

THE TRANSITION NOBODY EXPECTED: A THOROUGH EXAMINATION OF
MOTIVATION, RELATIONSHIPS, AND CONTENT DELIVERY DURING THE ONLINE
LEARNING PERIOD AT COLORADO COLLEGE

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Margaret McDonnell

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Abstract

As a result of the COVID-19 pandemic, higher education institutions were forced to transition to online delivery for the end of the 2020 academic year and most of the 2020-2021 academic year. This study explored the experience and transition to online learning at Colorado College. Qualitative and quantitative data was collected from 50 students across all grade levels and disciplines. The factors explored across grade level, major and grade point average were motivation, relationships, content comprehension and delivery, and overall satisfaction. The findings in this study present the significant correlation between relationships and motivation, but not among other factors. The findings also showed the freshman and sophomore students had an overall better experience learning online than juniors and seniors. This study presents suggestions on how content should be delivered to students at Colorado College while learning online. The study also showed the importance of strong relationships between students and professors during virtual instruction.

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Margaret McDonnell

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ABSTRACT

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The Transition Nobody Expected: A Thorough Examination of Motivation, Relationships, and Content Delivery During the Online Learning Period at Colorado College

The COVID-19 pandemic and resulting stay at home order presented new challenges for college students and educators as they entered a virtual learning environment. Students and teachers were confronted with gathering and applying new skills that centered around virtual relationships.

When the threat of COVID-19 became urgent, Colorado College announced a week-long extension to spring break in March of 2020. The extension was quickly replaced with the news that the rest of the academic year would be conducted online. The fall of 2020 was conducted remotely with the exception of freshmen that were offered the opportunity to come to campus and take in-person classes. After one month, all students on campus were sent home due to various outbreaks among students.

Students that spent the three previous years developing the skills necessary to be successful in the college classroom were confronted with the task of shifting to learning online. Similarly, new students entered a learning environment completely new and unexpected. The new students had to transition from high school to college from the isolation of individual screens. Professors, young and old, were told to reshape class structures to support the virtual platform. All aspects of college life changed in a matter of weeks.

The abrupt shift in content delivery, relationships, and motivation proved to host many challenges. This study aims to answer questions regarding the intense transition that happened as a result of COVID-19. Some of the questions regarding this research include how students learn best while engaging with online classes, how satisfied Colorado College students were with the

academic year being online, and how students were able to shift the pre-existing knowledge they held as a learner and translate that to the virtual classroom.

The overall goal of this study was to examine how the general uncertainty regarding how classes would be taught and the difficult transition to online learning implicated the student experience. Further, this study was focused on the complexity of transitioning educational content to a virtual setting and examining the success of that transition. For this study, satisfaction was defined by students' relationships, motivation, ability to comprehend content, and student's perception of the tuition charged for the academic year.

A significant comparison that will be examined in this study is how younger students (freshmen and sophomores) and older student's (juniors and seniors) online experience varied. Older students had access to more resources and skills than younger as a result of more years in college. However, this study addressed more questions which confront if those skills were useful when transitioning online. This study confronted the idea that older students may not have the same motivation to do well because they are more critical of the transition as they are able to compare online learning more thoughtfully to in-person learning because they experienced it for longer.

This paper examines research conducted on motivation, relationships, and the learning process. The primary theory explored and used to comprehend the data is Vygotsky's zone of proximal development (1978). Vygotsky's (1978) research illuminates the significant connection between relationships and motivation. The overall purpose of this research is to examine the effect of the COVID-19 pandemic on Colorado College student's relationship building and maintenance, engagement with course content, and motivation for academic performance.

This study was specific to liberal arts education during online learning. Liberal arts schools have distinguished themselves as providing thoughtful and innovative educational strategies and resources. Additionally, they have successfully convinced students that a more general education is worth the cost and that students will graduate into competitive and lucrative fields (2017). According to Haberberger (2017), it is why liberal arts education has taken on a different meaning in contemporary society. The resources that make the liberal arts education more expensive are not exclusive to physical spaces, but include access to small classes, close relationships with professors, and hands on learning. The intimate elements incorporated in classrooms at small liberal arts schools set them apart from other curriculum models at typically larger universities. The value of each institution is clarified through specific curricular goals or academic models.

At Colorado College, the rigorous schedule of the block plan is a focal part of the distinctiveness of the education delivered. When considering this in the context of a global pandemic and temporary online learning, it is important to understand if students feel tuition accurately represents the education they receive. This study occurring at a liberal arts school is fundamental to understanding the effects of the transition to online learning. The aspect of education as a commodity (Shirkey, 2010) is critical when considering how many schools have kept tuition the same or raised it during the COVID-19 pandemic despite most of the campus being closed and classes all taught remotely.

Liberal arts institutions emphasize a learning model similar to the Vygotskian (1978) experience. Both Vygotsky (1978) and the liberal arts experience, emphasize the importance of close relationships and structured, active teaching. These structures present themselves through

small classes where relations become built and are critical to the overall academic experience. This study highlights the context of Colorado College as a liberal arts institution in the examination of student's perceptions when learning became fully virtual.

Literature Review

Motivational theorists suggest that student perception of relationships with teachers is essential in motivating students to perform well (Bandura, 1997; Fan & Williams, 2010; Pajares & Graham, 1996; Ryan, Stiller, & Lynch, 1994; Wentzel, 2003; Zimmerman, Bandura, & Martinez-Pons, 1992). Students that perceive relationships with teachers as positive, warm, and close are motivated to be more engaged in school and to improve academic achievement (Hughes, Cavell, & Jackson, 1999). Studies have shown that interaction between learner and instructor is at the heart of most effective learning environments regardless of delivery format, and interaction tends to aid student motivation (Baker, 2010; Paechter & Maier, 2010). This study looked deeper into Colorado College student's experiences regarding online learning in the context of a global pandemic and student preferences regarding how professors deliver instruction.

Cognitive engagement is the cognitive process that allows the student to absorb knowledge presented by an instructor (Kemp et al., 2019). The engagement with material includes directing attention, engaging curiosity, concentration, and flow (2019). However, the material delivered by virtual instruction must be presented in a way that works harder to engage and enhance the learner due to the constraints of the online learning platform. The research conducted by Aguilera-Hermida (2021) explained the challenges college students have experienced regarding comprehension during online learning. Students in the study reflected that the quality of the learning process decreased after the transition to online learning. Students

claimed there was a "lack of educational value found in modified assignment structure," and "I felt like I wasn't learning at all," (2021). Additionally, participants reported stress because they were not familiar with the online tools (2021).

As confirmed through multiple studies (Aguilera-Hermida, 2020; Albelbisi & Yusop, 2019; Tichavsky, et al., 2015) strong teacher and student relationships are critical in student motivation and success in the context of both in-person and online learning. When teachers form positive bonds with students, classrooms become supportive spaces in which students can engage in academically and socially productive ways (Hamre & Pianta, 2001). This conclusion can be noted from lower school to higher education. Positive teacher-student relationships are classified as having the presence of closeness, warmth, and positivity (Hamre & Pianta, 2001). Vygotsky (1978) concluded similar findings in his studies of social interaction. According to Shirkey (2010), contemporary students view information as a commodity that can be traded openly among a community of learners and collaboration becomes fundamental to a variety of educational outcomes (Dziuban et al., 2013).

Vygotsky (1978) unfolds the principles included in the zone of proximal development which explain the process of learning. To assist a person moving through the zone of proximal development, educators are encouraged to focus on three components that aid the learning process. The first element is the presence of someone with knowledge and skills beyond that of those learning. The second component is social interactions with a skillful tutor that allow the learner to observe and practice skills. The third component outlined by Vygotsky is scaffolding. Scaffolding includes the provision of supportive activities introduced by the educator, or a peer with an understanding of the material needed to support the student.

One of Vygotsky's (1978) principles in essential learning by the student is social interaction with a skillful tutor. The tutor may model behaviors and provide verbal instructions for the student. Vygotsky refers to this as cooperative or collaborative dialogue. The student seeks to understand the actions or instructions provided by the teacher then internalizes the information, later using it as a guide to regulate individual performance (Vygotsky, 1978). Understanding this transaction in the context of a virtual setting is complex, and one of the aims of this study. If a large segment of virtual learning is done asynchronously, students do not experience the zone of proximal development in the way Vygotsky would argue is most important for the learner. The zone of proximal development is centered around relationships and meaningful activities with an instructor, which is challenging to experience when learning occurs online and independently. Vygotsky illuminates through his studies that there is a strong correlation between relationships and motivation in an academic setting.

Relationships and motivation are integrally linked during the learning process. Tichavsky et al. (2015) found that students view themselves as poor self-motivators. Students will rely on others to regulate and direct the learning experience. When considering the frequency that online learning is delivered through asynchronous work, it is notable that students are fully responsible to motivate themselves to engage with material and assignments. The theories suggested by Tichavsky et. al (2015) suggest that learning online may be an obstacle to student motivation. Similarly, the findings from another study (Aguilera-Hermida, 2020), confirm that motivation decreased when students transitioned to online learning in 2020 as a result of the pandemic. Additionally, it was discovered that interaction with peers and professors contributed as a motivating factor for students (2020). These results align with the research conducted by Albelbisi & Yusop (2019).

A study completed in 2019 (Albelbisi & Yusop, 2019) examined motivation and online learning with college students. In the context of the COVID-19 pandemic and resulting stay-at-home order, the research conducted in the study offered applicable literature. Both quantitative and qualitative data presented that the participants were more motivated before the stay-at-home order than after (2019). Existing literature (Albelbisi & Yusop, 2019; Chang et al., 2016; Sun, Lin & Chou, 2018; Tichavsky, et al., 2015) confirms that when students are not motivated, the level of cognitive engagement is lower. Motivation influences students' effort and degree of perseverance invested in certain academic tasks. The authors (2019) also found that quality interaction, and specific interaction with professors, was important for students and was one of the most mentioned explanations as to why students prefer face-to-face over online learning. This research supports the 2010 study examining the interaction between students and instructors (Baker, 2010; Paechter & Maier, 2010).

The qualitative data collected from Albelbisi & Yusop's study (2019) reported the lack of interaction between professors and students proved to be a challenge for students. Due to the crisis of the COVID-19 pandemic and resulting stay-at-home orders, students were not able to choose the delivery method they preferred. As a result, they had to pursue online or hybrid approaches. Professors were confronted with the task of understanding the shift in student motivation levels (Aguilera-Hermida, 2020) and had to alter course material and instruction to best support students.

A study conducted on student perceptions regarding online and in-person instruction discovered that while requiring higher levels of self-motivation, online learning offers the advantages of flexibility and convenience for many students (Tichavsky, et al., 2015). Yet, despite these advantages, most students still seem to prefer face-to-face courses (2015). Although

many students found benefit in online instruction the study concluded that for most students, "It's just nice to have a real teacher" (2015).

The COVID-19 pandemic and stay-at-home orders across the United State have resulted in a mass shift to online learning at all levels of education. Although there has been a continual shift to online learning in recent years, many institutions, educators, and students were faced with an academic environment that was new and unfamiliar. The online learning platform supports two significant types of instruction: synchronous and asynchronous. The distinction between the two is important to distinguish in the context of teaching and learning virtually.

Synchronous classes occur at a given time while individuals log on from separate devices. This "live" platform often encourages discussion, question asking, and relationship building with peers and professors. Asynchronous learning takes form through engagement with pre-recorded lessons, lectures, online discussion boards, and video assignments. In much of asynchronous instruction, class interaction (i.e., lecturing, class discussion, group projects) occurs on online discussion boards. Additionally, much of the professor's "lecturing" role is replaced with recorded videos. If alternative forms of instruction are not applied, the class is meeting in the space of virtual meeting rooms such as zoom, google classroom, or Microsoft office. The lack of face-to-face instruction has indicated it may lead to a disconnect between teachers and students, and students to students (Aguilera-Hermida, 2020).

Online teaching techniques, especially synchronous modes of content delivery, challenge Vygotsky's theory of the zone of proximal development (1978). Asynchronous delivery removes the interaction between student to teacher and student to student. Asynchronous teaching is not an active form of learning, while synchronous teaching can model more elements of active learning. According to Vygotsky (1978), the virtual form of asynchronous instruction would not

allow students to excel in the learning model and would, according to Tichavsky, et al. (2015), lose motivation.

Another factor of online learning and content delivery involves accessibility and mobility. Accessibility is the degree that a student has access to reliable internet and use of cloud applications. Mobility can be defined as the students' ability to use devices without any time or place restriction (Aguilera-Hermida, 2020). In the context of this study, accessibility is important to understand regarding relationships. As previous studies have suggested (Vygotsky, 1978; Tichavsky et al., 2015; Aguilera-Hermida, 2020) relationships are strongly correlated to learning and motivation. Students entering the virtual learning space that are new to college or younger may not have access to the same relationships as older students because they did not have the opportunity to form them before COVID-19.

The online instruction implicated during the COVID-19 pandemic redefined the interactions that happen in the classroom as they all occurred virtually (Garrison, 1989). Computers represent a different approach to the teacher-student educational transaction (Garrison, 1989), and studies have shown they increase misunderstandings of expectations (Moore, 1973).

In 2020, the Covid-19 pandemic, stay-at-home order, and school closures forced a drastic increase in the number of online resources being utilized to encourage productivity to resume. Zoom became the leading software package because it was free, reliable, and comprehensible for a wide range of age groups (Bailenson, 2021). While the software has been an essential tool for efficiency, learning, and social interaction, the expectation to exist on a screen all day has proved to be exhausting (Bailenson, 2021). The term "Zoom Fatigue" has become a popular expression as a result of the many hours each day that educators, students, and professionals spend online. A

study conducted at Stanford University (2021), was able to categorize the recent phenomenon of zoom fatigue into four sections that help explain why people have become more worn-out completing work through conference calls than in person.

The first conclusion drawn addressed the excessive amount of close eye contact that occurs when communicating through a screen. Both the amount of eye contact necessary on video chats, as well as the size of faces on screens is unnatural (Bailenson, 2021). On Zoom, behavior ordinarily reserved for close relationships, such as long stretches of direct eye gaze and faces seen close up, has become the standard for conversations. The design feature on Zoom constantly exposes each face to everyone, regardless of who is speaking. The software converts listeners into speakers and makes listeners often still feel at the center of attention (2021). According to Bailenson, zoom "smothers everyone with eye gaze," (2021).

Bailenson's second point describes the fatigue that can be experienced when staring at oneself during video chats, especially when speaking. The effect of seeing oneself in a mirror has already been studied (Duval & Wicklund, 1972) which demonstrated that people are more likely to evaluate themselves when seeing a mirror image. It can be assumed that a constant "mirror" on Zoom causes self-evaluation and can be highly distracting.

The next factor of Zoom fatigue is the decreased physical mobility that occurs when sitting and looking at a screen. In-person and audio phone conversations allow users to walk around and be expressive. Zoom users are stuck in a small physical box, and are limited to sitting down and staring straight ahead. Research has shown that people moving around, come up with more creative ideas than people sitting (Opezzo & Schwartz, 2014). Other studies also indicate a relationship between movement and cognitive achievement (Cook et al., 2008).. For example,

one study reported that children required to gesture with their hands while learning math showed more learning retention compared to a control group (2008).

The last conclusion in the study that confirms zoom fatigue to be a real, present cognitive roadblock, explains why online instruction requires a higher cognitive load than in person. Zoom users are forced to consciously monitor nonverbal behavior and to send cues to others that are intentionally created (Bailenson, 2021). Bailenson includes examples such as centering oneself in the camera's field of view, nodding in an exaggerated way to signal agreement, or looking directly into the camera lens rather than the faces on the screen. These cues and behaviors are not natural because of the engagement with the device rather than a person and was proved to be draining for users (2021). Users are constantly receiving nonverbal cues that may have a particular meaning in a face-to-face context but can be interpreted as a different meaning on Zoom. Studies have shown that people adapt to media over time (Walther, 2002), yet it is often difficult to overcome automatic reactions to nonverbal cues (2021).

Additionally, the transition to online learning was abrupt and unpredicted which forced students to learn new nonverbal cues rapidly. There is no lesson on how to interact or behave on zoom, students are required to teach themselves new methods to remain engaged and communicative in a new learning environment. Students spend an entire academic career learning how to interact in the classroom and most of those skills lost value when classes moved online.

According to Dziuban et al. (2013), within a particular class, both students and faculty form a large number of contracts that present challenges with overall satisfaction if either the student or teacher feels the standards they set are not met (Dziuban, et al., 2013). This suggests that student satisfaction with online learning is a construct that offers clarity and structure for the

student. The complex interaction of these constructs supports the notion that student satisfaction with online learning offers many parallels to in-person learning. To clarify, according to Spies et al. (2010), students begin to form expectations as they assess course offerings for academic development, decision-making input, challenges, feedback, and support before viewing a syllabus. Further, students may have set expectations for the online class before attending the first day. According to Spies et al. (2010) students pay close attention to the following categories when assessing a course or academic experience: faculty, student development, course and curricular content, learning opportunities, involvement, and facilities (2010). In the context of this research, it is important to remember all that was not offered to students due to online learning.

It is important to identify the resources and relationships that older students already had access to that younger students were still working to acquire before the school year turned virtual. Ke and Kwak (2013) identified five elements of student satisfaction: learner relevance, active learning, authentic learning, learner autonomy, and technical competence. Ke and Kwak's (2013) findings align with Vygotsky's (1978) theory of the zone of proximal development which puts active learning at the center of the learning experience. It is also important to consider how accessible the elements of and Spies et al. (2010) and Ke and Kwak's (2013) findings are when learning occurs remotely.

Colorado College has thread immersive learning, close relationships, and an ethic of hard work into the academic mission of the school. This study aims to better understand if Colorado College students have felt that the online learning experience has embodied the curriculum and mission that the school guaranteed upon admission. The participants of this study are students

being delivered an education that is different from the one that they received in previous years or were anticipating when starting college.

Methods

This study was a mixed-method, multi-phase, phenomenological research project that was approved by the Institutional Review Board. The first phase of this study included a thirty-minute-long focus group with six current Colorado College seniors. Students participated in a conversation regarding the major themes of the research to better inform the researcher of the topic. The students were asked three questions regarding how online learning has affected the academic year. The participants were instructed to only offer experiences that they were comfortable sharing. The conversational format of the initial focus group allowed the researcher to develop a 19-question survey that asked detailed questions regarding online learning at Colorado College. Categorical variables in this study include the participant's year at Colorado College, GPA out of 4.0, major or intended major, where students were located for the academic year, and whether they qualify for financial aid. The quantitative scaled questions and ordinal variables measured are students' experiences with classes taught in-person, experiences with classes taught online, motivation, relationships, and content comprehension.

Participants

A total of 50 Colorado College students responded to an anonymous online questionnaire administered through Qualtrics. This study dealt exclusively with members of the community at Colorado College. Colorado College operates on a unique academic calendar. Rather than a semester schedule that requires students to take multiple classes per semester, Colorado College functions on an 8-block system. Students take one class at a time for three and a half weeks. This calendar encourages close relationships with professors and peers, balances school with

extracurriculars, and dives deep into academics. The schedule of the block plan is balanced with a four-day break after each class ends.

Of the 50 students that responded to the survey, 31 participants were seniors, 10 were juniors, six were sophomores, and three were freshman. The survey was broadcasted to as many as 300 students at Colorado College using social media and email. Tools such as email, group chats, and Facebook were used to distribute the survey to participants, but social media posting was the platform that generated the most responses. 23 of the participants had a major that qualified as a social science, 23 participant's majors were natural science, one participant majored in humanities, and 3 identified with a major that did not fall under any of the categories. 13 participants spent the year living on campus, and 37 participants lived off campus (33 in Colorado Springs and 4 lived off campus not in Colorado Springs).

Instruments

The instrument used in this study was a Qualtrics questionnaire distributed to Colorado College students ranging from freshman to seniors. The questionnaire was a mixed survey with six initial questions posed to better understand the demographics of the participants. The six questions addressed grade level, major discipline, and GPA. Two of the questions on the survey were scaled questions that were used to compare the participant's experience learning in-person compared to learning online. Three of the questions were scaled questions that were used to compare motivation, relationships, and content comprehension during online learning. Four of the questions were open-ended questions that encouraged participants to add qualitative feedback regarding the scaled questions. The format of the survey required students to first reflect on the experience with in-person classes before COVID-19, and then answer the same questions in the context of online classes.

Procedures

During each phase of the research, participants were reached out to by email, school group chats, or social media platforms. The first phase of the research involved a thirty-minute-long focus group with Colorado College seniors. The focus group was recorded using a cell phone and then later downloaded, coded, and transcribed using the online tool NVIVO. A focus group and a survey were used to collect data in the study. The researcher was able to engage with students and clarify the significant themes in the research. This initial conversation informed the researcher of the important topics of the study. The information collected assisted in the creation of the Qualtrics survey that was distributed to Colorado College seniors.

The second phase of research included the distribution and completion of the online Qualtrics questionnaire. The Qualtrics questionnaire was available to be completed by either cellular phone or computer. The estimated time of completion was 5 minutes per user which ensured that participants were not discouraged by the length and were more willing to participate in the research. After the survey was closed, the software SPSS was used to analyze the results. More specifically, the independent t-test, descriptive frequencies, bivariate correlations and one-way ANOVA tests were performed by the researcher using the software.

The questionnaire included four open response questions that addressed comprehension, motivation, and relationships. NVIVO coding software was used once the results were collected to interpret and sort the qualitative responses on the survey. NVIVO coding software and SPSS analytical tools were used to interpret all the data collected on the Qualtrics survey.

Results

Initial descriptive data indicated that students were generally divided on the experience with online learning during the 2020-2021 academic year. 16 participants indicated that they had

a “somewhat positive” experience, 16 indicated they had a “somewhat negative” experience, 13 students indicated that the experience was “neither positive nor negative”, two said it was “extremely positive”, and three said it was “extremely negative” (Table 13).

An independent t-test was conducted between participant’s relationships during online learning and year in school (Table 1). The results indicated a significant relationship between freshmen, sophomores ($M=7.67$, $SD=.5$) and juniors, seniors ($M=6.8$, $SD=1.3$; $p=.003$) and relationships during online learning. The data indicated that freshmen and sophomores reported that relationships were impacted more negatively than juniors and seniors.

An independent t-test was conducted between student’s sense of community among a specific major during online learning and the year in school of participants (Table 2). The data indicated a significant relationship between freshmen and sophomores ($M=2.0$, $SD=0.0$) and juniors and seniors ($M=1.68$, $SD=.471$; $p=.001$) and sense of community among a specific major during online learning. The data revealed that freshmen and sophomores did not feel as strong a sense of community among the major as juniors and seniors did. Qualitative coded data reported similar findings. A sophomore commented regarding relationships during online learning and expressed that they were, “Generally weak. I don’t feel like I’m a part of the department anymore, or a part of the campus community.” Another student noted, “A lot of relationships were established prior to online learning due to the nature of upper-level major classes...which helped with the online learning experience”. A senior expressed, “I feel a stronger connection during my online major classes but that is because I’m a senior, so I know people (classmates and professors) from the past three and a half years. If I wasn’t a senior, I don’t think I would have strong connections in major classes.”

Significant findings are displayed by an independent t-test conducted between student's sense of community among peers during online learning and year in school (Table 3). The table indicated a significant relationship between freshmen, sophomores ($M=2.0$, $SD=0.0$) and juniors, seniors ($M=1.73$, $SD=.449$; $p=.001$) and sense of community with peers during online learning. The data showed that freshmen and sophomores did not feel as strong a sense in community among peers as juniors and seniors did. Qualitative data collected indicated the same findings, "For relationships that are already developed, it is much easier to feel a strong community, especially with classes in my major with peers or professors I know."

Findings displayed by an independent t-test reported a significant relationship between relationships during online learning and overall experience (Table 4). The significant difference indicated that there is a relationship between students that had a positive experience learning online ($M=6.39$, $SD=1.37$) and students that had a negative online learning experience ($M=7.42$, $SD=.961$; $p=.012$) and relationships. Students that had a positive online learning experience indicated that relationships were not implicated and students that had a negative online learning experience indicated that relationships were implicated. Coded qualitative data aligns with the findings. One participant noted, "I have non-existent relationships with my peers and teachers". Another participant shared that they find it "hard to connect with people online". A participant that has had an overall positive experience with online learning explained that online learning for them has been, "so much better, especially for disabled students that may benefit from flexible classes and access to recordings. There is a much greater sense of community online."

After running an independent t-test, a significant relationship was found between student comprehension from pre-recorded lectures and student major (Table 5). The data revealed that comprehension varies between students in the social sciences ($M=1.87$, $SD=.344$) and students in

the natural sciences ($M=1.61$, $SD=.499$; $p=.045$) when lectures are pre-recorded during online learning. The data indicated that social science majors comprehend less material through pre-recorded lectures than natural science majors.

After running an independent t-test, a significant relationship was found between student comprehension when completing group work during online learning and student major (Table 6). The data revealed that comprehension varies between students in the social sciences ($M=1.22$, $SD=.422$) and students in the natural sciences ($M=1.57$, $SD=.507$; $p=.015$) when participating in group work. The data indicated that natural science majors comprehend less material when participating in group work than social science majors.

An independent t-test conducted showed a significant relationship between student's year in school and comprehension of material when class is shorter than three hours (Table 7). There was a significant relationship found between freshmen, sophomores ($M=1$, $SD=0.0$) and juniors, seniors ($M=1.10$, $SD=.300$; $p=.044$) and comprehension of class material when class is shorter than three hours. The results show that freshmen and sophomores comprehend material best when class is less than three hours and juniors and seniors do not comprehend material best when class is shorter than three hours. Qualitative data after coding supports the quantitative data. One student shared, "I have had two blocks this year where we meet 5 days a week, three hours virtually with only a ten-minute break. I find it incredibly challenging to stay engaged as it is really exhausting, and the courses have been an hour and a half a day to two hours and have worked much better. It is also challenging because professors notice a lack of participation and get frustrated, but it is most likely because students are tired so there is a lack of communication between professors and students which is difficult to overcome."

Findings displayed a significant relationship between the motivation of participants during online learning and school year (Table 8). The data indicated a significant relationship between freshmen, sophomore ($M= 7.89$, $SD=.3330$) and juniors, seniors ($M=7.34$, $SD=1.01$; $p=007$). The results showed that freshmen and sophomores are more motivated during online learning than juniors and seniors. Coded qualitative data supports the quantitative findings. A senior participant reflected, “I will not be returning to ‘normal’ school as I am a senior and will graduate before this happens. However, I am glad to be done with online learning soon.” Another noted that they are “resentful” that senior year was conducted remotely.

An independent t-test was conducted and indicated a significant relationship between the overall student experience with online learning and overall motivation during online learning (Table 9). A relationship was discovered between students that had a positive online learning experience ($M=6.9$, $SD=1.31$) and students that had a negative experience learning online ($M=7.7$, $SD=.418$; $p=.011$) and motivation. The data indicated that students that had a negative online learning experience were less motivated than the participants that had a positive online learning experience. Coded qualitative data supported these findings. One student shared that, “Lulls in motivation are common in normal times, but during COVID-19, I have found that the lows are lower than they have ever been in my life.” A similar response noted, “I’m so drained from everything going on that I definitely feel less motivated. I think classes being online impacts my motivation but there are also a lot of other factors (mental health suffering, exhausted and stressed in general, school doesn’t feel as important in the bigger picture, etc.)” A participant that had a positive experience learning online commented, “I am always motivated to learn no matter the environment, it’s just that I am more motivated to do all the above more often and it’s easier when in person.”

An independent t-test was conducted to understand the relationship between school year and motivation to ask for help during online learning (Table 10). A significant relationship was found between freshmen and sophomores ($M=2.0$, $SD=0.0$) and juniors and seniors ($M=1.78$, $SD=.419$; $p=.002$). This test showed that juniors and seniors are less motivated to ask for help when classes are online than freshmen and sophomores.

A inter-item correlation matrix was conducted to highlight any correlations between the scaled questions comparing in-person learning to online learning (Table 11). Seven significant correlations were discovered. The first relationship found was between attending office hours online and in person ($p=.003$, two tailed). Another correlation was between asking questions during in person class and how often you attend office hours in person ($p=.003$, two-tailed). Also, the relationship between anxiety giving a presentation in person and online ($p=.001$, two-tailed) was significant. Another significant relationship was found between distraction on the computer during in person class and computer fatigue in person ($p=.001$, two-tailed). There was a significant relationship between asking questions in person and online ($p=.014$, two-tailed). The correlation between asking questions in person and attending virtual office hours ($p=.042$, two-tailed) was significant. The relationship between computer distraction in online and in person classes ($p=.012$, two-tailed) was significant. The correlations found supported the independent t-tests displayed in Table 1 through Table 10.

DISCUSSION

An important finding regarding relationships was displayed in the findings (Table 4). The data discovered students that had a positive online learning experience indicated that relationships were not implicated and students who had a negative online learning experience indicated that relationships were implicated. The data suggests that relationships are aligned with

the overall online experience and student relationships are important to the online learning experience.

The most significant findings regarding relationships during online learning, were noted between freshmen, sophomores and juniors, seniors at Colorado College. Multiple findings in the study displayed independent t-tests conducted between school year and scaled questions regarding relationships (Table 1, Table 2, and Table 3). The findings showed that freshmen and sophomores at Colorado College indicated that relationships were more impacted than the juniors and seniors (Table 2, and Table 3). However, other findings showed that freshmen and sophomores reported overall relationships were less impacted than juniors and seniors (Table 10). More specifically, juniors and seniors reported stronger relationships within a specific major and with peers than freshmen and sophomores, but overall freshmen and sophomore's relationships were less impacted during online learning.

The findings can be explained by the challenges of forming new relationships during online learning. Juniors and seniors have already formed relationships within the community and were able to transfer those to online classes. However, due to the lack of experience with face-to-face learning, freshmen and sophomores likely experienced a less drastic shift in overall relationships when school moved to a remote platform.

The difference between freshmen, sophomores and juniors, seniors highlighted the difference between building and maintaining relationships. Juniors and seniors were focused on maintaining relationships that had been formed prior to COVID-19 and freshmen and sophomores were confronted with developing important relationships in the context of a pandemic and online learning. The findings regarding juniors and senior's relationships, align with literature that explain why strong relationships are important in academic success

(Vygotsky, 1978). However, the findings that indicate freshmen and sophomores having stronger relationships overall does not align with the literature. Yet, it may still be able to be explained. Freshmen and sophomore students did not have any relationships to compare the ones they developed online to, which can serve as an explanation as to why they indicated overall stronger relationships than juniors and seniors who were comparing in-person relationships to online relationships.

The findings in the study are supported by research that reported the lack of face-to-face instruction has indicated it may lead to a disconnect between teachers and students, and students to students (Aguilera-Hermida, 2020). However, the study indicated a reason why older students are not struggling as much with relationships with peers and within majors, because most of the relationships were formed when classes were in person. Students spend the first years of college developing and strengthening relationships with peers and professors and the data showed that those relationships successfully transferred to the virtual platform.

The findings in the study support the typical structure of online learning for different majors (Table 5 and Table 6). The data can be used as helpful context for professors to understand how students learn best online based on the discipline.

Juniors and seniors entered online learning with the tools and ability to be more successful than freshmen and sophomores yet were less motivated overall (Table 8).

The findings indicate a difference between freshmen and sophomores and juniors and senior's relationships within a specific major during online learning (Table 2). According to Hamre and Pianta (2001), when teachers form positive bonds with students, classrooms become supportive spaces in which students can engage in academically and socially productive ways.

Freshmen and sophomores reporting poor relationships within the major could transcend into relationships with professors and implicate success in the classroom learning online.

The findings showed that social science majors comprehend less material through pre-recorded lectures than natural science majors (Table 5). Social science classes often surround discussion and group work, while natural science classes are more focused on lectures and lab work. In the context of online learning, many natural science classes have turned to pre-recorded lectures to ensure that students have ample time to engage with the material at one's own pace. The findings indicated that natural science majors comprehend less material when participating in group work than social science majors (Table 6).

Comprehension and content delivery were also to be tied to relationships (Table 6, Table 7, Table 10). Two significant trends were found when focusing on student comprehension of content during online learning. Freshmen and sophomores comprehend material best when class is less than three hours and juniors and seniors do not comprehend material best when class is shorter than three hours (Table 7). This data addressed the issue of computer fatigue when learning online in the context of Colorado College and the block plan. Juniors and seniors at Colorado College have spent previous years learning how to learn on the academic calendar called the block plan. The data align with similar findings in the study that indicated older students had access to more resources and stronger relationships going into online learning and were therefore set up to be more successful. Freshman and sophomores are learning how to be students on the rigorous academic calendar used at Colorado College during online learning. Freshmen and sophomores are less likely to comprehend material when class is three hours long, even though the standard academic schedule on the block plan includes three-hour long classes (Table 7). This data is supported by the research conducted at Stanford that confirms Zoom

fatigue a real, present cognitive roadblock and clarifies why online instruction requires a higher cognitive load than in person (Bailenson, 2021). Freshmen and sophomores reported three hours to be more challenging which indicated that juniors and seniors were able to be more successful learning online because of the adjustment that they already had to the block plan.

The findings regarding relationships across grade levels are particularly interesting when compared to the findings that show freshmen and sophomores as more motivated than juniors and seniors during online learning (Table 2, Table 3, Table 4, Table 8). Although the findings show a difference between freshmen and sophomores and juniors and seniors regarding relationships, other data showed that freshmen and sophomores still report higher motivation results overall (Table 2, Table 3, Table 4, Table 9). Motivational theorists suggest that students' perception of relationships with a teacher is essential in motivating students to perform well. However, the data in this study would disagree with that claim and show that learning online may have poor relationships but do not indicate lower motivation levels. This finding can be supported by the amount of isolation experienced when learning online and indicated that strong relationships among peers and within the major are not as valued when learning online.

Results express that freshmen and sophomores are more motivated during online learning than juniors and seniors (Table 9). The results position more research to be conducted to address if freshman and sophomores are more motivated during in person learning as well. Interestingly, studies have shown that interaction is at the heart of most effective learning environments regardless of delivery format, and interaction tends to aid student motivation (Baker, 2010; Paechter & Maier, 2010). However, freshmen and sophomores reported generally worse relationships during online learning than juniors and seniors although higher motivation. The data disagrees with other research and calls into question the factors that motivate students most

effectively during online learning. However, the results align with general knowledge of motivation between freshmen and sophomores and juniors and seniors. Coded qualitative data allowed seniors to reflect on being more “resentful” of online learning and less motivated because it was the final year of school. That attitude towards learning online aligns with the data that states freshmen and sophomores are more motivated during online learning (Table 8). The data collected regarding comprehension and relationships show that juniors and seniors began online school with more resources, relationships, and skill sets to be successful learning online, yet qualitative and quantitative data confirms that juniors and seniors felt less motivation to engage fully with learning online.

Another explanation of this relationship could include the amount of time before online learning that students had learned in-person. Students that spent two and a half years at Colorado College participating in in-person classes were more critical of the transition because experienced a more drastic change.

Further findings provide more context as to why juniors and seniors were less motivated than freshman and sophomores during online learning (Table 10). Juniors and seniors were less motivated to ask for help when classes were online than freshmen and sophomores (Table 10). Juniors and seniors demonstrated in this study more resentment and frustration with online learning and as a result were less motivated during the school year. Juniors and seniors were more capable of comparing learning at Colorado College from in person to online and reported less satisfaction with the transition. Younger students that had less experience learning in person were more motivated to adjust to the online platform and become adaptable as students. The results show the most significant difference across all categories (relationships, comprehension, and motivation) seen between the participants year in school.

The study found significant relationships between participants in different majors and comprehension during online learning (Table 5, Table 6). The research conducted by Patricia and Aguilera-Hermida (2021) explains the challenges college students have experienced regarding comprehension during online learning. Students in that study reflected that the quality of the learning process decreased after the transition to online learning (2021). Different methods (i.e. pre-recorded lectures, group work) of instruction affected comprehension differently for participants studying natural sciences and participants studying social sciences (Table 5, Table 6).

Findings in this study showed that students that had a negative online learning experience were less motivated than the participants that had a positive online learning experience (Table 9). This data supports one study conducted on student perceptions regarding online and in-person instruction discovered that while requiring higher levels of self-motivation, online learning offers the advantages of flexibility and convenience for many students (Tichavsky, et al., 2015). The students that indicated that online learning was generally negative, also indicated that they were not motivated.

Another interesting finding when examining descriptive statistics found that 16 participants indicated that online learning had been somewhat positive, 16 indicated it had been somewhat negative, and 13 indicated it was neither positive nor negative (Table 13). The findings indicate participants to be divided based on whether the experience was positive or negative. The findings are interesting when compared to other data that showed descriptive statistics for the question posed regarding tuition at Colorado College while school was taught remotely (Table 12). The data showed that 92 percent of participants indicated that the tuition

being charged during the academic year was not reflective of the education they received while learning online.

Overall, the findings in this study illuminate the importance of strong relationships while learning, especially online. The data indicated that although older students had access to stronger relationships and better learning strategies, they had a more difficult time motivating to engage with the online learning experience than younger students.

Limitations

One limitation of this study is that the majority of participants were seniors at Colorado College. A further study would focus more attention on other grades to display more diverse experiences regarding online learning. This limitation also confronts bias that may have existed in this study due to the fact that the researcher was a senior in college addressing an issue that they also experienced. The researcher being a senior at Colorado College can be used as an explanation as to why a large percent of the participants were seniors.

Another limitation of this study was the focus on the perspective from students regarding relationships without including professor perspectives as well. Future studies should include the professor experience as well when exploring online learning.

Recommendations

Further studies regarding online learning should focus closely on the professor experience. That study should focus on content delivery and examine justifications for different kinds of delivery while teaching online. This study presents the student perspective regarding what was success and unsuccessful while learning online, yet no justification as to why certain techniques were used. A study including professors in the sample group would be a strong follow up to this study, especially once school transitions back to in-person learning. Additionally, a

study examining the transition back to in-person would be a strong follow-up study. Professors have experienced many of the same challenges indicated in this study as students and it would strengthen this study if the professor experience was included.

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Appendix A

Qualtrics questionnaire

Student Satisfaction with Online Learning at Colorado College

Start of Block: Student satisfaction with Colorado College online learning

Q24 Student Satisfaction at Colorado College during COVID-19 Consent Form

Margaret McDonnell

Mike Taber

Colorado College Department of Education

617-901-6348

m_mcdonnell@coloradocollege.edu Key information about this research study: The following is a short summary of this study to help you decide whether to be a part of the study. Additional information is provided later in the form. You are invited to take part in a research study about how the COVID-19 pandemic and resulting virtually learning has affected student satisfaction with Colorado College. The purpose of this study is to investigate how different methods of virtual instruction affect student achievement, motivation, engagement, and relationships. The overarching aim of this study is to gain insight on how the remote 2020-2021 academic year affected students. This study is measuring student satisfaction with online courses as a tool to analyze the benefits and drawbacks of online instruction. A thorough understanding of that relationship can allow goals and priorities to be set as the school transitions back to in-person that best support students. You will be asked to complete a brief Qualtrics survey, consisting of both open response and multiple-choice questions based on your own experiences. The benefits

of participating in this study include the opportunity to reflect on your own experience with online learning at Colorado College. Your participation will provide much-needed insight into the effects of online learning on college students. We do not expect you to experience any kind of harm or discomfort if you participate in this study. Data collection will stop if a participant shows any signs of emotional stress from participation. Taking part in this study is completely voluntary. You should only decide to take part in the study because you want to do so. If you choose to be in the study, you can withdraw at any time without consequences of any kind. You may also choose to skip any question or task. Participating in this study does not mean that you are giving up any of your legal rights. The person in charge of this study is Margaret McDonnell. You can contact Margaret at m_mcdonnell@coloradocollege.edu or 617-901-6348. If you have any questions about whether you have been treated in an illegal or unethical way, contact the Colorado College Institutional Research Board chair, Dr. Amanda Udis-Kessler at audiskessler@coloradocollege.edu. Additional information: To protect your identity and personal information research will be anonymous, IP addresses will not be tracked, electronic data will be coded (with arbitrary ID numbers denoting individual participants) and a master list connecting codes to identities will be secured and kept separately, electronic records will be maintained on a network with restricted access and maintained on a protected laptop, and I will shred or delete the raw data as soon as I have turned in my project. I will not share your information with other researchers. I have also eliminated any risky questions, experimental conditions, test items, or aspects of my data collection that are not essential in reaching the goals of my research. Participation in this study poses no risk of emotional, physical, financial, academic, social, political, criminal, or legal risk. I have read the above information. Completing

this survey indicates that I am 18 years of age or older and indicates my consent to participate in this research project. I understand that I may print a copy of this form to keep for my records.

Q29 Do you consent?

Yes (1)

No (2)

Page _____

Break

Q1 What year in school are you?

- Freshman (1)
 - Sophomore (2)
 - Junior (3)
 - Senior (4)
-

Q2 Which discipline does your major(s) or intended major(s) fall into?

- The Arts (e.g. Art, Music, Dance, Theatre, Film) (1)
 - Humanities (e.g. English, Philosophy) (2)
 - Social Sciences (e.g. Education, Political Science, REMS, FGS) (3)
 - Natural Sciences (e.g. Psychology, mathematics) (4)
 - Other (5)
-

Q3 Do you qualify for financial aid?

- Yes (1)
- No (2)
- I prefer not to answer (3)

Q4 I have access to the technology and internet bandwidth to keep up with my online coursework

- Always (1)
 - Sometimes (2)
 - Rarely (3)
 - Never (4)
-

Q5 What is your cumulative GPA at Colorado College?

Q21 Where are you living this year?

- On campus (1)
- Off campus, in Colorado Springs (2)
- Off campus, not in Colorado Springs (3)
- At my family home (4)

Page _____

Break

Q6 Have you had a generally positive or negative experience with online learning as a result of the COVID-19 pandemic?

- Extremely positive (1)
 - Somewhat positive (2)
 - Neither positive nor negative (3)
 - Somewhat negative (4)
 - Extremely negative (5)
-

Q7 Please indicate the following questions based on your experience with classes that were taught in person pre-COVID-19

	Always (1)	Sometimes (2)	Rarely (3)	Never (4)
How often are you distracted by your computer when taking an in-person course? (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often do you experience computer fatigue when taking an in-person class? (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How frequently do you participate in group work when classes are in person? (13)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often are you anxious when preparing to give a presentation in person? (14)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often do you ask questions in classes when they are in person? (15)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often are you to attend a professors office hour when you can meet in person? (16)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q30 Please indicate the following questions based on your experience with classes that were taught virtually

	Always (1)	Sometimes (2)	Rarely (3)	Never (4)
How often are you distracted by your computer when taking an online course? (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often do you experience computer fatigue when taking an online class? (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How frequently do you participate in group work when classes are in virtual? (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often are you anxious when preparing to give a presentation online? (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often do you ask questions in classes when they are virtual? (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often are you to attend a professors office hour when they are virtual? (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Break

Q33 The following questions concern relationships during online learning

	True (1)	False (2)
I have developed strong relationships with my professors during online learning (4)	<input type="radio"/>	<input type="radio"/>
I have developed strong relationships with my peers during online learning (5)	<input type="radio"/>	<input type="radio"/>
I have felt a strong sense of community among my classmates during online learning (6)	<input type="radio"/>	<input type="radio"/>
I have felt a strong sense of community within my major during online learning (7)	<input type="radio"/>	<input type="radio"/>



Q31 Is there anything you would like to add regarding your relationships with peers and professors during learning online compared to learning in person?

Page _____

Break

Q34 The following questions concern motivation during online learning

	True (1)	False (2)
I am more motivated to complete assignments when my class is online (1)	<input type="radio"/>	<input type="radio"/>
I am more motivated to participate in class discussions when classes are taught online (4)	<input type="radio"/>	<input type="radio"/>
I am more motivated to ask for help when classes are taught online (5)	<input type="radio"/>	<input type="radio"/>
I am more motivated to pay attention when classes are taught online (6)	<input type="radio"/>	<input type="radio"/>

Q17 Is there anything you would like to add regarding your motivation learning online compared to learning in person?

Break

Q35 The following questions concern comprehension of material during the online learning period

	True (1)	False (2)
I comprehend class material best when class is taught in person (6)	<input type="radio"/>	<input type="radio"/>
I comprehend class material best when lectures are pre recorded (7)	<input type="radio"/>	<input type="radio"/>
I comprehend my class material best during online learning when class is shorter than 3 hours (8)	<input type="radio"/>	<input type="radio"/>
I comprehend my class material best during online learning through participating in group work (9)	<input type="radio"/>	<input type="radio"/>
I comprehend class material best during online learning when I turn my camera off (10)	<input type="radio"/>	<input type="radio"/>

Q20 Is there anything you would like to add regarding your comprehension of material during online learning compared to learning in person?

Q16 Do you feel that the tuition being charged this academic year is reflected in the education you have received online?

- I think that tuition accurately reflects the education and access to resources I have had while school has been virtual (1)
- I do not think that tuition accurately reflects the education and access to resources I have had while school has been virtual (2)
- This question does not apply to me (3)



Q22 Can you briefly explain your feelings regarding expectations, fears, or excitement surrounding class returning to an in person model?

Appendix B

TABLE 1

Relationship between school year and relationships

Group Statistics										
		Schoolyear2	N	Mean	Std. Deviation	Std. Error Mean				
TOTrelationships	1.00		9	7.6667	.50000	.16667				
	2.00		41	6.8049	1.34572	.21017				

Independent Samples Test										
		Levene's Test for Equality of Variances			t-test for Equality of Means					
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
TOTrelationships	Equal variances assumed	7.929	.007	1.880	48	.066	.86179	.45841	-.05990	1.78348
	Equal variances not assumed			3.213	35.645	.003	.86179	.26823	.31760	1.40597

Independent Samples Effect Sizes					
		Standardizera	Point Estimate	95% Confidence Interval	
				Lower	Upper
TOTrelationships	Cohen's d	1.24532	.692	-.046	1.423
	Hedges' correction	1.26521	.681	-.045	1.401
	Glass's delta	1.34572	.640	-.098	1.371

- a. The denominator used in estimating the effect sizes.
 Cohen's d uses the pooled standard deviation.
 Hedges' correction uses the pooled standard deviation, plus a correction factor.
 Glass's delta uses the sample standard deviation of the control group.

TABLE 2

Relationship between school and year and sense of community within major

Group Statistics					
	Schoolyear2	N	Mean	Std. Deviation	Std. Error Mean
I have felt a strong sense of community within my major during online learning	1.00	9	2.00	.000	.000
	2.00	41	1.68	.471	.074

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
I have felt a strong sense of community within my major during online learning	Equal variances assumed	55.910	<.001	2.003	48	.051	.317	.158	-.001	.635
	Equal variances not assumed			4.309	40.000	<.001	.317	.074	.168	.466

Independent Samples Effect Sizes					
		Standardizera	Point Estimate	95% Confidence Interval	
				Lower	Upper
I have felt a strong sense of community within my major during online learning	Cohen's d	.430	.737	-.003	1.470
	Hedges' correction	.437	.726	-.003	1.447
	Glass's delta	.471	.673	-.067	1.405

a. The denominator used in estimating the effect sizes.
 Cohen's d uses the pooled standard deviation.
 Hedges' correction uses the pooled standard deviation, plus a correction factor.
 Glass's delta uses the sample standard deviation of the control group.

TABLE 3

Relationship between school year and sense of community among classmates

Group Statistics									
	Schoolyear2	N	Mean	Std. Deviation	Std. Error Mean				
I have felt a strong sense of community among my classmates during online learning	1.00	9	2.00	.000	.000				
	2.00	41	1.73	.449	.070				

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
I have felt a strong sense of community among my classmates during online learning	Equal variances assumed	31.592	<.001	1.780	48	.081	.268	.151	-.035	.571
	Equal variances not assumed			3.830	40.000	<.001	.268	.070	.127	.410

Independent Samples Effect Sizes					
		Standardizer ^a	Point Estimate	95% Confidence Interval	
				Lower	Upper
I have felt a strong sense of community among my classmates during online learning	Cohen's d	.409	.655	-.081	1.385
	Hedges' correction	.416	.645	-.080	1.363
	Glass's delta	.449	.598	-.139	1.328

- a. The denominator used in estimating the effect sizes.
 Cohen's d uses the pooled standard deviation.
 Hedges' correction uses the pooled standard deviation, plus a correction factor.
 Glass's delta uses the sample standard deviation of the control group.

TABLE 4

Relationship between online learning experience and relationships

Group Statistics					
	Experience2	N	Mean	Std. Deviation	Std. Error Mean
TOTrelationships	1.00	18	6.3889	1.37793	.32478
	2.00	19	7.4211	.96124	.22052

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
TOTrelationships	Equal variances assumed	2.488	.124	-2.655	35	.012	-1.03216	.38882	-1.82151	-.24282
	Equal variances not assumed			-2.629	30.222	.013	-1.03216	.39257	-1.83366	-.23067

Independent Samples Effect Sizes					
		Standardizera	Point Estimate	95% Confidence Interval	
				Lower	Upper
TOTrelationships	Cohen's d	1.18212	-.873	-1.544	-.191
	Hedges' correction	1.20823	-.854	-1.510	-.187
	Glass's delta	.96124	-1.074	-1.795	-.330

a. The denominator used in estimating the effect sizes.
 Cohen's d uses the pooled standard deviation.
 Hedges' correction uses the pooled standard deviation, plus a correction factor.
 Glass's delta uses the sample standard deviation of the control group.

TABLE 5

Relationship between major and comprehension of pre-recorded lectures

Group Statistics										
	Which discipline does your major(s) or intended major(s) fall into?	N	Mean	Std. Deviation	Std. Error Mean					
						I comprehend class material best when lectures are pre recorded	Social Sciences (e.g. Education, Political Science, REMS, FGS)	23	1.87	.344
	Natural Sciences (e.g. Psychology, mathematics)	23	1.61	.499	.104					

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
I comprehend class material best when lectures are pre recorded	Equal variances assumed	18.708	<.001	2.064	44	.045	.261	.126	.006	.516
	Equal variances not assumed			2.064	39.079	.046	.261	.126	.005	.517

Independent Samples Effect Sizes					
	Standardizer ^a	Point Estimate	95% Confidence Interval		
			Lower	Upper	
I comprehend class material best when lectures are pre recorded	Cohen's d	.429	.608	.013	1.197
	Hedges' correction	.436	.598	.013	1.176
	Glass's delta	.499	.523	-.081	1.115

a. The denominator used in estimating the effect sizes.
 Cohen's d uses the pooled standard deviation.
 Hedges' correction uses the pooled standard deviation, plus a correction factor.
 Glass's delta uses the sample standard deviation of the control group.

TABLE 6

Relationship between major and comprehension during group work

Group Statistics

	Which discipline does your major(s) or intended major(s) fall into?	N	Mean	Std. Deviation	Std. Error Mean
	Natural Sciences (e.g. Psychology, mathematics)	23	1.57	.507	.106

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
I comprehend my class material best during online learning through participating in group work	Equal variances assumed	8.596	.005	-2.530	44	.015	-.348	.137	-.625	-.071
	Equal variances not assumed			-2.530	42.592	.015	-.348	.137	-.625	-.070

Independent Samples Effect Sizes

	Standardizer ^a	Point Estimate	95% Confidence Interval	
			Lower	Upper
I comprehend my class material best during online learning through participating in group work	Cohen's d	.466	-.746	-.144
	Hedges' correction	.474	-.733	-.141
	Glass's delta	.507	-.686	-.067

a. The denominator used in estimating the effect sizes.
 Cohen's d uses the pooled standard deviation.
 Hedges' correction uses the pooled standard deviation, plus a correction factor.
 Glass's delta uses the sample standard deviation of the control group.

TABLE 7

Relationship between school year and comprehension when class is shorter than 3 hours

Group Statistics					
	Schoolyear2	N	Mean	Std. Deviation	Std. Error Mean
I comprehend my class material best during online learning when class is shorter than 3 hours	1.00	9	1.00	.000	.000
	2.00	41	1.10	.300	.047

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
I comprehend my class material best during online learning when class is shorter than 3 hours	Equal variances assumed	4.697	.035	-.966	48	.339	-.098	.101	-.301	.105
	Equal variances not assumed			-2.080	40.000	.044	-.098	.047	-.192	-.003

Independent Samples Effect Sizes					
	Standardizer ^a	Point Estimate	95% Confidence Interval		
			Lower	Upper	
I comprehend my class material best during online learning when class is shorter than 3 hours	Cohen's d	.274	-.356	-1.079	.371
	Hedges' correction	.279	-.350	-1.062	.365
	Glass's delta	.300	-.325	-1.048	.402

- a. The denominator used in estimating the effect sizes.
 Cohen's d uses the pooled standard deviation.
 Hedges' correction uses the pooled standard deviation, plus a correction factor.
 Glass's delta uses the sample standard deviation of the control group.

TABLE 8

Relationship between school year and motivation

Group Statistics					
	Schoolyear2	N	Mean	Std. Deviation	Std. Error Mean
TOTmotivation	1.00	9	7.8889	.33333	.11111
	2.00	41	7.3415	1.01513	.15854

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
TOTmotivation	Equal variances assumed	8.483	.005	1.588	48	.119	.54743	.34477	-.14579	1.24064
	Equal variances not assumed			2.828	40.314	.007	.54743	.19360	.15625	.93860

Independent Samples Effect Sizes					
		Standardizera	Point Estimate	95% Confidence Interval	
				Lower	Upper
TOTmotivation	Cohen's d	.93662	.584	-.149	1.312
	Hedges' correction	.95158	.575	-.147	1.292
	Glass's delta	1.01513	.539	-.195	1.267

- a. The denominator used in estimating the effect sizes.
 Cohen's d uses the pooled standard deviation.
 Hedges' correction uses the pooled standard deviation, plus a correction factor.
 Glass's delta uses the sample standard deviation of the control group.

TABLE 9

Relationship between online learning experience and motivation

Group Statistics					
	Experience2	N	Mean	Std. Deviation	Std. Error Mean
TOTmotivation	1.00	18	6.9444	1.30484	.30755
	2.00	19	7.7895	.41885	.09609

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
TOTmotivation	Equal variances assumed	19.264	< .001	-2.683	35	.011	-.84503	.31501	-1.48453	-.20553
	Equal variances not assumed			-2.623	20.298	.016	-.84503	.32222	-1.51653	-.17353

Independent Samples Effect Sizes					
		Standardizera	Point Estimate	95% Confidence Interval	
				Lower	Upper
TOTmotivation	Cohen's d	.95771	-.882	-1.553	-.200
	Hedges' correction	.97886	-.863	-1.520	-.196
	Glass's delta	.41885	-2.017	-2.922	-1.085

- a. The denominator used in estimating the effect sizes.
 Cohen's d uses the pooled standard deviation.
 Hedges' correction uses the pooled standard deviation, plus a correction factor.
 Glass's delta uses the sample standard deviation of the control group.

TABLE 10

Relationship between school year and motivation to ask for help

Group Statistics

	Schoolyear2	N	Mean	Std. Deviation	Std. Error Mean
I am more motivated to ask for help when classes are taught online	1.00	9	2.00	.000	.000
	2.00	41	1.78	.419	.065

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
I am more motivated to ask for help when classes are taught online	Equal variances assumed	18.815	<.001	1.559	48	.126	.220	.141	-.064	.503
	Equal variances not assumed			3.354	40.000	.002	.220	.065	.087	.352

Independent Samples Effect Sizes

		Standardizera	Point Estimate	95% Confidence Interval	
				Lower	Upper
I am more motivated to ask for help when classes are taught online	Cohen's d	.383	.574	-.160	1.301
	Hedges' correction	.389	.565	-.157	1.281
	Glass's delta	.419	.524	-.210	1.251

a. The denominator used in estimating the effect sizes.
 Cohen's d uses the pooled standard deviation.
 Hedges' correction uses the pooled standard deviation, plus a correction factor.
 Glass's delta uses the sample standard deviation of the control group.

TABLE 11

Inter-Item Correlation Matrix

	How often are you distracted by your computer when taking an in person course?	How often do you experience computer fatigue when taking an in-person class?	How frequently do you participate in group work when classes are in person?	How often are you anxious when preparing to give a presentation in person?	How often do you ask questions in classes when they are in person?	How often are you to attend a professors office hours when you can meet in person?	How often are you distracted by your computer when taking an online course?	How often do you experience computer fatigue when taking an online class?	How frequently do you participate in group work when classes are in virtual?	How often are you anxious when preparing to give a presentation online?	How often do you ask questions in classes when they are virtual?	How often are you to attend a professors office hours when they are virtual?
How often are you distracted by your computer when taking an in person course?	1.000	.522	-.324	.024	-.295	-.132	.352	-.086	-.142	.088	-.179	-.038
How often do you experience computer fatigue when taking an in-person class?	.522	1.000	-.216	-.056	.039	-.130	.223	.350	-.057	.016	-.175	-.008
How frequently do you participate in group work when classes are in person?	-.324	-.216	1.000	.054	.255	.178	.038	.180	.184	.019	.150	-.036
How often are you anxious when preparing to give a presentation in person?	.024	-.056	.054	1.000	-.042	.039	.249	-.021	-.028	.696	.050	-.109
How often do you ask questions in classes when they are in person?	-.295	.039	.255	-.042	1.000	.408	.033	.335	.068	-.050	.347	.288
How often are you to attend a professors office hours when you can meet in person?	-.132	-.130	.178	.039	.408	1.000	.014	.073	.077	.168	.348	.428
How often are you distracted by your computer when taking an online course?	.352	.223	.038	.249	.033	.014	1.000	.198	-.162	.253	-.305	-.103
How often do you experience computer fatigue when taking an online class?	-.086	.350	.180	-.021	.335	.073	.198	1.000	.096	.084	.000	.084
How frequently do you participate in group work when classes are in virtual?	-.142	-.057	.184	-.028	.068	.077	-.162	.096	1.000	.026	.290	.271
How often are you anxious when preparing to give a presentation online?	.088	.016	.019	.696	-.050	.168	.253	.084	.026	1.000	-.141	-.040
How often do you ask questions in classes when they are virtual?	-.179	-.175	.150	.050	.347	.348	-.305	.000	.290	-.141	1.000	.410
How often are you to attend a professors office hours when they are virtual?	-.038	-.008	-.036	-.109	.288	.428	-.103	.084	.271	-.040	.410	1.000

TABLE 12

Student satisfaction with tuition during the 2020-2021 academic year

Do you feel that the tuition being charged this academic year is reflected in the education you have received online?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I think that tuition accurately reflects the education and access to resources I have had while school has been virtual	3	6.0	6.0	6.0
	I do not think that tuition accurately reflects the education and access to resources I have had while school has been virtual	46	92.0	92.0	98.0
	This question does not apply to me	1	2.0	2.0	100.0
	Total	50	100.0	100.0	

TABLE 13

Total student experience with online learning

Have you had a generally positive or negative experience with online learning as a result of the COVID-19 pandemic?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Extremely positive	2	4.0	4.0	4.0
	Somewhat positive	16	32.0	32.0	36.0
	Neither positive nor negative	13	26.0	26.0	62.0
	Somewhat negative	16	32.0	32.0	94.0
	Extremely negative	3	6.0	6.0	100.0
	Total	50	100.0	100.0	