.3%) participated in the study than males (n=134, 44.7). Faculty (n=150, 50.0%) and students (n=150, 50.0%) participated in study. Students' Academic level spread between (n=21, 7.0%) freshmen, sophomore (n=40, 13.3%), junior (n=50, 16.7%), and senior (n=39, 13.0%) students. Faculty teaching level higher in number both graduate and undergraduate (n=74, 24.7%), graduate (n=34, 11.3%) and undergraduate (n=42, 14.0%) participated in the study.

After collecting data, the next step was editing the raw data. We excluded the incomplete scales and the questionnaires with inappropriate responses. The questionnaires were separated according to the study population, i.e., questionnaires filled by males and females were separated, and the corrected data was finalized for scoring. All the data was entered in SPSS, and the completed data was labeled. Numerical values were given to the variables for identification in the analysis through SPSS. Descriptive, frequency, correlation, and independent samples t-test analyses were conducted to determine students' and faculty perceptions of online learning.

To effectively assess the constructs of pedagogy and technology, we recognized the need to narrow down the initial pool of 41 survey questions. Our objective was to select a set of items that would best capture the essence of each construct while maintaining measurement reliability. Through a systematic and rigorous process, we carefully evaluated each question's relevance and content validity concerning the constructs of interest. After thorough consideration, we successfully dwindled the initial pool of 41 questions to a focused set of 7 questions about pedagogy and 6 questions relating to technology. The selected questions underwent subsequent reliability analysis to ensure the internal consistency and reliability of the measurement scales. Cronbach's alpha (Cronbach, 1951) coefficient was calculated for each construct, providing a quantitative measure of internal consistency. The pedagogy construct (Cronbach's alpha coefficient: 0.576) was measured by a set of seven survey questions, suggesting a moderate level of internal consistency, indicating some variability in participants' responses within this construct. The technology construct was measured by six survey questions and exhibited a higher level of internal consistency, with a Cronbach's alpha coefficient of 0.660. This suggests a more satisfactory level of reliability within the technology construct, indicating greater consistency in participants' responses.

TABLE 2
DEMOGRAPHIC CHARACTERISTICS OF THE SUBJECTS

Characteristics	n	%
Gender		
Male	134	44.7
Female	166	55.3
Faculty/Student		
Faculty	150	50.0
Student	150	50.0
Student Academic Level		
Freshmen	21	7.0
Sophomore	40	13.3
Junior	50	16.7
Senior	39	13.0
Faculty Teaching Level		
Graduate	34	11.3
Undergraduate	42	14.0
Both Graduate and Undergraduate	74	24.7

RESULTS AND DISCUSSIONS

Pedagogy

Table 3 displays the results of questions about pedagogy for faculty and students and those that yielded significant differences between the two groups. H1 was supported, as there are significant differences between faculty and students' perceptions of online classroom learning.

When asked if moving to an online university due to COVID-19 negatively impacted faculty teaching experience and students' grades/university experience, over half of the students felt that COVID-

19 negatively impacted their grades and university experience. Ultimately, students are more negative than faculty about their online experience ($\beta = 0.27, p < .01$).

When discussing engagement through various activities, group work was highlighted as an activity that faculty and students viewed differently. A probit regression revealed that students responded lower than average given the negative beta coefficient ($\beta = -.34, p < .01$). For mandatory student/professor meetings, 93% of faculty felt such meetings were important (38.18 – important, 54.55% - very important) while 85.5% students felt these were important (47.59% - important, 37.95% -very important). The probit regression supported those students showed a significantly lower response ($\beta = -.41, p < .001$) than faculty.

For online discussion boards, 97% of faculty and 80% of students felt these were important. However, the probit regression showed that students' response was significantly lower on average ($\beta = -.65, p < .0000$) than faculty.

For in-classroom activities, although a majority of both the groups (96% faculty and 84.4% students) felt that these are important, the probit regression showed that the student's response was significantly lower on average ($\beta = -.25, p < .01$) compared to faculty.

88.6% of faculty and 71.3% of students felt these were important for gamified activities. However, for this activity, too, the probit regression showed that students' response was significantly lower on average ($\beta = -.32, p < .01$) compared to faculty. The above results show that from the given activities. However, a vast majority of students and faculty felt these were important, but the student's responses, on average, were lower than those of the faculty. This implies that some students would instead do a lecture than engage actively with their peers in various activities.

TABLE 3
RESULTS OF QUESTIONS ABOUT PEDAGOGY

	Questions	Faculty % Positive	Students % Positive	Beta
Q3	Did moving to an online university due to COVID-19 negatively impact your teaching experience? For students, the question was - For me, moving to online education due to COVID-19 negatively impacted my grades/university experience.	28.5	49.8	($\beta = 0.27, p < .01$)
Q8.1	What activities do you believe would encourage student engagement – Group Work	97	79.5	($\beta = -0.34, p < .01$)
Q8.2	Rate the importance of these activities that you believe would encourage student engagement - Mandatory Meetings	93	85.5	($\beta = -.41, p < .001$)
Q8.3	Rate the importance of these activities that you believe would encourage student engagement - Online Discussion Boards	97	80	($\beta = -.65, p < .0000$)
Q8.4	Rate the importance of these activities that you believe would encourage student engagement - In classroom activities	96	84.4	($\beta = -.25, p < .01$)
Q8.5	Rate the importance of these activities that you believe would encourage student engagement - gamified activities	88.6	71.3	($\beta = -.32, p < .01$)

* Of the 7 questions related to pedagogy, one was insignificant and therefore left out of Table 3.

Technology

Table 4 displays the results of questions about technology for faculty and students, along with those that yielded significant differences between the two groups. Again, H2 is supported, as there are significant differences between faculty and students' perceptions of online classroom technology.

Around 78% of faculty agreed that their students turn on their cameras, while 48% said yes. Another 35.6% of students responded to 'sometimes' ($\beta = -.18, p < .1$). When asked, faculty felt it should be mandatory for students to turn on their cameras, with 63% of faculty saying yes. Approximately 81% of faculty agreed, and ~62% of students agreed, while 10.5% of faculty and 18% of students disagreed with the statement. The probit regression model did not show any significant differences between the responses of the students and faculty.

When students were asked an open-ended question about why they do turn their camera on, some reasons stated were – “so that I can be more engaged”, “it is expected of us”, “it depends on the teacher”, “more likely to focus when people see me”, “I turn it on to see with others”, “it is easy to use”, “because it can cause better communication”, “its respectful”, “to see people”, “I like to see and be seen”, “because need to turn on”, “I like to feel immersed, and that happens more with ‘on’”, “I want my professor to see me and that I am attentive.” An opposing view mentioned students’ anxiety when turning their cameras on... “When turning your camera on during Zoom lectures, it can almost distract the actual learning process. For example, when I turn my camera on, I often look at myself in the corner of the screen to monitor how I appear to others. I also feel hindered when doing ordinary tasks like taking a drink from a water bottle or getting up to use the bathroom. It is silly, but I think many students would agree that we tend to get camera anxiety.”

For breakout rooms in a virtual class, almost 94% of faculty felt it was necessary (56.36% - important, and 37.58% - very important), while 73.7% of students felt breakout activities were important (44.31% - important, and 29.34% - very important). The probit regression supported those students showed a significantly lower response ($\beta = -.47$, $p < .0001$) than faculty. Students may prefer the less active approach to learning by just listening to lectures in the main room. Meanwhile, faculty strongly believe breakout rooms are important for students to work on applying what they’ve learned in class and discuss with classmates.

For online discussion boards, around 82.3% of the faculty surveyed agreed with the statement, and 66.5% of students agreed. 7.4 percent of faculty and 15.6% of students disagreed. The probit regression did not show any significant differences between the students’ responses and faculty on average ($\beta = -.20$, $p < .1$).

For Livestream, synchronous Zoom lectures over prerecorded lectures, around 78.5% of faculty agreed, while 60% of students agreed. The probit regression showed that students’ response was significantly lower on average ($\beta = -.33$, $p < .01$) than faculty. Students prefer to do an online course at their own pace with no class times. It might be easier for faculty to talk to students in real-time than just pre-record lectures and videos.

When asked if faculty or students preferred online or virtual over in-person classes, slightly more than half of the faculty (56.1%) agreed and slightly less than half (48%) of the students agreed with the statement, while 22% of faculty and 38% of students disagreed. The probit model did not show any significant differences in the average responses of the students and faculty ($\beta = -.20$, $p < .1$).

In an open ended-questions related to oral presentations on Zoom, faculty mentioned that zoom presentations were easier because of its ease of operation, the fact that anyone can join from any location, the inclusion of easy-to-use sharing features, including the chat, and that it is easier to view questions from students. In addition, students reported that with oral presentations, they were less nervous, could prepare for class, and found the courses on Zoom easy to operate and manage.

For many, this presentation format was a new experience that made teaching and learning more difficult. A few reasons why some faculty found Zoom presentations difficult were based on internet connection issues for themselves or their students, which cost time. Faculty felt that students did not pay attention in virtual settings and that some were nervous with online presentations, making it challenging to judge presentations. In addition, many faculty face problems with their computer, as all the electronic equipment must work to be effective. Finally, many faculty felt online presentations could not replace in-person oral presentations.

TABLE 4
RESULTS OF QUESTIONS PERTAINING TO TECHNOLOGY

	Questions	Faculty % Positive	Students % Positive	Beta
Q9/Q10	Most of my students turn their cameras on during Zoom lectures/	78	48	($\beta=-.18, p<.1$)
Q11	In zoom interactions, breakout rooms help students connect with their classmates/ In zoom interactions, breakout rooms help me connect with my classmates and/or group members.	81	62	($\beta=-.47, p<.0001$)
Q12	Online discussion boards provide a useful way for students to interact with their classmates and professor/ Online discussion boards provide a useful way for me to interact with my classmates and professor.	82.3	66.5	($\beta=-0.20, p<0.1$)
Q13	I preferred live-streamed (synchronous Zoom) lectures over pre-recorded lectures	78.5	60	($\beta=-.033, p<.01$)
Q19	I prefer online/virtual classes over in-person classes	56.1	48	($\beta=-.20, p<0.1$)
Q22	Oral presentations are easy to navigate online via zoom.	75.4	57.3	($\beta=-0.28, p<.1$)

SUMMARY AND CONCLUSION

This study examines faculty and student opinions and perceptions of online teaching and learning via Zoom. Therefore, this study's objectives are to evaluate if there are any significant differences in perceptions of online learning via Zoom among faculty and students during the Covid-19 pandemic.

This study's results show areas where there were significant differences between perceptions of online learning via Zoom and engagement among faculty and students during the Covid-19 pandemic. As in past studies, this study highlighted technological, educational, and engagement concerns as the key issues impacting and disrupting online learning during COVID-19 (Mahyoob, 2020). In addition, the study's findings show that faculty and students had trouble with online tests and assessments (Khan et al., 2021).

The second hypothesis illustrated a considerable difference between faculty and students' perceptions of online teaching and learning usefulness. Past studies found that the perception of e-learning among students and faculty is higher than the average level. According to the students, online teaching is a new trend, as students are becoming more aware of the value of modern technology in their education (Premalatha, 2013). According to the research, 94.26 percent of teachers communicated with students online, while 57.94 percent of students believed online engagement was insufficient and burdensome. In one-on-one online meetings, students frequently appear calm and open. It could be the solution because comfortable and extroverted students are more likely to interact with professors (Browne, 2020).

This study's results show that students faced many challenges during online learning compared to faculty during the pandemic. This research supports previous findings. According to recent research, students have had difficulty attending online classes. As per the data, students' struggles with online courses include a lack of meaningful interaction with faculty, a lack of interest in joining classes, and schedule management (Almahasees, Mohsen, and Amin, 2021). Another study highlighted that COVID-19 difficulties were tough for everybody, especially students (Almendingen et al., 2021). Because of several interruptions, focusing and maintaining self-discipline may be challenging. Numerous students stated that they felt alone in their studies and that feeling alone while responsible for mastering the material was challenging (Almendingen et al., 2021).

Lastly, this study revealed that faculty have more difficulty engaging via Zoom than students during a Covid-19 pandemic. This study's result support previous findings and illustrate that faculty participants thought their classrooms were harder to control because faculty feel stressed and are usually in a rush; adjusting to online teaching is difficult. Faculty members' critical concerns in teaching revolve around testing and assessment and students' engagement with their teachers' online classes (Chierichetti and Backer, 2021). Further, several earlier researchers found that faculty thought e-learning took time, caused problems with student supervision, and reduced engagement in direct classroom teaching (Bhardwaj et al., 2015). According to Zalat, Hamed, and Bolbol (2021), 43 percent of faculty believed online training evaluations are much more difficult for students due to connectivity challenges. Many teachers were unaware of virtual evaluation platforms and did not have the requisite equipment and training to conduct them.

It is concluded that faculty and students encounter exceptional circumstances in online learning. These students and faculty faced difficulties and challenges with the improvised online instruction after the quarantine and self-perceived lower learning outcomes than before the outbreak. They have adjusted swiftly to the new environment but have also expressed concerns about shifting to new online teaching techniques.

PRACTICAL IMPLICATIONS AND THE WAY FORWARD

As educational institutions cope with the rapid growth of online learning, it is critical to understand the relationship between online interaction and learning and how instructors might nurture educationally effective interactions. Our literature review identified the main challenges for faculties and students in switching to online/distance learning. These include access to technology (computers, software, stable Internet connection, etc.), increased workload, lack of support and concentration, and stress working from home. Our study's findings suggest that necessary technical changes must be made in online learning design to facilitate peer interaction, support, and socialization in the online learning environment. Further, support in terms of more educational resources would help teachers and students meet the challenges of online teaching.

We recommend teachers and institutions improve the features liked by students, including involvement, flexibility, and accessibility of materials. Online platforms should be designed to provide opportunities for interaction between faculties and students, including mandatory meetings and online discussion boards. Faculties should reconfigure their teaching and incorporate active student involvement by integrating multiple media presentations and activities to make learning more participative for students. Additionally, for live streams, students prefer synchronous Zoom lectures over prerecorded lectures. It might be easier for faculty to talk to students in real-time than prerecord lectures and videos. For an online asynchronous class (which do not have set class times), faculty might want to build optional Zoom sessions every two weeks to regularly check in with students and/or further clarify difficult concepts. Knowledge of such differences in perceptions can drive effective online teaching for faculty. Appropriate and timely professional development, such as short courses on online teaching and opportunities for teachers to share resources, ideas, and challenges, could provide interesting possibilities for innovation and new ways of working.

At this time, although most universities have returned to fully in-person classes, there is a significant shift in the workforce to fully remote or hybrid work models. This shift is correlated to some students

demanding flexibility in continuing with online courses or a mix of traditional classroom and online learning. The flexibility that comes with the online course modality is especially important for the non-traditional college student juggling family responsibilities and a part-time or full-time job (see Wiley's 2022-2023 Top 5 Trends Report). Higher education institutions would need to become more inclusive and provide equitable access to education for all groups of students. Although the government restrictions about online learning have now eased, universities and colleges worldwide need to evolve and be mindful of our future workforce and their preferences.

The paper contributes to designing an online course that meets the needs of the students without sacrificing the quality of learning and the use of technology to meet learning goals. The study's findings provide insights to faculty about strategies and tactics to implement while designing their syllabi and lesson plans for a virtual class. In addition, the results would inform administrators and policymakers on adopting technologies and pedagogy that enhance student learning and engagement while making the educators' time and efforts worthwhile. This would facilitate faculty to prepare our students for the workforce – high-quality talent with sound knowledge and the proper attitudes towards working in online environments. Finally, this study can help move the conversations around effective online teaching to prepare faculty to include features that create a high-quality student experience.

LIMITATIONS AND FUTURE RESEARCH

In this paper, we have outlined hypotheses on how perceptions of students and faculty differ on two aspects of an online course – online classroom learning and online classroom technology during COVID-19, wherein uncertainty and stress levels were enhanced. The results supported our hypotheses. However, for generalizability, future research could sample different universities across the United States and analyze how students at the undergraduate and graduate levels perceive online learning and associated online technology. Furthermore, the coefficient for the pedagogy construct fell below the commonly accepted threshold of 0.7, and the coefficient for the technology construct approaches it; therefore, it is worth considering further examination and potential refinement of the measurement items. In addition, our study did not examine nor control institution-level factors such as their budget for teaching and learning technologies, incentives for faculty to acquire online teaching certificates, and so forth. Hence, an analysis might be required on a university's budget for teaching and learning technologies, utilization of the same, preferences of students and their satisfaction with their university's technology, and mandatory certification (for example, Quality Matters) completion for faculty who teach online courses. With the emergence of AI (artificial intelligence) tools such as ChatGPT, maintaining the integrity and value of a university course, especially an online course, could become more challenging. Similar research incorporating questions to faculty and students about using such open AI tools and how these could be leveraged to serve faculty and students is required so that universities could serve their students in a way that makes them capable individuals who are fit for the current workplace.

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