

COVID-19 and the Transition to Online Learning in the Basic Course: Examining Effects on Student Learning


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Abstract

Objectives: This study examines how the transition to remote delivery during the spring of 2020 affected student learning in the basic communication course.

Methods: Participants in three different course delivery modes (face-to-face, online, and live interactive) were enrolled in a public speaking course with standardized adaptive reading quizzes, exams, and speech assignments. Participants completed several measures over the course of the semester and had their responses paired up with their end-of-semester grade book data.

Results: Results of this study indicate that students who were enrolled in a face-to-face course and transitioned online during the COVID-19 pandemic were outperformed by online and learning interactive students in several of the standardized assignments in the course.

Conclusions: Overall, face-to-face (FtF) students performed four percentage points lower in the course than the learning interactive and online groups while also demonstrating more emotional interest in the course than the other two groups.

Implication for Theory and/or Practice: In future transitions to remote learning, FtF students may experience greater disruption than existing online students. Instructors should be mindful of this finding in transitioning to remote learning during the semester.

Keywords: *higher education COVID, transition to online, going remote, basic course online*

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Introduction

Unlike any other time in higher education, the digital age has transformed learning and student experiences within the university classroom. The proliferation of technology matched with our information-oriented society and desire for rapid access to information has permeated the learning experiences of the university student. There is opportunity in the new availability of technologies for students; however, higher education is caught among the tensions of securing cost-conscious resources and meeting student learning goals and expectations (Davidson & Dwyer, 2013). Complicating the landscape of higher education further are the pressures of shifting budgets, funding concerns, and decreased enrollment (Broeckelman-Post et al., 2020); the basic public speaking course is no exception to these pressures. The basic course or a basic public speaking course is typically a survey of public speaking practices and is both a theory and performance-based course. However, 2020 brought an unexpected and significant threat that upended the day-to-day operations of higher education across the globe. As a result of the COVID-19 pandemic and to hold back the spread of the pandemic, nearly all faculty and students were forced to transition to some form of online, hybrid, or remote learning in the middle of the spring 2020 semester.

Arguably one of the most important conversations, or debates, occurring in higher education over the past decade has been the transition to online learning and the integration of technology into the face-to-face classroom. A wide variety of studies have cataloged student learning preferences with e-textbooks (Davidson & Dwyer, 2013; O'Bannon et al., 2017), examined multitasking and mediated devices (Kuznekoff & Titsworth, 2013; Kuznekoff et al., 2015), and assessed the development of communication skills and classroom community in online learning environments (Ward, 2016). Conversation has been rightfully focused on best practices for faculty and students in this unique situation. However, the reflection on teaching and learning during the pandemic needs to include, as an important consideration, how this transition affected student learning. Thus, the goal of the present study is to examine how the transition to remote learning affected student learning in the basic course.

This study compares how students in three different course delivery modes (face-to-face [FtF], online, and live interactive [LI]) performed in their standardized sections of the basic course. This course used an integrated e-textbook across all sections as well as a standardized grading system for all assignments, quizzes, and exams. Using both grade book and survey data, we examine the influence of the COVID-19 crisis on student learning in the basic course.

Literature Review

The COVID-19 pandemic likely accelerated the growth of online learning. Even before the pandemic started in Spring 2020, remote learning options were becoming more prevalent at colleges and universities across the United States. The National Center for Education Statistics (2020) reports that, out of the nearly 17 million undergraduate students enrolled in Fall 2018, nearly 6 million were enrolled in some form of distance education. Furthermore, 14% of undergraduate students were enrolled in exclusively distance education courses. According to Pokhrel and Chhetri (2021), the COVID-19 pandemic “**created** the largest disruption of education systems in human history, affecting nearly 1.6 billion learners in more than 200 **countries**” (p. 133). Although popular, remote or online learning is not for everyone, as both faculty and students have provided mixed reactions to this newer form of instructional delivery as well as to the integration of e-textbooks. In what follows, student learning with e-textbooks, the online learning classroom, and the influence of a crisis on student educational experiences are examined.

Student Experiences With E-Textbooks

Today it is widely accepted to have an e-textbook integrated into an online learning classroom. An e-textbook or a digital textbook is an electronic version of a text. A student may read an e-textbook on a computer, mobile device, or e-reader. Researchers have found that students who received instruction through an e-textbook, as well as lecture instruction, outperformed students who only received lecture instruction from the instructor (O'Bannon et al., 2017). Such a finding is intriguing and suggests that an e-textbook's interactive instruction may positively affect student learning but does not replace the human component of a teacher's instruction in either the FtF or online classroom. Martin (2012) noted that e-textbooks have multiple advantages: they are portable; are often less expensive than traditional books; have text search and annotation capability; and have offline availability, among other notable features. Martin also noted the need for exploration into “whether existing resources provided by publishers of textbooks may be utilized to increase students' engagement and lead to better learning outcomes” (p. 4). For example, e-textbooks like the one used in this study include adaptive readings and quizzes. O'Bannon et al. (2017) suggested that the potential benefits of an e-textbook are the ways learning can become more exciting and engaging in comparison to a traditional hardcopy textbook.

Providing engaging content to students may make the online learning experience more fun; however, there are concerns with e-textbooks. Weisberg (2011) asserted that students may enjoy the flexibility of accessing their content through the laptop or tablet but may fail to recognize that they are supposed to be deeply engaged with the reading. Daniel and Woody (2013) posed another concern that educators must remain keenly aware of—how much students are multitasking while reading their e-textbooks. Given the significant amount of research on the negative effects of multitasking on student learning, implementing an e-textbook that is accessed through a smartphone or laptop, which also provides access to the web, may be detrimental to a student's success in a course (Kraushaar & Novak, 2010; Kuznekoff et al., 2015; Kuznekoff & Titsworth, 2013). The seamless accessibility of an e-textbook on a mobile device or tablet, while touted by publishers as a benefit, may actually be a detriment for educators and students.

For many students, e-textbooks are a desirable option for accessing textbook content. Davidson and Dwyer (2013) noted that students tend to like e-textbooks because they were less expensive than printed versions, but students did not like the proposition of needing to spend potentially hours at their computer screens reading. “The more that a student has used an e-book or e-textbook, the more likely they are to find it useful. It seems that the disadvantages students perceive with using e-textbooks are related to low familiarity with the e-textbook format and the tools they offer” (Davidson & Dwyer, 2013, p. 147). Such a finding is a strong reminder that consideration must be given as to whether students have the skills, knowledge, or technological dexterity to successfully use an e-textbook. Ma (2021) established that if instructors are willing to increase adoption of e-textbooks (or open access education resources), students could experience both cost savings and potentially higher digital learning in the 21st century. Moreover, questions remain regarding how student attitudes toward e-textbooks influence learning outcomes.

Student Learning and the Online Classroom

Prior to online learning, student learning on university campuses primarily occurred in a FtF classroom. With a significant influence from the COVID pandemic, the modalities in which students can learn has greatly increased. In a post-COVID era, there are online asynchronous (ONLA) and online synchronous (ONLS) classrooms, and students are likely to have at least some experiences with both modes of online learning (Ashby-King, 2022). The primary difference between the two is that the latter affords students scheduled live instruction and the former allows students to learn at any time they wish through pre-loaded instructional materials and no live teacher instruction. Like the FtF classroom, the online classroom is also fraught with complexity and challenges. Questions remain about the degree to which the online classroom should replicate FtF social learning experiences, how the increased proliferation of online classes fails to equate with the accessibility or equity in education (Parsloe & Smith, 2022), and how challenges with technology or external

disruptions (e.g., COVID, natural disasters) may impact student learning (Ashby-King, 2022). There are also questions regarding the sense of community and support (Broekelman-Post et al., 2019) as well as motivation (Vallade et al., 2020) in online courses.

As the educational landscape continues to change at elementary through tertiary education, students have become increasingly more accustomed to technology in the classroom as well as opportunities to take online courses. For many students, online learning provides the opportunity to access higher education previously viewed as impossible (Blau et al., 2018). As a modality, online learning is more flexible than FtF, which allows a student who may have the commitments of a family, full-time job, or other responsibilities to pursue an education (Miller, 2010). With the proliferation of mobile technology and tablets, a student can access and participate in an online class with more flexibility in comparison to a FtF class. Shin and Lee (2009) also found that students enjoy taking an online class and expressed an interest in taking additional online courses in the future. And as colleges and universities continue to build fully online degree programs, it seems the demand and rapid growth of online courses will continue to permeate higher education.

Although students may appreciate the flexibility of an online learning classroom, they also report challenges and obstacles, too. While Gen Z (ages 9–24) might be more tech-savvy than previous generations of students, there is a potential increased cognitive overload when taking an online course (for a discussion of cognitive load and online learning, see Skulmowski and Xu (2022)). A student may experience cognitive overload when attempting to comprehend too much, while making connections between existing and new knowledge (Hosek & Titsworth, 2016), or while solving complicated problems that require many steps and sub-steps for comprehension. Further, students may also face challenges with learning if the online learning environment seems chaotic, disorganized, or difficult to navigate (Simonds et al., 2019). Understanding and using embedded tools in the learning management system (LMS) as well as adaptive readings and exams may also cause cognitive overload and lead to learner fatigue (Matthew, 2012; Peper et al., 2021; Toney et al., 2022).

For students in a fully online basic communication class, there are specific challenges related to the content and performative nature of the course. Unlike other courses, public speaking requires both content and performative mastery. As a result, students must demonstrate their knowledge and skills through online recording tools, which may affect their public speaking anxiety (Westwick et al., 2015) and development of communication skills (Ward, 2016). Complicating student perceptions of the online learning experience further is the deep integration of e-textbooks and adaptive learning resources.

External Disruptions and Modality Switching

Prior to the spring of 2020, the U.S. university system had never experienced a widespread modality change. Each year, a few universities in the United States experienced closures or modality changes due to natural disasters such as wildfires, hurricanes, and non-environmental threats like terrorism or weapon violence (see Brisbon et al. (2020) for a discussion of Hurricane Katrina; Willoughby (2020) for a discussion of the September 11 attacks). During the spring of 2020, the COVID pandemic had its initial impact on most universities in the United States and globally. For students, the sudden shift from FtF to online (ONLA or ONLS), live-streamed, or in some cases back to a FtF classroom, but with live stream and hybrid incorporated, was nothing short of confusing. Prior communication research has long established the importance of structure and organization in the classroom as important for an effective classroom experience (see Simonds et al., 2019). However, with the external threat of the COVID pandemic, teachers were forced to shift their classrooms and students found themselves experiencing a disruption to their education.

An issue for all instructors during a crisis is the reality of having to be reactive rather than proactive. Scholars suggest that it is important for teachers to be proactive with decisions and organization in the classroom because these advanced choices impact classroom climate and student learning (Evertson & Harris, 1992; Ornstein, 1995). During the COVID pandemic, an unprecedented shift occurred for many students in terms of

the delivery modality of the course (i.e., moving from FtF to online), but also the ways in which their learning was assessed. It is possible that students felt a lack of clarity from teachers, which also impacted their willingness to participate and perhaps influenced their affective, cognitive, and behavioral learning (McCrosey, 1994; Mottet et al., 2006; Richmond et al., 1987).

Modality switching occurs when the mode of delivery for courses changes during the term of instruction (Trust & Whalen, 2020). Often, this change occurs due to an extreme or unpredictable circumstance that makes the starting mode of instruction difficult to continue with. Trust and Whalen (2020) argued that during times of modality switching technology is often used to ensure the continuation of student learning; however, there may be significant gaps in teacher preparation and training. For example, the instructor of an FtF class may encounter a disruption that prevents them from leaving their home. Switching the class from FtF to online synchronous delivery using a video conferencing platform (e.g., Zoom) might be preferable to canceling the class mid-semester. However, changing the mode of delivery can influence student learning (Armstrong et al., 2022; Westwick & Morreale, 2021). Through self-report assessments from 163 undergraduate students, Armstrong et al. found that switching course modality diminished student learning opportunities and decreased student efficacy in the course and motivation to complete course material. The researchers asserted that because of the abruptness of modality switching, students received less teacher confirmation (or instructional support), which in turn harmed their learning outcomes. Other scholars have established that abrupt modality switching jeopardizes student learning (Mahdy, 2020; Ramlo, 2021; Serhan, 2020) and may add to anxiety associated with living environments (Schwarzman, 2020). More specifically, Mahdy (2020) asserted that the abrupt shift to online learning could negatively affect students enrolled in practical application competency-based courses like chemistry, veterinary science, or biology. Relatedly, Ramlo (2021) found students reported negative effects to their education during the modality switching of the COVID-19 pandemic because of changes to hands-on lab experiences, time-management, absence of instructor lecture and discussion, or overall disdain for online courses. And speaking to the use of technology with student learning, Serhan (2020) established that students who had a negative attitude towards Zoom during the shift to remote learning also reported a negative effect on their learning experience and motivation to learn. In short, the consequences of modality switching on student learning should be carefully weighed. In summary, we might expect that those students who experience the greatest change in modality switching (i.e., FtF to online) could also experience greater disruptions to their learning. Comparing student grade book data across courses that experience different forms of modality switching will help to inform our understanding of how modality switching influences student learning.

Research Questions and Hypotheses

Based on past research and the need to further examine how student educational experiences changed with switches in modes of course delivery and how these factors may have influenced student learning when examined alongside an external crisis, we posed the following research questions and hypotheses.

- (RQ1) Did students in the three modes of course delivery (online, initially FtF, and LI) score differently on the quizzes throughout the semester?
 - Hypothesis: Mean scores on the quizzes will differ between the three groups.
- (RQ 2) Did students in the three modes of course delivery (online, initially FtF, and LI) score differently on major assignments throughout the semester?
 - Hypothesis: Mean scores on major assignments will differ between the three groups.
- RQ 3) Were there any differences in total points earned during the semester between students in the three modes of course delivery (online, initially FtF, and LI)?
 - Hypothesis: Mean total points earned during the semester will differ between the three groups.

Method

Participants

Participants were 659 students recruited from multiple sections of the basic course at a large university in the western United States. This university regularly offers approximately 100 sections of the basic course, which enrolls students from a variety of majors and functions as a general education requirement in the humanities, throughout the academic year. Data collection occurred during the spring 2020 semester, and the basic course initially offered sections across three forms of class delivery that semester: traditional FtF ($n = 23$), online ($n = 16$), and live interactive (distance broadcast) ($n = 1$).

Procedures

The basic course has a high degree of standardization. All sections use the same adaptive e-textbook and the same major assignments including speeches, quizzes, and exams; all rubrics are standardized. All quizzes are embedded in the e-textbook, and grades are automatically ported over to the grade book on the LMS (Canvas). Students in the basic course are required to participate in research for a small amount of course credit (approximately 2% of their overall grade). Those students who do not wish to participate in research or do not consent to participate in research studies are provided with an alternate assignment that allows them to earn the same amount of course credit.

After receiving IRB approval, one of the authors contacted basic course instructors and provided them with information about the first part of the study. This information included a link to a Qualtrics survey and an email template that instructors would use to contact students about completing this assignment. The link to the survey provided students with the informed consent form, and any student not agreeing to participate was immediately forwarded to a page with information about how to complete the alternative assignment. Those agreeing to participate were then asked for their student ID number, which was only used to match data from the study with class academic performance data. This same procedure was used for all three data collection points. Part 1 included basic demographic information about the participant. Part 2 included scales that measured media and technology usage, as well as attitudes toward technology, and a scale measuring student interest. Part 3 included questions measuring student academic reading characteristics and open-ended questions asking for participant feedback on their reading experience in the class. After completing each part of the study, participants were instructed to take a screenshot of the survey completion page and to submit that image to the respective Canvas assignment to receive credit for participating in that part of the study.

Following the end of the semester, data collected from each part of the online survey and the grade book was downloaded to a computer and merged into a single file based on student ID number collected during each part of the study. Approximately 890 merged cases were included in the data file; however, 33 students either did not include their ID number or provided an invalid ID number and were removed. In addition, approximately 170 students completed individual parts of the study twice and thus did not represent unique cases. In these cases, duplicate student ID numbers were identified by the computer and individually reviewed by the authors. Generally, the merged case with the most data (i.e., contained two or more parts of the study) or with the earliest completion date (i.e., the first time they completed that part of the study) were kept and the remaining duplicate cases were removed. The dataset was again analyzed for duplicate cases, and none were found. This resulted in a sample of 659 participants who completed at least one part of the study. After merging with grade book data, a sample of 488 students remained.

Measures

Media and Technology Usage and Attitudes Scale (MTUAS)

The MTUAS is a 60-item measure with 15 subscales that examines media/technology usage and attitudes

(Rosen et al., 2013). Only the four subscales measuring attitudes toward technology were used. The four subscales, with past reliability noted in parentheses, include Positive Attitudes Toward Technology ($\alpha = .87$), Anxiety and Dependence ($\alpha = .83$), Negative Attitudes Toward Technology ($\alpha = .80$), and Multitasking Preference ($\alpha = .85$) (Rosen et al., 2013). The subscales include 16-items across the four subscales. All scale items are 5-point Likert type, with six items for Positive Attitudes Toward Technology, three for Anxiety and Dependence, three for Negative Attitudes Toward Technology, and four for Multitasking Preference. One item on the Multitasking Preference subscale was reverse coded for consistency. Higher scores indicate greater attitudes or preference towards that construct (i.e., higher scores for negative suggest more negative attitudes toward technology).

Student Interest

The Student Interest Scale (Mazer, 2012; 2013) is a 16-item scale that can “**assess** emotional (nine items) and cognitive (seven items) **interest**” (Mazer, 2013, p. 131). Both emotional and cognitive interest can help students engage with the course content and, in-turn, help promote learning. Each item is measured on a 5-point Likert scale with higher scores indicating greater levels of emotional or cognitive interest. Mazer (2013) reported alpha reliabilities of .95 for Emotional Interest and .88 for Cognitive Interest.

Additional Items

Beyond the measures noted above, additional survey items were included in this study. Several of these items were standard demographic questions, including age, ethnicity, biological sex, year in school, and if they were a first-generation college student; however, additional items concerning student technology use were also included. In particular, one item asked participants to identify which devices they used for electronic course readings (Mizrachi, 2015).

Data Analysis

A one-way ANOVA was run for each quiz to determine if mean scores for the quizzes differed between the three groups. Alpha was set at .01 to control for Type I error when evaluating the *F*-test statistic. Additional ANOVAs were run to determine if mean scores on major assignments differed between the three groups and if total points earned during the semester differed between the three groups (with alpha set at .01).

Results

Participants were 313 (60%) males and 210 (40%) females, with ages ranging from 18 to 53 ($M = 22.44$ $SD = 5.36$). Roughly 78% were Caucasian, 9% Hispanic, 5% Other, 3% Asian, 2% African American, 2% Pacific Islander, and 2% Native American. Approximately 28% of participants indicated that they are a first-generation college student and 21% identified as a non-traditional student. Nearly half of participants (47%) were first-year students, 34% were sophomores, 13% were juniors, and 7% were seniors. The average GPA, self-reported by participants, was 3.37 ($SD = 0.53$). A total of 291 participants were in the FtF group, 123 in the Online group, and 74 in the LI group.

Alpha reliabilities associated with the sample included .77 for Positive Attitudes Toward Technology, .81 for Anxiety and Dependence, .74 for Negative Attitudes Toward Technology, .81 for Multitasking Preference, .94 for Emotional Interest, and .86 for Cognitive Interest. Roughly 67% of participants noted they used a laptop computer, 15% used a desktop computer, 13% used a tablet/iPad, 6% used a different device (i.e., other), 2% used an audio application, 1% used a dedicated e-reader (e.g., Kindle), and <1% indicated they never read course materials electronically.

Research Question 1

The first research question asked if the students in the three modes of course delivery scored differently on quizzes throughout the semester (see Table 1 for ANOVA reporting).

Table 1: Means, Standard Deviations, and One-Way Analyses of Variance on Quizzes

Variable	FtF		Online		LI		F(2, 485)	η^2
	M	SD	M	SD	M	SD		
Quiz 1	4.60	1.31	4.73	1.09	4.93	0.58	2.43	.01
Quiz 2	4.66	1.27	4.80	0.99	4.80	0.12	0.87	.00
Quiz 3	4.44	1.57	4.76	1.08	4.53	1.46	2.08	.01
Quiz 4	4.40	1.61	4.72	1.16	4.53	1.47	1.93	.01
Quiz 5	4.40	1.62	4.67	1.24	4.64	1.28	1.86	.01
Quiz 6	4.18	1.83	4.78	0.93	4.39	1.65	5.88*	.02
Quiz 7	4.33	1.68	4.58	1.33	4.70	1.17	2.26	.01
Quiz 8	4.21	1.80	4.63	1.26	4.40	1.63	2.87	.01
Quiz 9	4.25	1.77	4.59	1.37	4.39	1.65	1.86	.01
Quiz 10	4.36	1.67	4.50	1.45	4.21	1.82	0.78	.00
Quiz 11	4.07	1.90	4.44	1.56	4.21	1.82	1.86	.01
Quiz 12	3.90	2.07	4.47	1.54	4.46	1.56	5.32*	.02
Quiz 13	3.91	2.04	3.87	2.09	4.44	1.56	2.35	.01
Quiz 14	3.67	2.19	4.31	1.71	4.61	1.29	9.11**	.04
Quiz 15	3.75	2.15	4.56	1.41	4.66	1.26	12.00**	.05
Quiz 16	3.76	2.15	4.25	1.73	4.56	1.39	6.32*	.03
Quiz 17	3.58	2.23	3.96	2.02	4.57	1.38	7.01*	.03
Quiz 18	3.81	2.12	4.29	1.74	4.19	1.86	2.99	.01
Quiz 19	3.75	2.16	4.15	1.89	4.15	1.87	2.19	.01

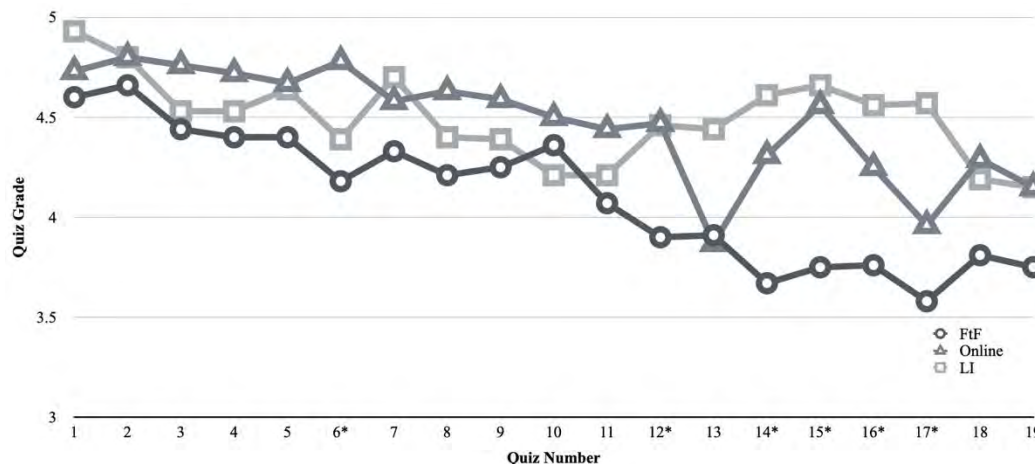
* $p < .01$. ** $p < .001$

For Quiz 6 (analyzing the audience), post hoc comparison using Games-Howell indicates that the FtF ($M = 4.18$, $SD = 1.83$) and online ($M = 4.78$, $SD = 0.93$) groups differed from each other, while LI ($M = 4.39$, $SD = 1.65$) was not different from the other groups. For Quiz 6, the Online students scored higher on the quiz than the FtF students. For Quiz 12 (language usage), post hoc comparison using Games-Howell indicates that the

FtF group ($M = 3.90$, $SD = 2.07$) differed from both the Online ($M = 4.47$, $SD = 1.54$) and LI groups ($M = 4.46$, $SD = 1.56$); however, no difference between Online and LI was detected. Both the Online and LI students scored higher than the FtF students on Quiz 12. A similar trend was also present for Quiz 14, which covered the chapter on using visual aids. Post hoc comparison using Games-Howell indicates that the FtF group ($M = 3.67$, $SD = 2.19$) differed from both the Online ($M = 4.31$, $SD = 1.71$) and LI ($M = 4.61$, $SD = 1.29$) groups, while Online and LI did not differ from each other. For this quiz, the FtF group scored the lowest, while Online and LI students performed better than the FtF students, while also not appearing to differ from each other. Quiz 15 (informative speaking) also demonstrated a statistically significant difference, and post hoc comparison using Games-Howell followed the same trend as in Quizzes 12 and 14. The FtF group ($M = 3.75$, $SD = 2.15$) differed from both the online ($M = 4.56$, $SD = 1.41$) and LI ($M = 4.66$, $SD = 1.26$) groups, while the Online and LI groups were not different from each other. As was similar for past quizzes, post hoc comparison using Games-Howell for Quiz 16 (persuasive speaking) found that the FtF group ($M = 3.76$, $SD = 2.15$) differed from both the Online ($M = 4.25$, $SD = 1.73$) and LI ($M = 4.56$, $SD = 1.39$) groups; however, the LI and Online groups did not differ from each other. The FtF group scored lower on Quiz 16 than either the LI or Online groups. Lastly, post hoc comparison using Games-Howell for Quiz 17 (methods of persuasion), found that the LI group ($M = 3.58$, $SD = 2.23$) differed from both the Online ($M = 3.96$, $SD = 2.02$) and FtF ($M = 4.57$, $SD = 1.38$) groups; however, the Online and FtF groups did not differ from each other. The LI group scored higher on Quiz 17 than either the Online or FtF groups. In general, across the quizzes with statistically significant differences present, it appears as though the FtF students performed worse on the quizzes than either the LI or Online groups did, except for Quiz 17.

At the institution this study was conducted at, classes shifted to fully remote during the 10th week of the semester, roughly the second week of March 2020. In all sections of the basic course, this corresponded to the roughly two-week period that featured informative speeches and no other assignments. Quizzes 1 through 15 took place prior to the transition to going remote, while quizzes 16 through 19 were taken after the class transitioned to fully remote (see Figure 1).

Figure 1: Mean Student Quiz Grade by Study Group



Note. Quizzes 1–6 were administered on January 7–13 in February 14–18 in March, and 19 in April. The basic course went fully remote for all sections prior to quiz 16 and approximately 2 weeks after quiz 15.

*($p < .01$)

Quiz scores tended to go down for students in the FtF sections of the basic course in the weeks leading up to the transition to going remote. At this point in the semester, the course content was also becoming a bit more challenging. For example, informative and persuasive speeches require the use of outside sources, while past speeches do not have this requirement. In addition, informative and persuasive speeches typically involve

more complex organization than earlier speeches in this course. It is typical for students to struggle with these more advanced speeches, and quiz grades may have suffered for those students who were also faced with their course section changing modes of delivery (i.e., the FtF group).

Research Question 2

The second research question asked if students in the three modes of course delivery scored differently in terms of major assignments over the course of the semester (see Table 2 for ANOVA reporting).

Table 2: Means, Standard Deviations, and One-Way Analyses of Variance on Major Assignments

Variable	FtF		Online		LI		$F(2, 485)$	η^2
	M	SD	M	SD	M	SD		
Introductory Speech	20.69	7.84	20.17	7.99	22.89	1.57	3.48*	.01
Great Speech	49.00	32.19	60.85	23.12	60.55	15.19	10.27***	.04
Informative Speech	88.17	17.33	85.12	22.30	87.69	8.72	1.28	.01
Persuasive Speech	105.81	33.68	109.81	28.18	109.97	20.55	1.03	.00
Exam 1	62.88	12.01	64.12	11.14	61.34	12.94	1.27	.01
Exam 2	59.94	14.81	62.20	14.02	62.42	9.42	1.67	.01
Exam 3	59.87	14.58	61.32	15.99	59.27	15.29	0.55	.01

* $p < .05$; ** $p < .01$; *** $p < .001$.

For the introductory speech, post hoc comparison using Games-Howell found that the LI group differed from both the Online and FtF groups; however, the Online and FtF groups did not differ from each other, $F(2,485) = 3.483$, $p < .05$, $\eta^2 = .014$. Findings indicate that the LI group scored higher than the other two groups. The LI students earned an average grade of roughly 92% on the introductory speech while the Online students had a grade of 81% and the FtF students averaged 83%. For the great speech, post hoc comparison using Games-Howell found that the FtF group differed from both the LI and Online groups; however, the LI and Online groups did not differ from each other, $F(2, 485) = 10.27$, $p < .001$, $\eta^2 = .04$. Findings indicate that the FtF group scored significantly lower on the great speech than the other two modes of delivery. On average, the FtF student earned a grade of 65% on the great speech, while the LI and Online students earned roughly 81%.

Research Question 3

The third research question involved any differences in total points earned during the semester between the different modes of course delivery. Total points include all standardized assignments that are required in each section of the class; this sums to 645 points and includes 19 quizzes (worth 5 points each), three exams (worth 75 points each), and four speeches collectively worth 325 points. A statistically significant ANOVA was found from the test of differences between the study groups on total points earned in the class, $F(2,485) = 5.445$, $p < .01$, $\eta^2 = .022$. Post hoc comparison using Games-Howell found that the FtF group ($M = 524.40$, $SD = 77.85$) differed from both the Online ($M = 548.66$, $SD = 98.9$) and LI ($M = 549.48$, $SD = 52.74$) groups; however, neither the Online nor LI groups differed from each other. Findings indicate that the FtF group earned a lower overall grade in the course than the Online or LI groups, which did not differ from each other. Putting this result in different terms, the FtF group earned an average percentage grade of 81.3%, while the Online group

earned 85.06% and the LI group earned 85.19%. On average, the FtF group scored roughly 4% points lower in the course than students in the Online or LI groups.

Discussion

The initial purpose of this study was to examine potential differences in student learning between two different types of textbook delivery (traditional and adaptive e-textbook); however, the COVID-19 pandemic restricted our ability to fully manipulate important variables needed to examine this topic with the attention it deserves. We modified the purpose of the study to instead examine student learning during a unique period in human history. Having not seen a global pandemic of this nature in a century (e.g., 1918 Spanish Flu), higher education was thrown into a crisis, and understanding the effect this crisis had and continues to have on student learning is vital for educators across the country.

We did not find substantive evidence that shifting to fully remote had a significant effect on student quiz grades as we might expect from past research (see McCrosey, 1994; Mottet et al., 2006; Richmond et al., 1987). One possible explanation is that the basic course program used in this study required all quizzes to be administered through the LMS used by the university (i.e., Canvas). Even though FtF students transitioned their mode of instruction to fully remote, the way in which they took quizzes remained consistent throughout the semester. Had the transition to remote caused a significant, negative effect on quiz grades, we would have seen quiz grades drop off, for FtF students, at the point in which classes went remote, which was right before quiz 16. However, by that point in the semester, FtF students had already demonstrated lower quiz grades for several preceding quizzes and the way in which FtF students took the quizzes did not change due to going remote.

We also did not find substantive evidence that modality switching (i.e., switching modes of course delivery during the semester) had an extreme negative effect on student learning or performance in the course. Trust and Whalen (2020) noted that technology is often used to facilitate modality switching but significant gaps in teacher training and preparation can occur, and other scholars report that this switch can influence student learning (Armstrong et al., 2022; Westwick & Morreale, 2021). While our study did find that FtF students earned a lower overall grade than Online or LI students, this difference was less than half a letter grade. One potential explanation is that instructors likely did receive additional training to aid them in the rapid transition to online learning. Anecdotally, many schools were able to quickly provide online tutorials to help faculty learn more about online learning. While Armstrong et al. (2022) found that students received less teacher confirmation (or instructional support) during abrupt modality switching, it could be that institutions did a better job of providing that support than they had in the past. It also could be that having nearly all of a **student's** class schedule shift to remote learning provided consistency for students. We would expect that each of the **student's** classes would make use of the LMS at their institution and that provides students with a consistent online experience across classes. While scholars have found that abrupt modality switching can endanger student learning (Mahdy, 2020; Ramlo, 2021; Serhan, 2020), our study only provides evidence of a 4% difference in course grade for those students that experienced the more significant shift in modality (i.e., FtF to online).

One significant finding was the difference in the average student grade on the great speech and, to a lesser extent, the introductory speech. FtF students earned an average grade of 65% of this speech, while the other two modes of delivery had an average of roughly 81%. A potential explanation for this finding is that the great speech is one of the more rigorous assignments and FtF students could be failing to take advantage of support like workshops or the public speaking lab. It could be that, for FtF students, the switch to online delivery may have had some aspects that were unclear (i.e., if speeches would be recorded or given synchronously) and that lack of clarity may have impacted their willingness to participate or affected their affective, cognitive, or behavioral learning (McCrosey, 1994; Mottet et al., 2006; Richmond et al., 1987). During the transition to online, students may have perceived that they were equipped to re-imagine an already delivered speech and underestimated the difficulty of successful audience analysis. In comparison to students in the LI or online

sections, who may already feel overwhelmed by the online synchronous or asynchronous nature of the course, they may feel more compelled to reach out to teaching assistants, speech lab peer mentors, and complete speech preparation worksheets prior to that graded assessment.

Another explanation is situated in the overall tension that existed across the country during Spring 2020. For nearly 1–2 months students, faculty, staff, and parents were likely apprehensive about how COVID might affect their lives. It was not until March 11, 2020, that the World Health Organization (2020) characterized COVID-19 as a pandemic, and many colleges and universities started shifting their classes to remote learning in the weeks following this announcement. However, it would be naïve to think that many students did not foresee this shift as being a possibility, if not being inevitable. It would be reasonable to believe that many students likely had a degree of uncertainty surrounding what their university might do or how the pandemic might affect them. This tension or uncertainty, prior to the March 11 WHO announcement, might help to explain why FtF students performed worse on several quizzes leading up to the shift to remote learning and, potentially, the great speech as well. FtF students were likely the ones who would experience the greater disruption to their learning, since students in our online group and LI sections were already engaged in some form of remote learning. Kaufmann et al. (2021) explain that many students were faced with not only changes to mode of instruction but also being required to vacate their on-campus housing and that “**taken** together, this pandemic has had a major impact on all facets of **students’ lives**” (p. 290). The uncertainty students likely experienced built up over the course of several weeks or months up to the WHO announcement and likely continued during the term. Because FtF students may have experienced greater disruption to their chosen method of course delivery, they also seemed to perform worse in the basic course when compared to those students whose mode of delivery did not radically change.

Finally, as our study unfolded during the COVID-19 global pandemic, there are community and cultural factors to consider. Approximately 71% of students at the university this study was conducted at identify with the Church of Jesus Christ of Latter-day Saints (LDS) (see Woolstenhulme, 2018 for discussion of campus culture). As one of the hallmarks of the faith is proselytizing, it is important to acknowledge how the campus culture and student experiences changed as missionaries returned early from their missions. Munz and Colvin (2018) found that LDS students in public speaking classes were concerned about their classmates because they attended church together and fostered relationships outside of the classroom. It is possible that students felt closeness and community with classmates or teachers on campus in the spring of 2020; especially as friends and family members returned early from missions. We surmise that students may have felt relief knowing their loved ones were safe at home and uneasiness as leaving a mission early is often stigmatized. As students experienced changes to their education due to the pandemic, it is possible they also experienced stress, uncertainty, and even relief knowing their friends and loved ones were safely home.

Limitations of the Study

Although our study took place during a unique period in higher education, we do recognize several limitations. First, the study was conducted at a single university that has a mix of residential and commuter students. Demographic characteristics of the sample used in this study may have affected results and this likely does limit the generalizability of this study. Application of the findings from the present work to other college campuses should be done with caution. In addition, this study collected data during the initial wave of the COVID-19 pandemic. At the time of writing, over a year after that initial wave, both faculty and students have likely grown more accustomed to remote learning. Faculty have had more time to develop their courses for online delivery instead of being forced to change modes of delivery practically overnight. Students and faculty have each gained more experience taking and teaching courses in an online environment. Thus, future researchers should carefully examine if the differences we detected were purely because of the rapid switch to remote learning or indicative of online education in general.

Implications for Research and Practice

One area for future research is examining differences in student learning as it relates to particular types of online classes. Broadly speaking, online classes during the pandemic can be broken down into two major categories: synchronous and asynchronous. Synchronous classes are akin to video conferencing and typically involve the instructor holding class via Zoom (or through another video conferencing service) while students all attend at the same time. Asynchronous classes lack this real-time component and, instead, allow students the flexibility to interact with the course according to their own schedule (i.e., no real-time component). Both modes of delivery appeared to be popular during the semesters that followed the first wave of the pandemic and scholars should examine if one mode of delivery was more conducive to student learning in the basic course than the other.

Conclusion

Although our study pivoted from our initial research topic to the present study, we did find some interesting results. After collecting self-report data and matching that with grade book data from the basic course, we were able to provide initial insight into how the COVID-19 pandemic affected student learning. We found that face-to-face students, whose mode of delivery was more greatly disrupted than online or live interactive students, scored slightly lower on several quizzes and speeches and earned a lower overall grade in the course than students in courses with a different mode of delivery. This finding represents an initial investigation into the effect that going remote had on students learning in the basic course.

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