

Covid-19 and Virtual Learning: Challenges, Implementation, and Student Perception of Online Course Delivery Formats

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Abstract

Over the years, the number of students who enroll in face-to-face learning typically outnumber those who enroll in online learning, and that most students prefer face-to-face instruction is not new or unknown. Then came the pandemic, and for the first time in our lifetime, the pandemic has posed a unique situation where more students are enrolled in online learning than face-to-face learning. Having the largest population of students to ever enroll in an online learning environment is an opportunity to revisit and learn about students' learning preferences, which could lead educators to find new opportunities to enhance learning in both face-to-face and online environments. This research reports on issues related to the rapid implementation of online or otherwise remote learning due to the COVID-19 pandemic. The research addressed creative solutions to moving coursework to a virtual or online learning format. This research follows a qualitative research method. The research examined students' perceptions of online course delivery for two construction-related courses, methods and supervision, and cost estimating, which are traditionally face-to-face and were shifted online due to COVID-19. The instructor, course delivery formats were consistent between the two courses, but the course content for both courses was different. The research findings show that the students perceived the online course delivery format as effective, yet most students prefer a face-to-face learning environment. Also, the research findings show that an effective online course must provide for and support an interactive and engaging learning environment. The research recommends the use of a synchronous online method, with regular class meetings, provision for breakout groups, and most of all, that educators make themselves available to quickly help students resolve any course-related issues students may run into online.

Introduction

COVID-19 pandemic has brought changes to every aspect of the US economy and people are forced to rethink how they go about with typical everyday activities. One of the areas affected is in education with specifics on the environment for learning and teaching. Over the years, the predominant mode of learning has been face-to-face which allows for the most social and interactive environment. COVID-19 has been disruptive, and educators are forced to find creative methods to teach effectively. The situation has resulted in virtual learning as the predominant alternative for the 2020 academic year. However, with the pandemic, educators have become creative and are using several variations of virtual learning (asynchronous online, synchronous online, and hybrid or blended). One of the goals of an educator teaching an online course will be to know what works and what does not work, and to evaluate students' preferences.

Literature Review

The pandemic

As reported by World Health Organization [1], the US and the rest of the world have braced themselves for the pandemic of coronavirus disease 2019 (COVID-19) caused by the novel virus SARS-CoV-2. Holshue et al [2], noted that the United States has seen a surge in cases, and local authorities have taken aggressive measures to limit its spread through social distancing, including the closing of colleges, and encouraging online learning.

The impact of COVID-19 on education

Due to COVID-19, educators and students have adapted to teaching and learning. While teaching and learning online is not new, and according to Miliszewska, [3], the rapid transition from face-to-face to virtual learning has resulted in an approach that is now known as “emergency remote teaching”. The pandemic is still unfolding and the full effects of COVID-19 on education will not be known for quite some time. COVID-19 has also spurred the need for virtual learning as an alternative to face-to-face learning. The disruption of educational activities due to COVID-19 can have a negative impact on students’ social wellness, mental health, and sense of community. The environment has also caused many educators to adjust and modify their curriculum to fit virtual learning. As noted by Barnett-Braddock [4], individuals’ behavior and environment impact how they learn, and online learning comes with the challenges to sustain student attention in a virtual learning environment especially for those students with attention and learning problems. Gottfried [5] found that student performance is positively or negatively related to class attendance. Hence the issue of absenteeism should be considered in the virtual environment as compared to the face-to-face environment. One more area of concern is the quality of the education gained through virtual learning, which according to Allen and Seaman [6] has previously been argued as inferior to face-to-face learning, but in recent years has been seen as just as good. The report by Allen and Seaman which was completed in 2015 and before the pandemic, points to the fact that only about 20% of the students here in the US learn online.

Compare face-to-face to virtual learning.

The main challenge to virtual learning is the ability to replicate a face-to-face learning environment. Face-to-face learning offers the students the opportunity to have access to specialized lab equipment, and hands-on exercises. In the face-to-face environment, students engage in face-to-face conversation with a classmate and instructors in or outside of the classroom about points that were made in class. Most of all, face-to-face offers the students an opportunity to socialize in person, gain social skills, or seek social support from classmates, college friends, instructors, and others. The internet has indeed facilitated the rise of various forms of virtual learning, namely asynchronous online, synchronous online, and hybrid or blended. Virtual learning provides for various technologies to allow students to engage and interact. Some of those technologies include web-based technology that allows students to access learning materials anytime

and anywhere. Another key technology includes discussion boards which provide a tool for students to engage in general and group conversations. Unlike a face-to-face environment where students must be in class to listen and learn, pre-recorded lecture video is also a tool in virtual learning and allows students to review lectures anytime anywhere. The presence of videoconference tools makes it possible for synchronous online learning as well as group breakout sessions for virtual classroom exercises. Also, the virtual learning environment has other features for email, announcement board, assignments, assessments, and Q&As.

Bridging the gap – from face-to-face to virtual learning

Hodges et al [7], posit that in the absence of a face-to-face learning environment, students overwhelmingly opposed a purely virtual learning model and, instead, preferred the blended delivery format. The study noted that students appreciate the importance of the internet in virtual learning, but only as a supplementary means to support face-to-face learning. However, with COVID-19 the only possible option to face-to-face is virtual learning, and it is important to understand the factors that make face-to-face the preferred option. Some of the factors pointed out by the students in the above study for their preference to face-to-face include direct and human interactions between instructors and students, ability to gain instant feedback and help, the sense of belonging and being part of a community of learners, and the fact that face-to-face provides better motivation to study and not be lazy. Virtual learning means freedom to learn whenever and wherever, but it also requires maturity on the part of the student to learn responsively and not be lazy.

According to Bettinger and Loeb [8] engagement in the classroom could be argued as the key to why most people prefer face-to-face learning. According to a report on online education especially with least prepared students, the research argues that the major difference between virtual learning and face-to-face courses is the level of student-instructor interaction, which can negatively affect student performance in online learning. A recent study by Elumalai et al [9] surveyed 784 undergraduate students from higher education institutions in India and the Kingdom of Saudi Arabia and found that seven factors that positively affect the quality of virtual learning include: administrative support, course content, course design, instructor characteristics, learner characteristics, social support, and technical support. In a comparative analysis research by Driscoll et al [10], the researchers collected data from 368 students enrolled in three online and three face-to-face sections of an introductory-level sociology course. In both the online and three face-to-face sections, the instructor, course materials, and assessments were consistent between the two delivery formats. The research found that when online courses are designed using pedagogically sound practices, they may provide equally effective learning environments. The study points to the course design and delivery format as a key factor. Being present and staying present in an online learning environment may be difficult as compared to face-to-face learning environment. We all know too well about being physically present, but mentally “checked out.” This situation could be made worst in an online environment with so many distractions, making it difficult for students to focus. Additionally, a student’s learning preferences may have much to do with their learning styles. As noted by Chick [11], students learn differently, and there are three main learning style categories: visual, auditory, and

kinesthetic. Visual learners are those who prefer written material and instructions, diagrams, posters, and demonstrations. The auditory learners learn best when there are oral components to the material being learned. Kinesthetic learners learn best when they can touch and feel what they are learning about. The use of lightboard in online teaching may provide an interactive and engaging experience for most learning styles. Moore and Kearsley [12], explained that the separation of instructor and learners creates a psychological and communications space referred to as the transactional distance. Lightboard-enhanced teaching could help close transactional distance that may exist between the students and the instructors. This may mimic the traditional classroom environment and provide an engaging learning environment that is important for teaching online.

Research Methodology

The data used in this study were drawn from two courses that were taught over the summer of 2020. The courses were moved online due to COVID-19. The methods and supervision course had 49 students, and the cost estimating course had 53 students, 49 of the students took both courses. Both courses were taught by the same instructor. The courses were offered in the summer semester in 12 weeks, and each had 36 scheduled lectures delivered through a combination of live virtual meetings, pre-recorded lightboard video lectures, and posted lecture materials. The two courses were primarily delivered as synchronous online courses, but they differed in the content. The typical design format included a discussion board forum for students to introduce themselves and get to know each other, regular live virtual class meetings using videoconference, pre-recorded lightboard videos to augment course material, breakout group sessions, and Q&A discussion forums specific to each module where students ask questions related to lecture, assignments, and projects. The course design format also included class announcements, lecture notes posted online, plus assignments and projects posted online. Besides, students were encouraged to contact the instructor anytime via emails, and their emails were promptly answered. The only fundamental differences between the two courses as it relates to interactions with the students were the number of virtual lecture meetings held. The cost estimating course held a total of 17 live virtual class meetings out of a total of 17 scheduled live virtual meetings. On the other hand, for the methods and supervision course, a total of 15 live virtual class meetings were held out of a total of 19 scheduled live virtual meetings. With an emphasis on student interaction, both courses made extensive use of the breakout group sessions, and the discussion boards for Q&A. Videoconferencing was used for live virtual class meetings, with breakout group sessions to work on in-classroom exercises, and for the groups to work on course projects. Videoconferencing was aimed to offer the student an opportunity to engage and interact with each other and with the instructor.

Students' perceptions of the online environment help shape educator's understanding of how best to teach online, and the research sought to find out. The students responded to the question that asked their preferred learning environment and why. The question

was framed as follows - which one of these learning methods (face-to-face, online, a mix of face-to-face and online) do you like most and why?

Research Findings and Discussions

Table 1 below summarizes students' perceptions about the learning environments. Most of the students prefer a face-to-face learning environment for several reasons, yet some of the students prefer an online learning environment.

Table 1: Responses from Students on the Preference of Learning Environment

Students Response on Why they Prefer Face-to-Face Learning Environment	Students Response on Why they Prefer Online Learning Environment
<ul style="list-style-type: none"> ▪ Beneficial for questions or visualizing the material better 	<ul style="list-style-type: none"> ▪ Allows you to enroll and take classes while holding a job
<ul style="list-style-type: none"> ▪ Asking questions and getting answers in person 	<ul style="list-style-type: none"> ▪ Gives more options to manage own study time
<ul style="list-style-type: none"> ▪ Able to engage in conversation with other students and ask questions while in lecture 	<ul style="list-style-type: none"> ▪ Allows you to take your time going through the material at your own pace
<ul style="list-style-type: none"> ▪ it is easier to keep up with the class when everyone can interact more easily and ask each other questions in class 	<ul style="list-style-type: none"> ▪ Work at your own pace but it can be helpful to check in with the instructor for clarification
<ul style="list-style-type: none"> ▪ Seeing some examples being worked out can really help when struggling 	<ul style="list-style-type: none"> ▪ Gets distracted in face-to-face classes and miss something
<ul style="list-style-type: none"> ▪ Be able to talk in person and ask real-time questions 	<ul style="list-style-type: none"> ▪ For non-math and non-science courses, prefer online, able to teach yourself the material whenever is best for you
<ul style="list-style-type: none"> ▪ Collaborate with fellow students in person and easily receive help and feedback from an instructor in person 	<ul style="list-style-type: none"> ▪ Convenience of working at home. Also, since it is online, you can go back and watch lectures or re-read material
<ul style="list-style-type: none"> ▪ More engaged in the class and if need be, can ask a question quickly 	<ul style="list-style-type: none"> ▪ Flexibility of online really helps on days you do not feel like you will learn anything even if you go to class
<ul style="list-style-type: none"> ▪ Interact with others and it is a lot easier to ask and receive questions and answers 	
<ul style="list-style-type: none"> ▪ Learn more by visualizing and hands-on tasks 	
<ul style="list-style-type: none"> ▪ Not too good with technology, prefer engaging in conversations 	
<ul style="list-style-type: none"> ▪ Get the most amount of information possible at a time 	
<ul style="list-style-type: none"> ▪ Create personal relationships with your professors and classmates 	
<ul style="list-style-type: none"> ▪ It is easier to pay attention 	
<ul style="list-style-type: none"> ▪ For a person that gets distracted easily, forces one to engage oneself 	
<ul style="list-style-type: none"> ▪ Feels more real and engaging 	
<ul style="list-style-type: none"> ▪ Bad habits of slacking with online classes 	
<ul style="list-style-type: none"> ▪ Retain more and learn a lot more than online lectures 	
<ul style="list-style-type: none"> ▪ Interact more personally with everyone else in the class 	

Students Response on Why they Prefer Face-to-Face Learning Environment	Students Response on Why they Prefer Online Learning Environment
<ul style="list-style-type: none"> ▪ Prefer science and math classes in person to visualize example problems better 	
<ul style="list-style-type: none"> ▪ More of a hands-on learner and seeing things in the real world 	
<ul style="list-style-type: none"> ▪ Helps to stay focused and mentally stimulated 	
<ul style="list-style-type: none"> ▪ Easier to concentrate, ask questions when needed, and learn from other students' question 	

It is a fact that the online learning environment may never entirely replace the face-to-face learning environment, and as educators, it is important to understand why. This research was conducted to examine students' perceptions of online course delivery for two construction-related courses, methods and supervision course, and cost estimating course, that is traditionally face-to-face and were shifted online due to COVID-19.

Overall, the findings support the arguments for face-to-face learning environment, yet in cases where students seek flexibility, and can manage their time, the preference is for online learning environment.

An interesting finding in this study is that students' learning preferences and the type of course may play a big role in their preference for face-to-face or online. For example, students' preference for face-to-face may be higher in science and math courses which require the instructor to show and explain solutions to a problem or calculation.

The online environment creates virtual barrier between students and students as well as students and instructors. The online environment inherently creates transactional distance. The findings in this study also reinforce the need for educators to provide much-needed support in an online environment.

A deliberate effort was made to replicate the face-to-face content in the online version of the courses and to incorporate a high degree of interaction and engagement. Yet the study shows that students still prefer a face-to-face learning environment to an online learning environment.

A surprising finding is a case where a student prefers an online learning environment because they get easily distracted in a face-to-face learning environment.

The research findings clearly show that students learn differently and what works for one student may not work for another student.

In general, the research found that students prefer a face-to-face learning environment. Yet, in cases where an online environment is an option, the course design and delivery formats must be centered around four fundamental areas that include 1. An opportunity for students to introduce themselves and get to know each other, 2. Synchronous regular class meeting using videoconferencing tools, 3. Breakout rooms to allow

students to interact, engage, and work together, and 4. The educators' availability (by email, teleconference, discussion board) to quickly help students resolve any course-related issues that students may run into online.

Conclusion

Over the years, the number of students who enroll in face-to-face learning typically outnumber those who enroll in online learning, and that most students prefer face-to-face instruction is not new or unknown. As reported by Allen and Seaman only about 20% of the students in the US are learning online. Then came the pandemic, and for the first time in our lifetime, the pandemic created a unique situation where more students are enrolled in online learning than face-to-face learning. Having the largest population of students to ever enroll in an online learning environment is an opportunity for educators to revisit and learn about students' learning environment preferences, which could lead educators to find new opportunities to enhance learning in both face-to-face and online environments. The research examined students' perceptions of online course delivery for two construction-related courses, methods and supervision and cost estimating, that are traditionally face-to-face and were shifted online due to COVID-19. The research found that the majority of the students do not like online courses because they lack the typical face-to-face engagement. However, students prefer an online course format that offers 1) an opportunity for students to get to know each other, 2) synchronous regular class meeting using videoconferencing tools, 3) breakout rooms to allow students to interact, engage and work together, and 4) an online course where the educator care and are always available (by email, teleconference, discussion board) to quickly help students resolve any course-related issues students may run into online.

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