International Journal on New Trends in Education and Their Implications
December 2022 Volume: 13, Issue: 2, ISSN 1309-6249

Rethinking Higher Education Post Pandemic[1]

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Abstract

Purpose -The current study suggests rethinking higher education due to COVID-19 or other similar high-stress conditions. **Research Methods** - As a result of comparing student perceptions and performance from identical courses in consumer behavior before and during the pandemic, definitive differences were found which lead to the consideration of revisions in the delivery of college courses to expand educational offerings. **Findings** - The *During COVID* group scored significantly lower than the *Before COVID* group in terms of their mid-term exam scores, final exam scores and overall grades for the course. The *During COVID* group had a significantly less number of likes for class components, a significant increase in the number of dissatisfactions, and a significant increase in the number of improvements for the course when compared to the *Before COVID* group. **Implications for Research and Practice** – Further research should assess the impacts of high stress conditions and the suggestions provided here such as determining ways to overcome the lack of person-to-person contact and to adjust the course delivery format and expected deliverables such as tests study materials.

Keywords: COVID, high-stress conditions, higher education

Article Type Research article

Recommended Citation: Whitson, D., Brazeal, D.V, & Good, M.C. (2022). Rethinking Higher Education Post Pandemic. International Journal of New Trends and Impacts in Education (IJONTE)13 (2), 90-103.

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Introduction

COVID-19 has distorted the way we work, socialize, and educate. Arnout et al. (2020) reported that the COVID-19 pandemic caused 1.6 billion children and adults in 161 countries to leave the educational arena, a catastrophe that is made more tragic by the already present global educational crisis. The importance of creating meaningful connections between professors and students (Gruber, Reppel, & Voss 2010) was particularly evident during the recent global pandemic and its impacts on educational experiences. While the world may not experience the multi-layered and pervasive implications of this educational void for years, early analysis of student performance and perceptions of the higher education class experience under high-stress conditions such as this pandemic provides a valuable glimpse into potential changes required in higher education.

Specifically, in a crisis educational setting (Ogunmokun, Timur, & Ikhide 2022) this study seeks to understand how the global pandemic may have impacted student performance and student perceptions of the class experience. This research is done in the context of a hybrid course format whereby students complete part of their coursework face to face (F2F) and use a virtual learning platform for the remainder of the class sessions. This study compares two student groups, *Before* COVID and *During* COVID with matching student demographics, course delivery, format, and content to assess the potential adjustments suggested for learning as a result of COVID. The purpose was to ascertain critical issues described by students to establish suggestions to reduce educational barriers and utilize effective methods of communication to improve the experience.

Despite identical course design and delivery, the differences in outcomes suggest adjustments may be necessary when trying to assure learning and satisfaction with the course. Hence, the ability to be flexible escalates during such periods and is critical to classroom success. This is important as previous findings indicate despite its recognized negative impacts, the COVID-19 environment can produce rewarding consequences for educators (Ogunmokun, Timur, & Ikhide 2022). Consistent with the importance of educators highlighting the value of student safety in their offerings during COVID 19 (Sheng & Fauzi 2022), higher education can use this situation to offer unique based learning processes. Hence while academics continually seek to advance learning approaches, rethinking ways to improve the hybrid format are potential outcomes of this study.

The hybrid format used in higher education courses attempts to combine the benefits of F2F teaching with online asynchronous or synchronous class sessions (Ambrose, 2021; Garrison & Kanuka 2004). The pros of hybrid classes include schedule flexibility, accommodation for diverse learning styles (auditory or visual learners), initiation to online classes (Carlton, 2021), time-saving proficiencies for both students and instructors, and ease of remote learning from any location. Further, hybrid courses can include virtual interaction between students and the instructor with record-keeping capabilities and may expand enrollment beyond local students. Students learn how to use distance learning technologies, interact with instructors, and stay current with coursework while maintaining familiarity with in-person sessions (Carlton, 2021). Disadvantages of hybrid classes are the requirement for strong organizational skills (time management and prioritization), adequate computer skills, reliable internet (Carlton, 2021), and the resultant lack of rich social connections contributing to a potentially monotonous home life (Tiulipin, 2021).

Given the pros and cons of hybrid course delivery, how will this format be evaluated by students when a high-stress condition such as COVID-19 occurs and requires all university classes to be held online with no face to face interaction on campus, limited contact with faculty, and complete reliance on technology platforms to deliver instruction and content? As discussed in the introduction paragraph, COVID-19 posed a radical and abrupt change across industries and households as well as academia. How did the immediate impacts of educational disruption with loss of control and a climate of

psychological consequences such as chronic stress, e.g., depression, isolation, loneliness, rage, and anxiety (Tang, 2021; Zhou, 2020) impact university student performance and perceptions?

Primary results of this study indicate that the performance of students in a university Consumer Behavior course during the pandemic was significantly lower; they liked fewer course characteristics and had more dislikes and more suggestions for course improvements than the *Before COVID* group. Accordingly, our results suggest that the online education system can be improved—in technical support and on behalf of instructors.

Literature Review

Rigorous research that examines the rapid transition to online teaching during COVID-19 is limited. It is thusly unclear how student performance and class perceptions were impacted during such high-stress conditions. The negative aspects of online teaching during the pandemic are not to be underestimated; in fact, some findings are disturbing and potentially threaten the quality learning environment. As early as 2012, Alexander et al. reported that students are more likely to misunderstand assignments, have difficulty concentrating, and are easily distracted by their home environment. In the educational arena, it has been reported that medical outbreaks, such as COVID-19, cause stress that can have detrimental effects on higher-education learning (Asaad et al., 2019; Kim & Kim, 2018). We contend that loss or lack of control theory helps explain why the stressful effects of the pandemic resulted in lower performance and more frequent negative perceptions of students *vis*-à-*vis* class content, delivery, and overall experience. The Loss of Control Theory suggests that as the perception of control decreases, it can result in heightened states of agitation which in turn affects cognition, i.e., the ability to think clearly (Blacker & McConnell, 2015). For example, Perry and Magnusson (1987) found that both objective and subjective measures of the student experience (e.g., test scores, overall perceptions, and course evaluations) were negatively influenced when the students experienced a loss of control.

In his best-selling book, *The Happiness Hypothesis*, Jonathan Haidt (2006) describes a lack of control as almost always an obstacle to happiness; it is a psychological condition that must be managed and reduced to improve one's happiness and purpose in life. It is not a leap to hypothesize that during the COVID-19 pandemic, students experienced a lack of control (like much of the general population) that was challenging to manage productively. Attempts to control their lives may have caused consternation and a changing lens of perception in the classroom causing them to react to assignments and testing in a chaotic, rather than rational, manner.

The lack of control experienced during the pandemic potentially exacerbated the challenges of online teaching which may have resulted in students' inability to fully comprehend assignments and maintain extended periods of concentration. Importantly, students struggled to participate in discussions with diverse groups of individuals and found instructor support insufficient (Dumford & Miller, 2018). Even when the format was synchronous (same time with two-way video class sessions), students could not clearly see each other face-to-face, thereby disrupting subtle verbal and nonverbal cues that might be misunderstood. Students lamented they could not acquire specialized skills and were not active participants in the learning process, thus reducing their comprehension and critical thinking skills significantly (Jeffery & Christopher, 2020).

The current study provides a unique opportunity to examine student performance and perceptions during a time when they experience a lack of control over their education and personal environment. Controlling for possible differences in student demographics and instruction delivery, student responses were compared in two time periods with the so-identified high-stress condition of COVID-19

present in the second period. The course studied, Consumer Behavior, was originally designed as a hybrid (part face-to-face and part online) format and was not modified when all instruction transitioned to remote learning as the result of the pandemic. The format of the course design was identical *Before COVID* versus *During COVID*, which allows for a more authentic glimpse into how the pandemic impacted student performance and student perceptions of the unchanged course.

The following research questions are examined:

RQ1: How will midterm, final and course grades differ between students in *Before COVID* and *During COVID* classes?

RQ2: How will the number and types of most liked aspects of the class differ between students in *Before COVID* and *During COVID* classes?

RQ3: How will the number and types of least liked aspects of the class differ between students in *Before COVID* and *During COVID* classes?

RQ4: How will the number and types of suggestions for improvements of the class differ between students in *Before COVID* and *During COVID* classes?

Method

Sample

At a large metropolitan university located in the western region of the United States, an optional online survey was administered to traditional undergraduate students in a Consumer Behavior class through the university's learning management system, Blackboard, at the end of the semester in Spring 2019 (*Before COVID*) and Spring 2020 (*During COVID*). The 28,000-student population from which the sample was obtained is rated as "Extremely Racially/Ethnically Diverse" with a 52% to 47% male/female (so-identified) ratio. The racial/ethnic breakdown consists of 47.6% Hispanic, 21.7% Asian, 14.8% Caucasian, 6% International with the remaining nominal percentages attributed to Multi-Ethnic, African American, and Unknown. The university is a commuter campus that attracts and serves under-represented students, and first-generation students, both in citizenship status and college experience. The upper-division marketing course is an elective for the General Education requirement and a required course for students pursuing a marketing major. Students in the course represent a broad swath of the university's demographics and culture. Students who enrolled in the course and completed the survey were representative of the university-wide demographics.

Both sections of the Consumer Behavior course were taught by the same professor, who had taught this course for more than 40 years by the start of Spring 2020. Thus, the content, structure, and delivery of the course were consistent across the two semesters. As a hybrid course, the professor met face-to-face with both sections twice a week for the initial two weeks, then face-to-face meetings were held two times once a month. Self-directed lectures and assignments were available on Blackboard for the remaining weeks of the semester.

Students in both years had similar course selection options and intentionally selected the hybrid format as opposed to other in-person options at different times. The only significant difference was that the first group completed the course *Before COVID* and the second group completed the course *During COVID* with a university-wide transition mid-semester to remote learning due to the pandemic. The number of in-person class sessions was identical between both groups. The COVID-19 shutdown occurred at the end of the semester and thus only affected the final face-to-face classes for in-person group presentations which were replaced with online-only written submissions.

The survey was optional with no course or extra credit points provided. Even though the survey was available on Blackboard throughout the semester, over 97% of the students completed the survey during the last two weeks of the semester. The survey completion rate was an average of 96% for both the *Before COVID* and *During COVID* group. The non-response rate was less than 4% for both groups. While this number is small, the professor did not report any evidence distinguishing those who did not respond. The two groups were not significantly different in age, gender, or their choice of taking the hybrid format.

Data Collection Tool

Performance information from the course was provided by the professor. The survey utilized consisted of both quantitative closed-ended and qualitative open-ended questions about their perceptions of this Consumer Behavior class. Their previous experience with a hybrid (part online/part face-to-face) course was determined with a positive/negative indication on a scale of 1 = Not a good experience to 5 = A good experience. The students completed a rating of the current course on the same scale.

We expected that midterm, final, and course grades and class perceptions from both time frames, *Before COVID* and *During COVID*, would be similar because both semesters had an identical course design with the same professor. However, the magnitude of the pandemic's effects on all aspects of personal and professional lives on a global basis was unprecedented and unpredictable, thus resulting in unexpected educational results.

The qualitative portion of the study was based on recording three open-ended questions that asked for the students' perceptions about their learning experiences: (1) what they liked most about this class, (2) what they liked least about this class, and (3) suggestions for improvements.

Validity and Reliability

Because the responses were exploratory in nature, no preconceived categories from previous studies were found. To assess reliability, one author determined categories and sorted the answers by the categories. The other two authors were provided the list of answers and were asked to group them into the provided classifications. There was 97% agreement between the first author's and the other two authors' categorizations. Table 2 provides the answer categories and the percentage of students who responded in a similar manner.

Findings

An evaluation of the data indicates significant differences between the two time periods. A parametric analysis of the data was performed. RQ1 investigated benchmark scores (midterm exam, final exam, total grade) between the *Before COVID* and *During COVID* student populations (see Table 1).

Table 1

T-Test of Student Grade Comparisons for Before COVID vs. During COVID

	Term	N	Mean	Std. Deviation	Std. Error Mean
Total Grade (%)	*Before COVID*	56	80.203	13.753	1.838
	During COVID	77	75.806	8.543	0.974
Midterm Exam (%)	*Before COVID*	56	54.310	11.130	1.487

	During COVID	77	48.955	13.639	1.554
Final Exam (%)	*Before COVID*	56	69.018	22.396	2.993
	During COVID	77	60.682	13.980	1.593

						95% Confidence Interval of the Difference	
	t	**df**	**Sig. (2-tailed)**	**Mean Difference**	**Std. Error Difference**	**Lower**	**Upper**
Total Grade (%)	2.269	131	0.025	4.397	1.938	0.563	8.230
Midterm Grade (%)	2.411	131	0.017	5.355	2.221	0.961	9.749
Final Grade (%)	2.637	131	0.009	8.336	3.161	2.082	14.590

As seen in Table 1 in a two-tailed t-test evaluating the Total Course Grades (average percentage), the *During COVID* group scored significantly lower (4.397%, t-value $_{df = 131}$ = 2.269 ($p < 0.05$) than the *Before COVID* group ($M_{Before\ COVID}$ = 80.203, SD = 13.753, n= 56; $M_{During\ COVID}$ = 75.806, SD = 8.543, n= 77) in terms of their overall grades for the course. Similarly, the two student populations significantly differed in terms of their Midterm Exam scores (average percentage) in a two-tailed t-test (t-value $_{df = 131}$ = 2.411 $p < 0.05$), where the *During COVID* group scored significantly lower (5.355%) than the *Before COVID* group ($M_{Before\ COVID}$ = 54.310, SD = 11.130, n= 56; $M_{During\ COVID}$ = 48.955, SD = 13.639, n= 77). The two student populations significantly differed in terms of their Final Exam scores in a two-tailed t-test, t-value $_{df = 131}$ = 2.637 ($p < 0.01$), where the *During COVID* group scored significantly lower (8.336%) than the *Before COVID* group ($M_{Before\ COVID}$ = 69.018, SD = 22.396, n= 56; $M_{During\ COVID}$ = 60.682, SD = 13.980, n= 77). Thus, it is evident that students who completed the course during the pandemic, had a lower comprehension of the course content than students in the previous semester.

Open-ended answers to the survey were categorized and then compared for differences in numbers and types of common responses. Table 2 provides the frequencies of student responses for course components that were most liked, least liked, and suggested improvements. Each will be discussed in response to the proposed RQs.

Table 2

Frequency of Student Responses in Course Evaluation

	***Before COVID* (%)**	***During COVID* (%)**
Most Liked Components of the Course		
Interactive Videos	52.9	41.2
Self-Directed Format	29.4	32.4
Course Formatting (Design & Organization)	5.9	11.8

Professor (Style of Instruction)	11.8	5.9
Group work	0.0	8.8
Total	**100.0**	**100.0**
Least Liked Components of the Course		
Exams	47.1	17.6
Lack of Face-to-Face Contact	29.4	41.2
Group Assignments	11.8	14.7
Format	5.9	23.5
Visuals on Blackboard	5.9	2.9
Total	**100.0**	**100.0**
Suggested Improvements		
None Needed	29.4	5.9
Exam Difficulty (Were Too Difficult)	29.4	29.4
Fewer Group Assignments	23.5	11.8
Better Format	11.8	14.7
Shorter Lectures	5.9	0.0
More Face-to-Face Access	0.0	35.3
Due Date Reminders	0.0	2.9
Total	**100.0**	**100.0**

RQ2 examined the number and types of most liked aspects of the class from an online anonymous survey from both timeframes. As shown in Table 2, positive aspects of the professor's class were reiterated with the same enthusiasm from students *Before COVID* as in the semester *During COVID*, when all classes university-wide were converted, with only a three-day notice, into a wholly online delivery format. Overall, the students in both groups enjoyed the interactive videos, the professor's fun, and informative teaching philosophy and style, the organization of the class, including reminders sent regarding upcoming assignments plus the freedom and reward of self-directed coursework. A major difference was that in the *During COVID* group, more students mentioned "liking the self-directed format and the group work". Figure 1 provides a visual comparison of the most liked course components.

Figure 1

Comparison of Students' Most Liked Course Components

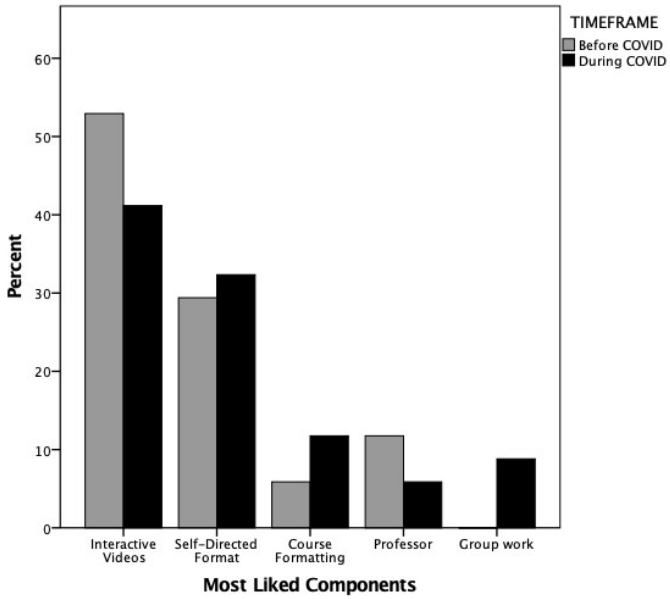

Table 3 provides the results of tests of significance to determine if there were significant differences between *Before COVID* and *During COVID* groups in the number of most liked, least liked components and improvement suggestions.

Table 3

T-Test Student Count Before COVID vs. During COVID: Most Liked Components, Least Liked Components, and Suggested Course Improvements

	Timeframe	N	Mean	Std. Deviation	Std. Error Mean
Most Liked (count)	*Before COVID*	17	2.000	0.500	0.121
	During COVID	34	1.118	0.327	0.056
Least Liked (count)	*Before COVID*	17	1.701	2.664	0.646
	During COVID	34	1.529	0.563	0.097
Improvements (count)	*Before COVID*	17	0.882	0.697	0.169
	During COVID	34	1.382	0.817	0.140

						95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Most Liked (count)	7.578	49	0.000	0.882	0.116	0.648	1.116
Least Liked (count)	0.373	49	0.710	0.176	0.473	-0.773	1.126
Improvements (count)	-2.159	49	0.036	-0.500	0.232	-0.965	-0.035

As seen above in Table 3, the two student populations differed significantly in terms of the number of Most Liked components in this course in a two-tailed t-test, t-value $_{df = 49}$ = 7.578 ($p < 0.01$), where the *Before COVID* group liked more components about this course compared to the *During COVID* group ($M_{Before\ COVID}$ = 2.0, SD = 0.5, n= 17; $M_{During\ COVID}$ = 1.1, SD = 0.33, n= 34).

RQ3 explores the number and types of least liked aspects of each class. As shown in Table 3, the *During COVID* students expressed a significant increase in the number of dissatisfactions, especially in areas with interpersonal components. The number of aspects students liked least about this class increased from 2019 to 2020, and also included new perceptions of the course not expressed by previous students. The two student populations did not differ significantly in terms of the number of Least Liked components in this course in a two-tailed t-test, t-value $_{df = 49}$ = 0.373 ($p > 0.05$), where the *Before COVID* group least liked approximately the same amount of components about this course compared to the *During COVID* group ($M_{Before\ COVID}$ = 1.706, SD = 2.664, n= 17; $M_{During\ COVID}$ = 1.529, SD = 0.563, n= 34).

Students reported in the *Before COVID* semester that they least liked the following: difficult exams (47.1%), did not meet often enough (29.4%), and too much group work (11.8%). For example, students most often mentioned that they disliked the lack of in-person contact (41.2%), the course delivery format (23.5%), and group work (e.g., communication, engagement) (14.7%). Figure 2 provides a visual comparison of the least liked course components.

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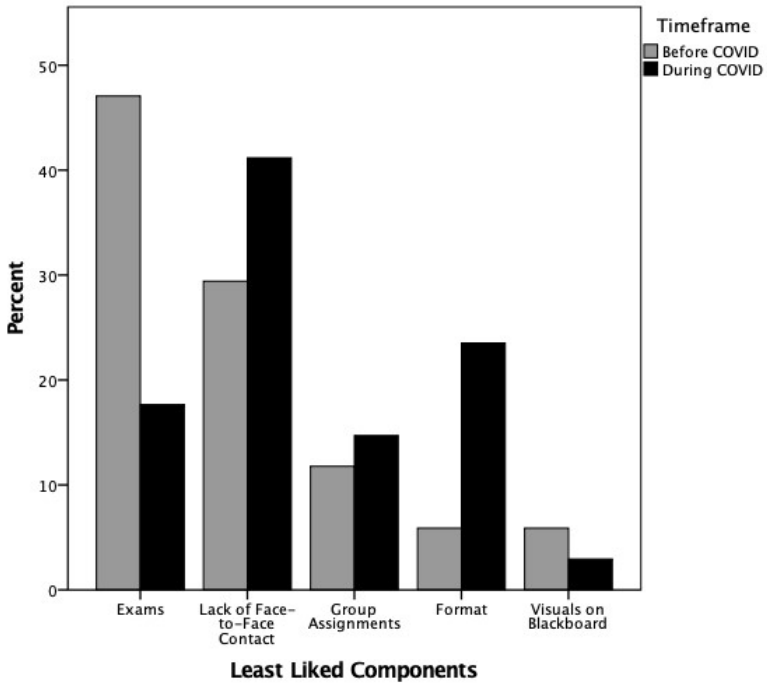
December 2022 Volume: 13, Issue: 2, ISSN 1309-6249

Figure 2

Comparison of Students' Least Liked Course Components



RQ4 evaluated the number and types of suggestions for improvements of the classes at the two different times. The number of suggested areas for improvement was greater when comparing the *During COVID* group to the *Before COVID* group (29.4%, compared to 5.9% reported 'no improvements needed'). The two student populations differed significantly in terms of the number of suggested Improvements for this course in a two-tailed t-test, t-value $_{(df = 49)}$ = -2.159 ($p < 0.05$), where the *Before COVID* group had fewer suggested changes for this course compared to the *During COVID* group ($M_{Before\ COVID}$ = 0.882, SD = 0.697, n= 17; $M_{During\ COVID}$ = 1.382, SD = 0.817, n= 34). (See Table 3).

Their perceived suggestions for improvement included: incorporating more face-to-face/in-person components (35.3%), utilizing a better format for the course (14.7%), making the tests easier (29.4%), assigning more individual assignments (rather than group work) (23.5%), and providing study guides, *despite the professor already providing study tools earlier in the semester*. Some students suggested that too many emails and reminders were sent, visual memes on the course learning management system were too distracting, and there were too many quizzes/assignments. One student opined that "extra credit would be a viable option to boost his/her grades", despite substantial opportunities for extra credit assignments that were already offered throughout the semester. Another student observed that assignments could be explained more clearly. A comparison of the perceived areas for improvement for each time frame is shown in Figure 3.

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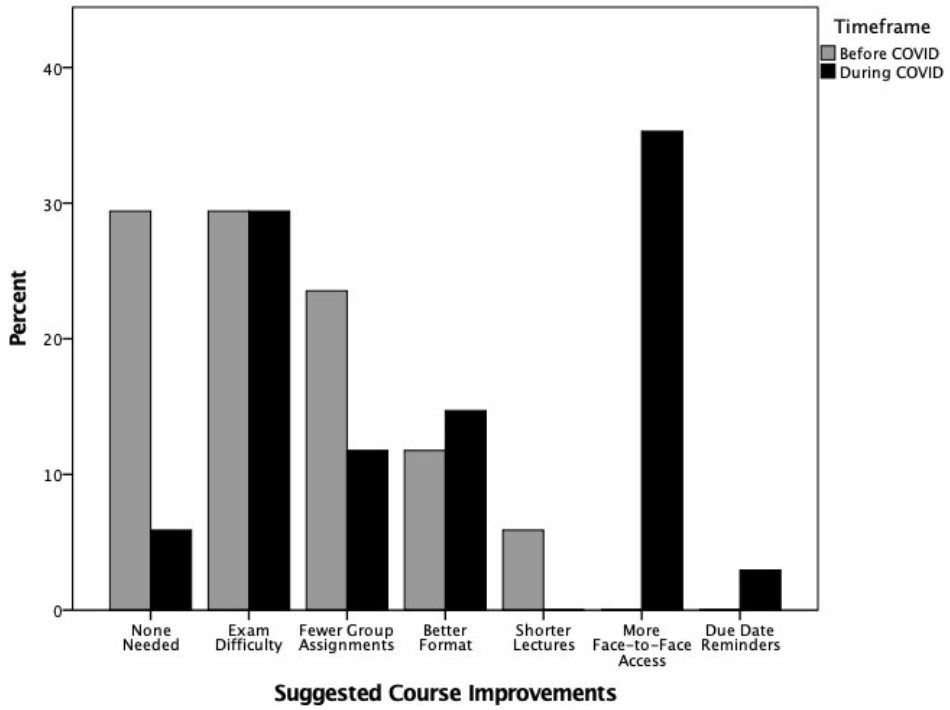
Figure 3

Comparison of Students' Suggested Course Improvements



These findings are fascinating since the format, design, content, and delivery of material were identical for both student groups, *Before COVID* and *During COVID*. Prior experience with hybrid courses did not affect the differences. The students' evaluations of this Course's Rating compared to their Previous Hybrid Course Rating are highly correlated for both timeframes ($r_{Before\ COVID} = 0.563$, $p < 0.05$; $r_{During\ COVID} = 0.378$, $p < 0.05$). However, Course Rating was not significantly different between the *Before COVID* and *During COVID* student groups ($M_{Before\ COVID} = 4.471$, $SD = 0.717$, $n = 17$; $M_{During\ COVID} = 4.265$, $SD = 0.751$, $n = 34$; t-value $_{Course\ Rating\ (df = 49)} = 0.936$, $p > 0.05$). Despite a similar global evaluation of the course, the findings show that drilling down to specifics will enhance the learning experience by considering the most liked and least liked components and suggestions for improvement. To state it succinctly, *During COVID* students liked less and criticized more.

Discussion and Conclusions

Comparing performance and perceptions between the *Before COVID and During COVID* sections is invaluable when addressing and potentially revising course delivery and content under a high-stress condition such as COVID-19. The findings suggest an identical course delivery may not be sufficient when trying to assure learning and satisfaction with the course. Despite being well-versed in educational pedagogies, coping mechanisms, and student needs, professors across the country struggled with the challenge of the rapid transition to a 100% online delivery format. Hence, despite concerted and conscientious efforts to attenuate the stress generated by the pandemic through extending grace to students in difficult circumstances, student perceptions of the course changed in a surprising and discernable fashion.

Two of the most important issues discovered from this comparison study are to address the lack of in-person contact and maintain group connections but adjust the assignments. This flexibility allows the professor to alter delivery strategies to maximize learning processes accompanied by unexpected environmental conditions. Understandably, students who knowingly signed up for a hybrid course missed the social components of traditional in-person connections and may have transferred this general unhappiness to a specific course ("I didn't sign up for this!"). Faculty should develop ways to simulate in-person contacts such as video communication sessions and video recordings where students can view other student presentations and then share comments on a discussion board. Students may have disliked group work because it is inherently more time-consuming and often creates logistical challenges, management of freeloaders, and division of equal responsibilities.

In response to student suggestions to improve communication (i.e., too many emails and reminders were sent, visual memes on the course learning management system were too distracting, and not enough notice of "extra credit" assignments), providing clear deadlines and announcements are ways to reduce miscommunications. Some students need more expanded instructions for assignments. Finding an exhaustive but not exhausting level of communication is important with online courses where students face high-stress conditions. Also, despite the format, design, content, and delivery of material being identical for both student groups, the *During COVID* class had the perception of too many quizzes/assignments. These findings suggest the importance of flexibility to address different student needs. The following section provides potential guidance in response to COVID-19 or other future high-stress conditions.

Though the stress response to COVID-19 has been profound, despite its recognized negative impacts, the COVID-19 environment can produce rewarding consequences for educators (Ogunmokun, Timur, & Ikhide 2022). With more experience in hybrid teaching, some professors perceived online teaching to be superior to face-to-face instruction (Shenoy et al., 2020). These respondents listed several personal benefits (e.g., more family focus time, no traffic, no commuting, and mental peace) that made online teaching more desirable.

Contributing to the lower performance and critical comments expressed about the course in this study may have been heightened levels of "FOMO" (fear of missing out) in response to missing critical college experiences outside of the classroom (Good & Hyman, 2021). These various activities included: developing their professional network of colleagues and faculty, attaining leadership positions in student organizations, and having spontaneous social opportunities to interact with faculty. Guest speaker presentations from notable practitioners, special lectures, onsite field trips, organizational and personal meetings (both planned and spontaneous), all became relics although could be replaced with Zoom contacts by the speakers. Throughout this pandemic experience, students anecdotally realized that they flourish in a well-rounded learning environment that includes face-to-face interactions, even if minimal. Furthermore, the overall college experience is not exclusively about learning content in a particular discipline; rather, the full educational benefits are realized through an engaging, interactive approach. Obtaining proficiency within a discipline is a carefully woven tapestry, rich with inter-cultural colors of meaningful dialogues with people different from themselves that culminate in a transformative social and professional maturation process.

So why the student dissatisfaction with professors/courses in the virtual classroom, even as faculty work diligently to provide an authentic learning environment? First, the feelings of FOMO in life can

manifest in a way that makes us hypercritical and heighten our need to control our environments and experiences (Good & Hyman, 2020). A second element could be logistical. That is, due to the pandemic, students were suddenly faced with the improbable predicament of an educational delivery format (e.g., all online classes) that they did not choose. Also, due to the learning disruption, students may experience added stress because they are more reliant on technology and if it fails, or is unreliable, then they risk suffering another catastrophic disruption in their education mastery. Professors who were once an attainable in-person resource, now seem distant to the students, despite synchronous class sessions and prompt communication (i.e., a stronger emphasis on returning emails promptly). While professors utilize the freedom to organize and manage their classes in vastly different ways to satisfy different student learning styles, students must now spend time getting accustomed to navigating a myriad of communication touchpoints, which can be a confusing experience for students. Previously, students could choose a variety of class styles (e.g., hybrid, in-person, online); however, during COVID-19 they were restricted to an online environment, whether or not they liked it, which also makes it excruciatingly easy for some students to isolate, to disengage, or to avoid active learning.

Another contributing factor to the results suggesting that "students like less and criticize more" is the expectation of the university experience in a "polytechnic" learning environment (like the one in this study) founded on a "learn-by-doing" philosophy and a low professor-to-student ratio. Students often choose this university due to its reputation for attention to students' needs, which is especially important for first- or second-generation Americans, first-time college students in their families, and underrepresented students. This university is known nationally for boosting student economic mobility. Faculty, thus, fulfill counseling and mentoring roles that were severely restricted by virtual instruction. Finally, the reference to stress, and its deleterious effects on anxiety and depression as expressed in earlier paragraphs, tends to manifest across contexts for the suffering individual. This means that all experiences, interactions, and activities are perceived and lived through a haze of apprehension and lack of normalcy.

As faculty, we, too, can relate to catastrophizing (assuming things are worse than they are) and a distracted mind as we attempted to negotiate and lead the online classroom experience. As we transition out of this COVID-19 pandemic, we hope that we are all more cognizant of the secondary effects of how a lack of control might be managed in the educational arena. As faculty, administrators, and universities begin to wrestle with the 100% online format and costs of investing in cameras, microphones, and other technology so that instructors could simultaneously teach online and in-person, as well as record their lectures, we might contemplate the importance of human contact with all its nuances, social cues, and richness, with our most basic needs.

Suggestions

Beyond the COVID-19 pandemic, other future high-stress conditions may require potential solutions for managing hybrid and online education to help students and faculty. One recent study investigating medical students' perceptions during MERS-CoV suggests that students actively sought more resources and adopted a myriad of coping mechanisms as their anxiety about the virus climbed (Al-Rabiaaha et al., 2020). Al-Hosan, AlRajah, and Arnout (2020) assert that faculty have the added responsibility to promote awareness of the virus and to instigate policies or programs that might increase morale and student belongingness to ameliorate the stress response. At the Mohammed Al-Mana College of Medical Sciences in Saudi Arabia, an online coffee break was implemented for all students to connect and bond with one another while discussing their coping mechanisms, study

techniques, fears, and academic goals. Similarly, faculty at Kuwait University were invited to participate in a Virtual Recharge Hour where faculty could discuss innovative teaching pedagogies, offer technological assistance, and share both professional and personal experiences. Both initiatives were instrumental in combatting the rapidly accelerating rates of mental health issues while also encouraging student interaction with their colleagues and faculty. Rippé et al. (2021) demonstrated that it was essential for instructors to help foster their students' "perceived control" in the rapidly changing environment by addressing atypical issues like isolation and loneliness alongside course topics. This supports our contention that lack of control helps explain why the stressful effects of the pandemic resulted in lower performance and more frequent negative perceptions of students.

Teaching under the stress of a pandemic has taken a more concrete approach to focus on social distancing procedures and policies. Thus, suggestions for these procedures may include in-school practices (e.g., restricting student access to common areas and alternating lunch breaks), as well as modified scheduling (i.e., limiting school day and week) (Uscher-Pines et al., 2020). Acknowledging and addressing stress on educators is necessary. The literature has coined the term *pandemic brain fog* to describe the prevalence of cognitive impairment associated specifically with individuals who have contracted COVID-19 (Bernard, 2021; Korducki, 2021; Belluck, 2020). Becker et al. (2021) found that individuals exhibited various types of long-term cognitive dysfunction (i.e., impairments in functioning, processing, fluency, encoding, and recall) because of COVID-19.

Faculty must learn how to devise and deliver content in a creative, interactive fashion that captures student interest while inspiring scholastic achievement (Trust & Whalen, 2020). Dhonncha and Murphy (2021) suggest that faculty have found novel, innovative teaching methods that open the classroom experience to the globe. In clinical dermatology classes that rely on hands-on instruction, tele-dermatology programs were implemented that utilized telephone and interactive video instruction. Some faculty suggest switching midterm grades for a "community contribution participation" grade, pre-notifying students that they will be called on in class to help students feel less off-guard during a live session when their peers were watching and assigning more student-made videos which result in increased access (Bamforth, 2021).

Limitations

The current study was conducted in one location with a limited sample size. Future investigations could be expanded to collect data from a larger sample, ideally across multiple universities or classes. Additional attitudes and behavioral scales could be included to better elucidate and nuance contributing factors to the high-stress conditions during COVID-19. Critiques of the educational issues could be addressed to determine specifically which factors result in lower performance and/or evaluations of the course. Finally, it might be enlightening to utilize in-depth interviews to determine aspects that students might now appreciate about learning during COVID-19.

Acknowledgements

This work was not supported financially by any funding group.

Disclosure statement: No potential conflict of interest was reported by the author(s).

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