STUDENT ACCESS TO VIRTUAL LEARNING DURING THE COVID-19 PANDEMIC

Gifty Akomea Key, John Doyle, Vinayak Mathur,* Alia Sheety, Maia Magrakvelidze, Celia Szelwach, Joseph Cimakasky, & John Cordes

Cabrini University, Radnor, Pennsylvania 19087, USA

*Address all correspondence to: Vinayak Mathur, Cabrini University, Radnor, Pennsylvania 19087, USA, E-mail: vm7027@cabrini.edu

This study reports university students' ratings of their perceived learning experiences in adapting to one of three course modalities during the fall 2020 semester's COVID-19 pandemic restrictions. During that semester, students were offered either fully online, hybrid/hyflex, or in-person courses. Approximately 795 undergraduate and graduate students at a small liberal arts university in the eastern United States were emailed a 40-item survey questionnaire in the spring of 2021 that asked them to reflect on their learning experiences in the previous semester. The survey endeavored to discover answers to these research questions: how did students rate their learning experiences in the fall semester of 2020; how did they compare those experiences to previous semesters; and what were the environmental settings of online or hybrid/hyflex students, including use of online cameras? Ninety-nine students (12.5%) completed the survey (69 undergraduates and 30 graduate students). Topline results included the following: undergraduate and graduate students rated their learning experiences differently, with graduate students giving higher ratings to all modalities. Among undergraduates, 14% of those with in-classroom courses said they learned less compared to previous semesters, 52% of those taking online courses said they learned less, and 26% of those enrolled in hybrid/hyflex courses said they learned less compared to previous semesters. Two-thirds of the undergraduate students accessing fully online courses disliked having cameras on since the majority of the undergraduates taking online courses accessed them in a personal room.

KEY WORDS: COVID-19, hybrid/hyflex, online learning, students' perceptions, learning experiences

1. INTRODUCTION

One crisis ends, another begins—this seems to be the fate of human societies. Through each crisis, adaptations are developed in efforts to reset norms. In response to the restrictions adapted by societies to counter the spread of the COVID-19 virus, in the spring

semester of 2020, many universities shifted from their traditional mode of in-person classes to online classes. The shift was in place generally by March of 2020, which was near the midpoint of the spring semester for many universities in the United States. As the restrictions continued, university administrators advised students and faculty members that the fall semester courses would be taught primarily online or via a partially online and in-person format.

The quick transition to emergency online formats has generated substantial research, which has found both positive and negative perceptions by students regarding this forced change. Parker et al. (2021) studied how undergraduate and graduate students in the United States perceived the rapid transition from in-person to fully online classes. They found that compared to pre-pandemic in-person classes, students who were forced into online classes were less engaged and less satisfied with remote learning. Armstrong et al. (2022) found that the online change negatively affected motivation and efficacy of learning. However, Clinkenbeard & Bonsangue (2022) found that for freshmen mathematics courses students' learning in online classes was comparable to that in in-person classes. Vishwanathan et al. (2021) found that at a medical institute in India students were satisfied with the mandated change to online class formats and found them to be useful.

With the aim of expanding this research, in this study we examined students' self-reported perceptions of their learning experiences during the 2020 fall semester with respect to one or more of these three modalities: (a) completely online classes (synchronous or asynchronous), (b) hybrid/hyflex classes (i.e., the instructor offered a combination of online and in-person classes for all students or a combination of online and in-person classes, where the student chose the venue), and (c) completely in-person classes.

2. BACKGROUND

Research on the effects of the shift to online learning caused by the COVID-19 crisis has been extensive. In an international study based in Russia, Abdimusa et al. (2022) studied the psychological and motivational aspects of the transition to primarily distance education among both graduate (N = 226) and undergraduate (N = 223) students in four Russian Federation universities. Students in the sample completed a survey, which measured readiness for independent work and the impact on academic performance, and a diagnostic test of motivation and values. The findings included a 10 percentage point difference between undergraduate and graduate students, where graduate students were more likely to complete work and initiate research.

In a second international study (Rabayah & Amira, 2022) conducted in Palestine, the researchers administered an online survey during the pandemic to over 11,000 Palestinian students in grades 8–12 to measure how students responded to and viewed e-learning practices. Two-thirds of the students had negative attitudes toward e-learning in "effectiveness, ease of use, interactivity, motivation, and academic assessment of the e-learning platform" (Rabayah & Amira, 2022, p. 1).

Capahay (2020), drawing on research about the use of learning spaces in selected countries (China, Denmark, Taiwan, Australia, and both Singapore and Hong Kong) during the pandemic, suggested avenues for reconceptualizing learning spaces. His research is part of the expanding literature studies on learning spaces predominately prior to the COVID-19 pandemic. He found that physical distancing measures and the need for emergency remote learning drove spatial reconceptualization, as did variables ranging from screen font selection to models of online classrooms. Additionally, Capahay (2020) used the theory of transactional distance with its three factors of dialog, structure, and autonomy to aid in this reconceptualization.

Griffiths et al. (2021) used a sociomateriality perspective in a case study to investigate remote learning spaces. The study (*N* = 18) posed two research questions:

1. What were students' perceptions to the response of the Higher Education Institution in the United Kingdom on the imposed changes to their learning?

2. With a focus on learning spaces, how did students perceive the early changes required by the pandemic?

The findings indicated that students multi-purposed and adapted their living spaces to meet online learning needs and selected spaces for learning based on comfort, such as noise, light, mood, seating, desk space, and technology. As students lost access to spatial resources on campus, they adapted the spaces in their homes. For example, while a stool was not the piece of furniture to use to study, a bed, on the other hand—which typically is reserved for rest—could be used while accessing an online course. This use, in turn, could pose issues with how students interpret learning experiences and how others perceive their attitudes toward their classwork (Griffiths et al., 2021).

Turning to the United States, Kee (2021) focused his research on the emotional and psychological impact of the COVID-19 restrictions on graduate students, which moved them from in-classroom to online courses at Morgan State University (Baltimore, MD). In a small, qualitative study (*N* = 7), he identified five themes in graduate students' reflection papers over six weeks. Overall, these students experienced general anxiety over losing control of their studies and life.

Swanson et al. (2021), using the critical incident technique, asked 309 undergraduate marketing students (211 in a midwestern public university and 98 from a southern private university) to share a satisfactory and/or dissatisfactory experience in any marketing course during the switch from in-person to online classes in the 2020 spring semester. The results showed an almost even incidence of satisfactory and dissatisfactory experiences when switching to online learning. Six hundred incidents were analyzed (307 satisfactory; 301 dissatisfactory). The researchers identified six themes that indicated satisfaction with flexibility was the most noted indicator of satisfaction by students in online classes. Student responses were quoted, indicating they felt that professors would be more willing to adjust the pacing of the class online. Students believed that by asynchronous online compared to in-person classes, they had the flexibility to review material at their own pace rather than

trying to experience class content in the single face-to-face setting. The researchers found six themes that indicated dissatisfaction, with the most prevalent theme being the lack of adaptability.

Gardner & Stotts (2022) found that students had positive experiences when switching to online courses during the pandemic. The study was set in Southeast Community College (Lincoln, NE) and the students were enrolled in adult basic education and adult secondary education courses (the number of students involved in the study was not reported). The authors asserted that "instructional changes during the pandemic showed that remote classes are viable, advantageous for students, and increased accessibility as they continued to be offered alongside traditional classes" (Gardner & Stotts, 2022, p. 39).

In research designed by Cernusca & Mallik (2022), all of the students in a Pharmaceutics 1 course at North Dakota State University (Fargo, ND) were invited to participate in a study designed to answer the following three exploratory research questions about a course transition to an online format. (a) Did the transition affect the usefulness of active learning strategies? (b) Did the transition change students' epistemic beliefs? (c) Did the transition change/affect performance outcomes? The final sample was comprised of 75 students in the face-to-face group and 63 students in the synchronous online group. Variables were rigorously explored and operationalized. For each question, statistical analysis found no difference between the two groups. The researchers concluded that "highly integrated active learning tasks successfully transferred to the online format … student performance, perceptions and opinions were similar or slightly better when compared with the face-to-face format of the course" (Cernusca & Mallik, 2022, p. 1).

While these studies showed positive outcomes for rapid switches to online formats, other studies found different results. Armstrong et al. (2022) studied the effects of switching rapidly to an online version of a course in the spring of 2020. One hundred sixty-three undergraduates who experienced this switch at a major U.S. university were asked to complete a course assessment survey. The students surveyed needed to have been in a face-to-face course for two weeks and switched to the online version for at least two weeks. In a carefully constructed analysis, the researchers found that generally switching to online diminished learning and performance, although more highly self-regulated students were impacted to a lesser degree.

Previous literature studies have shown differing assessments of the effects of the rapid emergency change to online formats during the spring of 2020. In our study, we focused on student perceptions of their learning experiences; specifically, in the 2020 fall semester, at which point faculty members had six months to experience both the immediate two month change in the spring and the three months of summer to prepare for their fall courses in one of three modalities. We explored both undergraduate and graduate perceptions of their learning experiences broken out by modality that fall. In addition, we looked at two environmental settings: (a) students' locations in the home while accessing a course online and (b) the faculty-required use of Zoom cameras by students while online.

3. THE STUDY

Beginning in the 2020 fall semester, a group of eight faculty members at a small eastern liberal arts university began to develop a survey questionnaire to gather student evaluations of their learning and its settings during the first 13 weeks of the 15-week semester (during the final two weeks after the Thanksgiving break all of the courses went online due to a decision by the administration). While the university traditionally offered primarily face-to-face course modalities, during the pandemic the university offered these delivery modalities: (a) hybrid, where students attended online and in-person classes based on the instructor and/or lesson plan; (b) hyflex, where the class was taught in person by the instructor and students had the option of attending in-person or online (special hyflex hardware and software programs were installed in multiple classrooms); or (c) online only, where the entire class was taught virtual. Online delivery was further broken down into synchronous (where instructors lectured and interacted with students online in real time) or asynchronous (where the instructor and the students in the course all engaged with the course content at different times) classes. The study sought to answer the following two research questions:

1. What were graduate and undergraduate students' perceptions of their learning experiences during the 2020 fall semester when they were in courses taught in the fully online, hybrid/hyflex, or in-person modalities?

2. How did students use the two environmental settings of (a) home location for accessing courses online and (b) required use of Zoom cameras during online accessed courses?

The final version of the questionnaire was administered as a Microsoft form with 40 questions distributed via email to 795 students at both the undergraduate and graduate levels. These students were majoring in the departments of science (biology, physics, and chemistry); education, health and exercise sciences; digital communications and social media; and the graduate organization development and change program. All of the students in these majors and programs were sent a link to the questionnaire. The survey collected demographic information, and used Likert scales to rate experiences and open-ended questions to explain the ratings. In this study, we focused on the questions about students' perceptions of their learning experience.

A pilot survey was administered to a small sample (N = 10) of undergraduate students in late fall of 2020, who had volunteered to complete the survey and give the researchers feedback on its structure, the questions asked, and the ease of completion. The survey was then adjusted. The final draft was submitted to the campus' Institutional Review Board (IRB) for review in January of 2021. The study was approved by the IRB in early February.

Of the approximately 795 undergraduate and graduate students who were sent the link to the survey, 99 students completed the survey for a 12.5% response rate, with 69 undergraduate respondents and 30 graduate respondents. These respondents did reflect the wider university enrollment in terms of gender, race, ethnicity, and academic class level

(Table 1). However, an overwhelmingly high number of participants [47 undergraduate (68%) and three graduate (10%) students] were from the School of Natural Sciences and Allied Health. Of the 99 participants in the study, the majority (54%) reported high grade point averages (3.5 or higher) with 26 of the 69 undergraduates (38%) and 28 of the 30 graduate students (93%) having 3.5 or higher grade point averages. Demographic information about the participants is shared in Table 1.

TABLE 1: Demographic breakdown of participants

Participant	Undergraduate (%)	Graduate (%)
Gender		
Male	29	23
Female	71	73
Housing		
Commuters	42	100
Campus Residents	58	—
Race or ethnicity		
Asian	4	7
Black American	30	18
Hispanic	11	4
White	55	71
Class level		
Freshman	33	—
Sophomore	22	—
Junior	23	—
Senior	22	—
School		
Business, Arts, and Media	17	37
Education	5	57
Humanities & Social Sciences	8	—
Natural Sciences & Allied Health	70	6

n = 99 with 69 undergraduate and 30 graduate.

4. RESULTS

To understand students' perceptions of their learning experiences during the fall of 2020 with respect to the emergency transition due to COVID-19, the students were asked to rate their experience in each of three modalities (in the classroom, online, and hybrid) using the Likert scale. Students could choose one of five options: poor, fair, neutral, good, and excellent. Students were also asked if they thought they had learned more, about the same, or less in the fall of 2020 compared to earlier semesters with in-person instruction. Each of the previous questions was followed by an open-ended single question asking students to explain their rating. In addition, students were asked about the home location they used to access virtual classes during the fall of 2020 and whether they preferred having the required Zoom camera on or off.

4.1 Student Perception Rating Their Learning Experience through the Various Modalities

Participants in the study were asked to rate their perception experiencing the three types of course delivery—in the classroom, online, and hybrid/hyflex (partially online/partially in the classroom)—during the fall of 2020, with respect to the emergency changes due to COVID-19. On a five-point Likert scale, the findings indicated that students rating their experiences as positive in the three modalities was on the higher end (Table 2). To look at whether there was a significant relationship between the ratings of the various modalities, a correlation was run (Table 3). The results indicated that there was a significant moderate relationship in the ratings between the online and partially online ($r = 0.66$) and the in-class and partially online ($r = 0.61$) modalities, while there was a weaker relationship in the ratings between the in-class and online ($r = 0.36$) experiences, all with the significant level of 0.01.

TABLE 2: Frequencies of students rating their perception

Rank for Experience	In Classroom (%)		Online (%)		Hybrid (%)	
	Under-graduate	Graduate	Under-graduate	Graduate	Under-graduate	Graduate
Excellent	26.70	75	7.4	35.7	17.6	50
Good	38.3	25	35.3	50	35.3	50
Neutral	23.3	—	26.5	3.6	31.4	—
Fair	10	—	20.5	3.6	11.8	—
Poor	1.7	—	10.3	7.1	3.9	—
N	60	12	68	28	51	12

Note: *N* = excluded from data participants who reported they did not have an experience in the specific modality.

TABLE 3: The relationship between rating the various modalities

Modality	In Class	Online	Partially Online and In Class
In class	—	.36**	.61**
Online	.36**	—	.66**
Partially online and in class	.61**	.66**	—

** Correlation is significant at the 0.01 level (two-tailed)

Reviewing the frequencies of the ratings with different variables (i.e., graduate versus undergraduate, gender, and race), it was noticeable that graduate students expressed rating their perceptions of their learning experience higher with the three modalities compared to undergraduate students (Table 2). To ascertain whether the differences were statistically significant between graduate and undergraduate students rating their perception of their learning experience during the fall of 2020, due to the ordered categorical variable, an independent samples Mann–Whitney test was applied, which showed a significant difference ($p < 0.05$) between graduate and undergraduate rating per each modality. To better understand the findings, the responses to the open-ended questions were analyzed, and the results are shared in the subsequent sections.

4.1.1 In-Classroom Perceived Learning Experiences

Although only 40% of the graduate students reported attending in-classroom courses, everyone (100%) of those respondents reported good-to-excellent experiences in the in-classroom setting. Eighty-eight percent of undergraduate students reported attending in-classroom courses. Out of the undergraduate students attending in person, 64% reported good-to-excellent experiences. Undergraduates who ranked their in-classroom experience as fair or poor (13%) mostly shared that being in class during COVID-19 seemed to be an inappropriate modality. For example, Dawn, a sophomore majoring in communications and social media, expressed that "Everyone seemed uncomfortable, no one talked except the professor, there was no sense of class community or discussion. It was just not engaging." Another undergraduate wrote: "The masks and social distancing made class feel weird." In other words, the required social distance, anxiety, and lack of sense of class community had a toll on undergraduate students, which was reflected in how they rated their in-person class experiences during the fall of 2020.

4.1.2 Online Perceived Learning Experiences

Overall, the majority of undergraduate (98%) and graduate students (93%) attended online classes during the fall of 2020, in which 85.7% of graduate students reported excellent or good experiences with the online delivery modality compared to 43% of undergraduate students. Only 10.7% of graduate students reported their experience with the online as fair or poor, while 31.8% of the undergraduate students reported fair-to-poor experiences with the online modality. Students' explanations of their rating led to the emergence of several themes: content difficulty, instructor and online instructional design, engagement, and distraction.

4.1.3 Content Difficulty

Existing research suggests that students who perceive subject matter to be difficult prefer face-to-face rather than online instruction (Bassili, 2008). With the sudden transition to online teaching due to COVID-19, some faculty members were not prepared to teach online and many higher education institutions did not have the capacity to support faculty in such a short time. Ting & Lee (2012) argued that the perceived level of difficulty is an important factor influencing a student's behavior. Students adopt different learning approaches when faced with content perceived to be highly difficult. Hence, it was not surprising that in the open-ended question, participants in the current study referred to the complexity of the course content when explaining their rating. Courses that were perceived by students as having difficult content were more challenging to take online and the students rated their experience on the lower end. Students missed the in-person interaction with the instructor and other students. For example, Natasha, a freshman majoring in exercise science and health promotion, reflected on her experience by sharing that "My hardest classes were online. I felt like I was teaching myself and it would've been easier to ask questions, get feedback, and make sure I'm 'teaching myself' the right things if we were in person." Another student, Rachel, a junior majoring in biology, shared, "I felt I couldn't focus and since I had difficult courses, it was hard for me especially it being online which I'm not used to." A freshman majoring in communications shared, "For certain subjects like math, it was hard to understand some of the concepts I was being taught online."

The descriptions that undergraduate students provided to explain their responses to the content difficulty were consistent with previous research outcomes. For example, Kemp & Grieve (2014) compared undergraduate students' preferences and academic performance during the presentation of class material and written assessments online and within the classroom. Students rated face-to-face teaching much higher than online teaching and feedback suggested they felt more engaged during face-to-face teaching due to receiving immediate feedback. Only one graduate student response to the open-ended question

explaining their rating had content difficulty as a factor in their rating: "I did not like the class that I was enrolled in. I had extreme difficulty with the content."

4.1.4 Instructor and Online Instructional Design

Designing and teaching online courses require skills that faculty members might have lacked if they did not have previous professional development in online pedagogy or previous experience in online course design and teaching. The emergency transition to online teaching from one day to the next did not allow enough time to train faculty and develop and design the courses. Therefore, students' complaints were loud and clear. For example, a mathematics undergraduate student shared, "teachers did not know how to use the technology or sometimes they did not have a backup plan if it was not working." David, a senior majoring in biology, stated that "Instructors presented information in 'YouTube' style, that basically was them lecturing for 60 minutes to a PowerPoint. Did not feel real and was too easy to disconnect from the instructor." Another student majoring in biology wrote that "some of my teachers did not seem prepared for the online learning." On the graduate students' side, the respondents provided explicit explanations related to course design. One of the graduate students stated, "It depended on the quality of the instructional design"; another mentioned, "Some were better than others in terms of learning since most were through lectures and recordings."

4.1.5 Less Engagement

Less engagement was another concept that students used to describe and explain their ranking when they were not satisfied with the online format. The perceived lack of engagement in online classes may be tied to the previous topic of instructional design. Faculty members who found themselves in 2020 transitioning to teaching online without being asked or trained were not prepared with best practices to engage students online. Clara, a freshman in health science wrote, "Classes sometimes weren't as engaging." A digital communications student also explained, "The online format makes it hard to stay focused, therefore I say the experience was fair." Another freshman majoring in exercise and science added, "Problems within getting connection to teacher." A graduate student shared, "Didactic courses or conversationally focused lesson plans were not very engaging."

4.1.6 Distraction

In a comprehensive literature review study, Wang (2022) identified three main types of distraction: multitasking, mind-wandering, and using digital devices. Wang (2022) proposed two additional types of distraction: unexpected interruptions and consistent interference. In our study, we asked students explicitly what they perceived as the most common distraction

in online classrooms. Students reported phones, other people, and social media as the main distractions. When students were asked to explain their rating of the learning in the course modality, Sam, a freshman in biology shared that:

> I would take notes slower than the lectures and then have to rewatch the lectures sometimes even twice in order to process the information; whereas in person, I feel like you could see if not everyone is done writing or if someone is confused.

Another example of a less positive experience with the online modality was provided by Anna, a senior majoring in political science, who shared the challenge of retaining information online: "I am unable to retain information online. My college courses were just centered around receiving the good grades instead of learning anything new."

Graduate students who expressed low satisfaction from their online experience shared the following reasons: (a) the course was asynchronous with no option for synchronous class meetings and discussion, which could be traced back to instructional design and engagement or lack of; (b) the class was accelerated, which was viewed negatively for both synchronous (hard to focus online after a few hours) and asynchronous (too much to do on your own in such a short time) modalities; these were related more to higher-level program issues than instructional ones.

On the positive side, graduate and undergraduate students also had comments indicating they appreciate the online delivery model especially during the COVID-19 times. However, we placed less emphasis on these comments since our goal was to learn about challenges that will help faculty better understand students' perceptions and supports needed to create better learning experiences as they prepare to teach online classes.

4.1.7 Partially In-Classroom, Partially Online Courses

Again, in this modality only 40% of graduate students reported taking part in such courses. Still, those who did expressed high satisfaction, with 100% reflecting on their experience as good or excellent, while only 58% of the undergraduate students ranked their experience in the modality as good or excellent. To understand what makes the experience positive in a hybrid delivery, graduate participants shared that being hybrid "was best fit for work and family life" and "I liked that we got into class some of the time."

Undergraduate students who expressed positive experiences in the hybrid delivery shared that "It was nice to have some in-person time, in case I had questions or needed to talk to the professor about something," "I chose this rating because I didn't really have many problems besides getting to campus," and "I liked the hybrid classes. There is balance between in-person and online. When I had a question, I was able to ask the teacher during the in-person classes, and during online was able to take efficient notes." On the other hand, undergraduate students who expressed low ratings for their experience in the partly in-classroom/partly online modality shared that "the shift between both modalities was challenging," "I had a hard time comprehending the material with only coming in for labs and

having lectures online" (a biology major), and "This form of attendance was difficult to keep up with for me personally."

4.2 Students' Perceptions of Level of Learning Pre- and During the COVID-19 Pandemic

All of the participants—graduate and undergraduate—were asked to report the level of learning during the 2020 fall semester (during COVID-19) compared to previous semesters (pre COVID-19) by rating their learning experience as less, the same, or more. Overall, compared to previous semesters, 47% of graduate and undergraduate students combined reported they learned about the same with in-person instruction, 50% reported they learned about the same with online instruction, and 61% reported they learned about the same in the partially in-class and online (hybrid) modality. A positive correlation was found between in-person and partially in-class and online (r = 0.34; p < 0.01) and a stronger moderate correlation was found between online delivery and partially in-class and online delivery (r = 0.5 = < 0.01).

A separate comparison of the results for the graduate and undergraduate students with respect to the three delivery modes indicated some differences between their perceptions. Table 4 provides detailed frequencies of the participants' ratings. Performing an independent samples Mann–Whitney test resulted in a significant difference (p = 0.002) between graduate and undergraduate ratings for the online delivery and partially in-classroom/partially online (p = 0.046) modalities, with no significant differences between graduate and undergraduate students for the in-classroom format.

TABLE 4: Frequencies of students reporting their perception of level of learning

Rank for Level of Learning	In Classroom (%)		Online (%)		In Classroom and Online (Hybrid)	
	Under-graduate	Graduate	Under-graduate	Graduate	Under-graduate	Graduate
Learned more	38.7	43.8	7.6	12.5	15.1	27.3
Learned about the same	46.8	50	40.9	75	58.5	72.7
Learned less	14.5	6.2	51.5	12.5	26.4	0
N	62	16	66	24	53	11

Note: *N* = excluded from data participants who reported they did not have an experience in the specific modality.

The results confirmed some of the narrative we had from undergraduate students feeling that a mix of in-classroom and online courses caused some confusion, when 26.4% expressed that they learned less in a combination of in-person and online classes. However,

even when they were asked about the online classes, 51.5% of the undergraduate students reported learning less during the COVID-19 pandemic. The results also aligned with the questions related to students' rating their perception of learning experiences for each of the modalities in the fall of 2020. Graduate students expressed learning about the same or more in the various modalities during the fall of 2020 compared to previous semesters, which was higher than that experienced by the undergraduate students (Table 4). This can be explained by their higher rating of their experiences during the fall of 2020, which indicates a trend that should be further studied. Comparing the three modalities for when all students reported they learned less, compared to the in-person (13%) and hybrid (22%) modalities, the online format had more respondents who expressed that they learned less (41%).

When trying to learn about differences in rating the modalities by gender, the results indicated no significant differences were found, which asserted to retaining the null hypothesis that there were no differences between how male and female students ranked how they perceived their learning experience. As for race, the small numbers in the subgroups describing race limited the ability to apply statistical tests to check for significant differences.

4.3 Environmental Settings: Home Location and Camera

4.3.1 Home Location for Accessing Virtual Classes

It is important to remember that the transition to virtual learning due to COVID-19 was sudden. For most students this transition meant being at home. However, the lockdowns, which were societal-wide at that time, also pushed many adults and children back into the home. The result was that many students may have been in a relatively crowded home, which impacted their home location access. Therefore, students and faculty members struggled to find the right location at their personal space to run synchronous sessions. In our study, most students (62%) reported that when accessing online courses they were usually in their personal room, while some students (29%) reported being in a shared room. While in their personal room, 54% sat at a desk, 16% sat on a bed, and the rest sat on "other furniture." Most often "other furniture" consisted of a table or a couch. Broken down by class level (see Table 5), 65% of freshmen, 68% of sophomores, 44% of juniors, and 53% of seniors sat at a desk. By class level, 22% of the freshmen, 13% of sophomores, 25% of juniors, and 33% of seniors sat on a bed. Miscellaneous furniture comprised the balance. Among graduate students, desks were the primary piece of furniture used (50%), with only one graduate student (3.3%) reporting using a bed. Mostly, a couch or kitchen table comprised the balance.

TABLE 5: Graduate students accessing virtual classes in percentage

Student	Student's Location during Virtual Class (%)		
	Desk	Bed	Other
Freshman	65	22	13
Sophomore	68	13	19
Junior	44	25	31
Senior	53	33	14
Graduate	50	3.3	46.7

4.3.2 The Use of Zoom Cameras (On/Off)

Not only did students need to find their own personal space to sit while attending an online class, they also had to deal with having the camera on/off during synchronous Zoom sessions. Observing the results for camera preferences while in a virtual environment (Table 6), undergraduate students overwhelmingly disliked having the camera turned on (68% of respondents) and only 9% liked having the camera on. In comparison, only 24% of the graduate student respondents disliked having the camera turned on, while 41% liked having the camera turned on. Qualitative open-ended questions were not asked about the preferred use of the camera.

TABLE 6: Student preference for camera on/off in a virtual learning environment

Camera Preference	Undergraduate Response (%)	Graduate Response (%)
Liked the camera on	9	41
No preference	23	35
Disliked having the camera on	68	24

5. LIMITATIONS

While the questionnaire was sent to 795 students, only 99 participants responded, and those 99 consisted of a pool of both graduates (30) and undergraduates (69). Due to the overall small sample size, categorical variables such as race and ethnicity had small numbers that did not allow for inferential statistical analysis.

6. DISCUSSION AND CONCLUSIONS

This study was conducted during the COVID-19 pandemic—a time in which there was a great deal of stress in academia due to the forced transition to virtual learning. Both students and faculty were faced with new fears and challenges. Faculty members were charged with preparing virtual curricula in new modalities over a short period of time. Many educators of this shared institution and others were challenged with the pivot to online learning and the different modalities associated with it. The students were also charged with pivoting to the online platform and adapting to their new learning environments for optimal academic delivery, which created further challenges. Some of the issues faced by the students during online content delivery included unstable internet connections (La Velle et al., 2020); unfamiliar learning methods (MacIntyre et al., 2020); inability to pay attention (Bozkurt & Sharma, 2020); and distractions at home such as noise, family issues, and digital devices (Kelly, 2022; Wang, 2022). Not all students preferred distance learning; therefore, they appreciated having the options of alternate modalities, which were provided by the university. Perhaps, unfortunately for the students, the modalities of classes were decided by the instructors of the courses; therefore, students did not have the option of which modality to learn.

Out of the three modalities provided students (in-person, hybrid/hyflex, and online classes), the online modality had more respondents saying that they learned less. The responses from the students suggested that the in-person classes had fewer distractions, allowing them to better focus on the content and learn more in an interactive environment. In terms of rating the perception of their learning in online classes, undergraduate students rated the experience poor or fair in much higher numbers than with in-person classes. The comments from the students suggested that the content delivery by instructors in the online environment was not ideal, which is understandable since many instructors were left scrambling to convert their classes to the online modality. It should be kept in mind that many instructors did not have enough preparation time or technical support for the online courses during this emergency period in 2020 (Sumer et al., 2021). Additionally, students complained of being easily distracted in an online class. Specifically for the graduate students, they were more concerned with the reduced levels of in-class engagement and discussion, along with the accelerated nature of content delivery. There is evidence to suggest that graduate and undergraduate students showed different coping behaviors in response to the COVID-19 pandemic due to their maturity levels and lifestyles (Zhao et al., 2022). In addition, previous research has also shown that graduate students had a positive perception of the preference online classes resulting from the COVID-19 pandemic (Al-Mawee et al., 2021), which aligns with the results of our study.

Consequently, this is not to say that the provision of faculty development might not have influenced student perceptions differently. While academic institutions attempted to pivot without major disruptions to learning, there was limited administrative, academic, and technical support to faculty during the transition to remote learning during the 2020 period

(Sumer et al., 2021). There was little to no faculty development for remote teaching prior to the transition. Understandably, there was such an immediate emergency response that instructors who had not previously taught in online modalities were charged to do so with limited support, support that otherwise could have been extensive and sometimes arduous in nature at another period of time. However, had that support and development been provided, who is to say that the student results would not be different?

According to Yan et al. (2021), there are three typical forms of learning interactions: student/content, student/student, and student/teacher. If at least one of the interactions is of high quality, then the other two can be reduced without affecting the interactions. Unfortunately, during the COVID-19 pandemic, social distancing and remote learning significantly impacted the student/teacher form; however, student/content and student/student interactions, which are usually amplified with technical promotion in faculty development, could have elevated the online learning experience for students. As such, the availability of technical support could be advantageous for future online or high-flex classes. Faculty development in areas of online teaching, hybrid learning, and the range of modalities may support better teacher engagement with students, as well as insight into student preferences.

Many instructors preferred cameras on during virtual learning to gauge and command the attention of students and level of engagement. Studies show that camera usage in synchronous online instruction helps build peer relationships and improve instructor teaching since teachers can respond to non-verbal cues (Mottet & Richmond, 2002). Our study indicated that guidelines by instructors requiring students to have cameras on during class were disliked by most students. An overwhelmingly higher percentage of students preferred cameras off. Most undergraduate students (68%) disliked having the camera on during class, compared to 24% of graduate responses. The preference may be related to socioeconomic factors such as their physical environment, shared spaces, or present family members. It must be considered that allowing students to turn off their cameras may elicit more pedagogical engagement. The same can be true for requiring cameras, where students are less engaged and distracted by other factors such as mobile devices or surroundings. Students have access to multiple devices (phones, tablets, and televisions) at home and could potentially utilize those devices when cameras are not required to be on (Kelly, 2022). This utilization then causes distractions that educators try to avoid. This preference appears to go against the very tenet that educators associate with online learning: the loss of engagement and attention, from the perspective of students. These findings may assist educators in executing best practices in the future.

While many students preferred the virtual learning modality for protection from the COVID-19 virus, others feared the impact that virtual learning may have on their academic performance. Although many of the challenges faced by students were considerable, the protection from COVID-19 was felt by most participants. Some students believed the in-person precautions did allow for a level of safety from the virus. Many participants admitted that there was still too much unknown, and therefore felt that a level of risk existed.

Responses from the surveys acknowledged feeling safer with distance learning modalities (see the Supplemental Table). Despite the challenges that accompanied distance learning, students felt protected from a virus that was still in the development stage to the public. Students who did not fear so much for themselves admitted to the preference of virtual learning for protection of their family members.

Implications for teaching and learning include educating faculty on how to recognize and help students manage stress and refocusing on effective learning design in all modalities. Additionally, educators must be provided the technical professional development to adequately serve the students, which was eliminated for many (Sumer et al., 2021). Educators admit to increased engagement, skilled competencies, and increased outcomes when faculty development is provided. As shared by one academic developer:

> I have encountered both academics and students talking about their experiences … for many of them, especially the academics, it [sic] can bring either joy or challenge to their well-versed academic practices, and either create barriers to their development or be the answer to their needs. (Sumer et., 2021, p. 4)

Providing the required resources and training to educators supports everyone in the classroom fairly, resulting in an improved learning environment.

Educators must be willing to assess and pivot for best outcomes. As supported by Gansemer-Topf et al. (2021), one of the three realities of teaching and learning must be "providing flexibility with teaching" (p. 32). Guidelines such as being required to have cameras on were disliked by students, which could have negative implications for learning. While online learning may be preferred by many, it is not preferred by all. Educators are encouraged to gauge the learning preferences of students and, moreover, consider the socioeconomic status factors associated with those preferences. Suggesting to educators that they assess the preferences of their students may prove beneficial for efficient pedagogical practices.

In conclusion, our results showed that students felt that they learned less in the virtual classroom compared to other modalities, and there was a lower rating of experience among undergraduate students in the online environment. The graduate students perceived their learning experience to be better in their online classes and were also more likely to have their cameras turned on in a virtual environment. The majority of the students surveyed accessed the online classes from a personal room while sitting at a desk, with a few choosing to be on their bed or couch. Perhaps virtual learning and the modalities associated with it should remain as viable options for efficient pedagogy, and perhaps there is increased need for collaborative work across disciplines to see this happens efficiently and effectively for the good of all teaching and learning.

REFERENCES

Abdimusa, Z.A., Ismailova, N., Shchedrina, E., & Kulanina, S. (2022). Distance education and the COVID-19 pandemic: Psychological and motivational aspects. *International Journal*

of Web-Based Learning and Teaching Technologies, 17(1), 1–16. https://doi.org/10.4018/IJWLTT.305803

Al-Mawee, W., Kwayu, K. M., & Gharaibeh, T. (2021). Student's perspective on distance learning during COVID-19 pandemic: A case study of Western Michigan University, United States. *International Journal of Educational Research Open*, 2, 100080. https://doi.org/10.1016/j.ijedro.2021.100080

Armstrong, K. E., Goodboy, A. K., & Shin, M. (2022). Pandemic pedagogy and emergency remote instruction: Transitioning scheduled in-person courses to online diminishes effective teaching and student learning outcomes. *Southern Communication Journal*, 87(1), 56–69. https://doi.org/10.1080/1041794X.2021.2011954

Bassili, J. N. (2008). Media richness and social norms in the choice to attend lectures or to watch them online. *Journal of Educational Multimedia and Hypermedia*, 17(4), 453–475.

Bozkurt, A., & Sharma, R. C. (2020). Emergency remote teaching in a time of global crisis due to coronavirus pandemic. *Asian Journal of Distance Education*, 15(1), 1–6. https://doi.org/10.5281/zenodo.3778083

Cahapay, M. B. (2020). A reconceptualization of learning space as schools reopen amid and after COVID-19 pandemic. *Asian Journal of Distance Education,* 15(1), 269–276. https://doi.org/10.5281/zenodo.3892969

Cernusca, D., & Mallik, S. (2022). Successful transfer of face-to-face active learning instructional design to online synchronous format during the COVID-19 pandemic. *Quarterly Review of Distance Education*, 23(1), 1–12.

Clinkenbeard, J. E., & Bonsangue, M. V. (2022). Academic outcomes and experiences of freshman students in mathematics courses during the COVID-19 pandemic. *Learning Assistance Review (TLAR)*, 27(1), 15–54.

Gansemer-Topf, A. M., Webb, A. S., Kensington-Miller, B., Maheux-Pelletier, G., Lewis, H., Luu, J. & Hofmann, A. K. (2021). Navigating the chaos: The value of SoTL during times of uncertainty. *Transformative Dialogues: Teaching and Learning Journal*, 14(2), 30–40.

Gardner, J., & Stotts, A. A. (2022). Zooming past the pandemic: New perspectives and positive outcomes in remote learning. *COABE Journal: The Resource for Adult Education*, 11(2), 39–42.

Griffiths, T.-L., Dickinson, J., & Fletcher, A. (2021). A case study of student learning spaces during the pandemic: A sociomateriality perspective. *Journal of Perspectives in Applied Academic Practice*, 9(2), 77–81. http://shura.shu.ac.uk/28713/

Kee, C. E. (2021). The impact of COVID-19: Graduate students' emotional and psychological experiences. *Journal of Human Behavior in the Social Environment*, 31(1–4), 476–488. https://doi.org/10.1080/10911359.2020.1855285

Kelly, K. (2022). Building on students' perspectives on moving to online learning during the COVID-19 pandemic. *The Canadian Journal for the Scholarship of Teaching and Learning*, 13(1), 4.

Kemp, N., & Grieve, R. (2014). Face-to-face or face-to-screen? Undergraduates' opinions and test performance in classroom vs. online learning. *Frontiers in Psychology*, *5*, 1278. https://doi.org/10.3389/fpsyg.2014.01278

La Velle, L., Newman, S., Montgomery, C., & Hyatt, D. (2020). Initial teacher education in England and the COVID-19 pandemic: Challenges and opportunities. *Journal of Education and Teaching*, *46*(4), 596–608. https://doi.org/10.1080/02607476.2020.1803051

MacIntyre, P. D., Gregersen, T., & Mercer, S. (2020). Language teachers' coping strategies during the Covid-19 conversion to online teaching: Correlations with stress, wellbeing and negative emotions. *System*, *94*, 102352. https://doi.org/10.1016/j.system.2020.102352

Mottet, T. P. & Richmond, V. P. (2002). Student nonverbal communication and its influence on teachers and teaching. In J. L. Chesebro & J. C. McCrosky (Eds.), *Communication for teachers* (pp. 47–61). Boston: Allyn & Bacon.

Parker, S. W., Hansen, M. A., & Bernadowski, C. (2021). COVID-19 campus closures in the United States: American student perceptions of forced transition to remote learning. *Social Sciences*, *10*(2), 62. https://doi.org/10.3390/socsci10020062

Rabayah, K. S., & Amira, N. (2022). Learner's engagement assessment in e-learning during the COVID-19 pandemic: Nation-wide exploration. *Education and Information Technologies*, *27*, 10647–10663. https://doi.org/10.1007/s10639-022-11006-7

Sumer, M., Douglas, T., & Sim, K. N. (2021). Academic development through a pandemic crisis: Lessons learnt from three cases incorporating technical, pedagogical and social support. *Journal of University Teaching and Learning Practice*, *18*(5), 1.

Swanson, S. R., Davis, J. C., Gonzalez-Fuentes, M., & Robertson, K. R. (2021). In these unprecedented times: A critical incidents technique examination of student perceptions' of satisfying and dissatisfying learning experiences. *Marketing Education Review*, *31*(3), 209–225.

Ting, D. H., & Lee, C. K. C. (2012). Understanding students' choice of electives and its implications. *Studies in Higher Education*, *37*(3), 309–325. https://doi.org/10.1080/03075079.2010.512383

Vishwanathan, K., Patel, G. M., & Patel, D.J. (2021). Impact and perception about distant online medical education (tele-education) on the educational environment during the COVID-19 pandemic: Experiences of medical undergraduate students from India. *Journal of Medicine and Primary Care*, *10*(6), 2216–2224. https://doi.org/10.4103/jfmpc.jfmpc_2306_20

Wang, C. (2022). Comprehensively summarizing what distracts students from online learning: A literature review. *Human Behavior and Emerging Technologies*, *2022*, 1483531. https://doi.org/10.1155/2022/1483531

Yan, L., Whiteclock-Wainwright, A., Guan, Q., Wen, G., Gašević, D., & Chen, G. (2021). Students' experience of online learning during the COVID-19 pandemic: A province-wide survey study. *British Journal of Educational Technology*, *52*(5), 2038–2057. https://doi.org/10.1111/ bjet.13102

Zhao, Y., Ding, Y., Shen, Y., Failing, S., & Hwang, J. (2022). Different coping patterns among US graduate and undergraduate students during COVID-19 pandemic: A machine learning approach. *International Journal of Environmental Research and Public Health*, *19*(4), 2430. https://doi.org/10.3390/ijerph19042430