

Online Learning for Non-Traditional Students

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Non-Traditional Students and Online Learning

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Abstract

Online courses became the primary method of course delivery at colleges and universities in the United States due to an emergency shutdowns in 2020. Online executions were imperfect, however, and institutions struggled to clarify effective practices, especially among educators who had no experience with how to teach online courses. Although, face-to-face courses will reemerge over time, student demand for online courses will likely increase due to a need for flexible course offerings. This paper outlines strategies that academic institutions could consider adopting for future online courses. Research indicates that human connections create the highest quality student experiences online. There are a number of online activities that can fulfill these types of connections. Studies evaluated online activities that reinforced connections using interactive communication strategies, media-rich and other types of PowerPoint presentations, video length and tags strategies, and engaging instructor delivery approaches. Studies outlined in this paper indicate that certain courses could be adapted to effectively serve students who choose online coursework. The instructor challenge is that one strategy will not fit all courses. The public opinion challenge is that students' negative perceptions on the value of an online education could impact enrollment. The equity challenge is certain student populations show gaps in performance. Nonetheless, online best practices must be a high priority in 2021 due to the likelihood of increasing online demand, the need for improving perceived value of these offerings and narrowing the performance gap for certain student populations.

Keywords: online teaching, student evaluations of online teaching, improve online teaching

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Non-Traditional Students and Online Learning

Student success in higher education can be negatively affected by many external factors. Some of the most challenged students, according to the National Center for Education Statistics ([NCES], n.d.), are those who are non-traditional. Non-traditional students can be defined as having at least one of seven characteristics: being 23 years old or older, attending part-time, being independent of parents, working full-time while enrolled, having dependents, or being a single parent. These students are also more likely to be a recipient of a GED or high school completion certificate. In addition, these students are more likely to be female, members of a minority group, and first generation.

Non-traditional students' lives are overloaded with challenges and responsibilities outside of academia; this can result in their being underprepared, unable to find the time for academia, and at risk of not completing their degrees. One way to address students' challenges is to offer students online coursework as a flexible option for learning (Jayaratne & Moore, 2017). Although non-traditional students are not singled out in all online learning research, they make up nearly 70% of the undergraduate population, according to the NCES (n.d.). It is, therefore, reasonable to assume that research on undergraduate students can be applied to non-traditional students. The question then becomes how colleges and universities can effectively reach these students through online learning. To answer this question, one must challenge traditional academic thinking about what effective courses and classrooms look like.

Faculty and Student Attitudes Toward Online Learning

For much of the first decade of the 21st century, in person instruction was thought to be the optimal way to deliver course material and foster sound decision making, communication, problem solving, critical thinking and teamwork. According to Choi (2018) these views are changing. Only one-quarter of academic leaders from 2,820 US higher institutions surveyed in 2013 felt online courses were inferior to face-to-face instruction. The COVID crisis of 2020 further opened educators' eyes to the value of understanding which online tools help students meet course objectives effectively. Although many college instructors had little to no training in online course delivery, they were forced to quickly change their teaching methods.

Based on experiences of many community college instructors during the emergency shutdown, there appeared to be four common methods for teaching online coursework. The first method was solely depended on self-guided course material and tools with no videos. The second method was an expanded version of the first, adding video components to the self-guided course material and tools. The third method was a hybrid that included all the components of expanded online instruction with the addition of limited in-person instruction. The fourth method was also a hybrid but included video learning components and real time class sessions using video conference technology. Many institutions struggled to identify best practices for online learning on such a large scale. Fortunately, research into a variety of practices for online learning could help instructors in higher education do a more effective job

of teaching online.

Unfortunately, students' attitudes toward online courses are more frequently negative than those of academic leaders of higher institutions. In a 2011 study, one-third of a sampling of online students considered their online courses to be a poor educational choice (Choi, 2018). However, online courses will continue to be offered, so these views must serve as motivation to improve online coursework.

Improving Student Attitudes Toward Online Instruction

There are a number of ways to improve student perceptions of online coursework. Overall, similar to in-person learning, what improves students' perceptions of online learning is the feeling of connection with peers and instructors. Online activities may vary, but to build these connections videos, PowerPoints and other styles of presentations are among the most effective tools to engage students (Drouin, Hile, Vartanian and Webb, 2013; Gorissen, van Bruggen and Jochems, 2015; Hong, Pi and Yang, 2018; and Ozan and Ozarslan, 2016).

Online tools should not be confused with mass communication. According to Skurat Harris et al., 2019, offering individual feedback on student work is an important part of the instruction mix. Students wanted instructors who motivated them and explained objectives of assignments clearly. These students were more likely to identify good instructors as available. In essence, students felt that they were building rapport with instructors and that instructors cared for them.

Online improvement became more crucial in March of 2020 when the COVID-inspired emergency shutdown of colleges

and universities took place, and video conferences and recorded videos became an alternative to in-person teaching in colleges and universities. By fall 2020, most college students had the option to attend real time online class meetings as a substitute for in-person instruction as well as to use other online methods. In a more predictable world, online methods of instruction could be refined over time, but now, in the new normal of a pandemic, online methods have to be refined quickly; the luxury of time just is not there. Online delivery best practices must be identified so that student perceptions of online coursework are more frequently positive. Perceptions will also improve as persistence improves. The sooner community colleges and practitioners understand online best practices, the more effectively they will serve college and university students.

An In-Depth Analysis of Relevant Research

Human Connection in Online Instruction

In 2017, the Global Society of Online Literacy Educators sponsored a nationwide survey to understand what helped students best prepare, access and learn in Online Writing Instruction (OWI) courses. Survey results were published by Skurat Harris, Meloncon, Hewett, Mechenbier, and Martinez in 2019. The survey targeted 346 students in the U.S. whose writing class was solely online or online with some class meetings face-to-face. The students were asked to rate the effectiveness of certain activities in their current online writing course. Activities rated by students included discussion boards, quizzes, tests, assigned reading, synchronous chats, podcasts, videos,

PowerPoints, and instructor and peer feedback. With both traditional and non-traditional students, the top three very or somewhat helpful online activities as seen in

Table 1 were instructors giving feedback, using assigned readings, and peers giving and receiving feedback.

Table 1
Student Rankings on Usefulness of Online OWI Activities

Online Activities	Very helpful/ Somewhat helpful
Instructor Feedback	74%
Assigned Reading	71%
Peer Giving/Receiving Feedback	63%
Discussion Boards in Online Writing Courses	58%
PowerPoints	52%
Videos	50%
Quizzes	35%
Synchronous Chats	29%
Podcasts	17%

Note. Information is based on Skurat Harris, et al. (2019) research.

Instructor feedback and peer giving/receiving feedback online activities built human connections. In addition, these activities clearly connected to online writing objectives. Although assigned readings were ranked second, according to the authors this should be an added assignment to help students prioritize learning objectives. Students often viewed assigned readings as a way to focus on what was important for quizzes rather than how to improve writing. Specific feedback on students' writing resulted in human connection and more clearly met online writing learning objectives.

Synchronous multimedia activities--chats, podcasts, videos and PowerPoints--were ranked lower when it was not clear how the information applied to writing. For example, when using discussion boards, some students shared that multiple perspectives were helpful for their writing. However, discussion boards ranked lower because some students felt discussions were

forced at times. In addition, some students perceived other multimedia online activities as too time consuming and did not always provide information to meet learning objectives. For example, students ranked quizzes lower because it was not clear how these activities improved their writing.

Regardless of ranking, students generally feel online activities are more helpful when scaffolding to clearly meet learning objectives. Scaffolding means that learning concepts are broken into parts, and instructors provide individual assistance to help students master each part. Scaffolding, in this research, also requires human connection to help students master all levels in the online writing instruction courses.

Although learning can be achieved with self-guided material, online writing activities need a human instructional touch to clarify learning objectives. The

issue is that online material can feel mechanical, and the instructor is already at an interactive disadvantage by not being in the same physical space as students; as a result, students will be quicker to assume the instructor does not care. However, if students perceive instructors are present or available in the online classroom, a rapport develops. Additionally, these instructor-student connections can result in students getting better grades. Students who reported feeling connected to their instructors were 30% more likely to earn a C or better.

Student responses in the study indicate the high value that students put on feedback given by instructors on a regular basis. Overall, students find activities that clarify learning objectives more helpful. These types of collaborations and activities positively impact students' participation, enhance students' learning experiences, elevate students' sense of support, and improve grades. Instructors serve as more than experts in their fields. Instructors serve as motivators to encourage students to continue the writing process. It is important to put forth the effort to develop strong online writing activities that promote instructor to student and student to student connections, as well as activities that clearly connect to learning objectives.

Online PowerPoints

Media-rich Presentations. Although PowerPoints are ranked fifth in helpfulness in the previous study, there are ways to make them more effective as evidenced by a study at a Midwestern U.S. university in 2011 by Drouin, Hile, Vartanian, and Webb. These researchers conducted a study of 113 students to measure PowerPoint effectiveness. These students populated

eight sections of psychology and English classes, and 79% had taken online courses prior to this study.

Drouin, et al. examined a variety of ways to use PowerPoint presentations in an online environment. They found that student and instructor connection can be strengthened when PowerPoint presentations are more media-rich. One way to achieve this is by including a video of the instructor on the PowerPoint slides as the instructor is lecturing about the material. Another way is providing PowerPoint slides with instructor audio but with no video of the instructor during the lecture.

There were a number of other major findings in this study. First, PowerPoint slides that included a video of the instructor lecturing during the presentation and PowerPoint slides that included audio but no video of the instructor were rated higher by students who had taken online courses in the past versus those who had never taken online courses. Second, PowerPoint slides with an instructor video image and PowerPoint slides with instructor audio only ranked consistently higher than audio recordings like iTunes audio lectures or Podcasts or PowerPoint slides with no audio or video components. Third, a finding outside of instructor control was that students who had experienced instructor video in the past continued to prefer instructor video images, and students who had experienced audio but no video in the past continued to prefer audio but no video. However, when students compared the quality of PowerPoint presentations that included instructor videos and PowerPoint presentations with instructor audio but without instructor image, there was no difference in student ratings.

According to Drouin, Hile, Vartanian, and Webb (2013), online instruction requires sharing material in a multi-dimensional manner. When speaking during a PowerPoint presentation, instructors should use a conversational tone whether a video image of instructors is included or only the audio is included. The video image of instructors on the PowerPoint slides may be optional, according to the authors of this study.

There were other important findings in this study as well. Students believed that online courses were valuable to their learning overall, and they learned equally well from all instructors, whether the course was English or psychology. In addition, students highly ranked their online instructors' courses for being well organized and having strong communication components. Overall, the authors of this study believe that these media-rich course qualities helped instructors manage student cognitive load and improved instructor-student connections.

PowerPoints and Knowledge Types.

Feeling a sense of connection using PowerPoint presentations may also depend on the type of learning required. According to Hong and Yang (2018) who surveyed sixty undergraduates, effective strategies might differ with declarative and procedural knowledge courses when learning online. The students in the study were enrolled in a variety of disciplines including Chinese, English, preschool education, special education, chemistry, bio-science, geography, physical education, history, math, and economics. Two types of online PowerPoint presentations with and without instructor video images were used to measure how students would respond when using two types of knowledge, declarative and procedural. Declarative knowledge

focuses on understanding and remembering facts, theories, and names. Procedural knowledge focuses on putting declarative knowledge into practice. An additional question was if cognitive load, or how much students were required to think, would be impacted when including or not including the instructor's image in a video lecture where procedural or declarative knowledge were required. At certain times within a course, declarative knowledge was conveyed using a PowerPoint with an instructor video image and without as a control, both using the same audio instructions.

In this study, undergraduates were arbitrarily assigned to two online video lectures per course; the videos were between 7 and 8 minutes and 20 seconds long. The authors found no change in student cognitive load, but test grades were higher for declarative knowledge. For declarative knowledge, there was no significant difference in the cognitive load with or without the instructor's image. In addition, for declarative knowledge, students who watched the video with the instructor image scored significantly higher on the test than those who did not see the instructor image. For procedural knowledge, the students' cognitive load was significantly higher when the instructor's image was present and was lower when the image was absent. However, for procedural knowledge, there were no significant differences found in test grades between those who were exposed to the instructors' video images and those who were not.

A course or topic is likely to have both declarative and procedural knowledge requirements, so it will be important for instructors to correlate declarative learning and procedural

learning with the Hong and Yang (2018) findings. The overall conclusion for declarative learning is that the instructor image should be included to improve learning outcomes. The authors surmise that instructors' images enhance the ability to learn declarative material by adding the component of non-verbal communication and encouraging more responses. On the other hand, the finding with procedural learning is that an instructor image contributes to cognitive overload which limits learning. The authors surmise that since procedural learning focuses on tasks, instructors' video images are more distracting.

PowerPoint with Video and Lecture Notes in Four Week Classes. Evans (2014) measured how introductory online political science students rated two different types of PowerPoint presentations. The students were enrolled in two different sections of the same four-week online American Government class. Both classes had 30 students, and both classes had the same course material, instructor, and class requirements. One type of PowerPoint presentation included video lectures using the talking head style plus PowerPoint slides. Half of the screen was the lecturer speaking and half of the screen was PowerPoint slides. Students could stop and start these videos as needed. The other course used still slide PowerPoints plus lecture notes, no video or audio.

Overall, students in both classes gave their common instructor high ratings. The mode of delivery did not have much impact on student opinion of the instructor. However, 85.8% of students rated the

PowerPoint plus video course excellent/good and PowerPoint plus lecture notes was rated 78.6%. Table 2 shows the ratings students gave to both versions of the same class by topic. Those in the class with PowerPoint and video rated the class higher for exam preparation and fairness. Those in the class with PowerPoint and lecture notes rated the class higher for organization, review material, and learning new concepts. The highest rated topic was students felt they learned more new concepts in the PowerPoint plus lecture class. Perhaps lecture notes with PowerPoints were clearer on important points and required less note-taking. Another possibility could be that videos were not viewed closely enough for content.

Although the difference in exam performance was not statistically significant, there are some interesting initial general findings. On the first exam students performed nearly the same in both courses with students in the lecture notes class scoring an average of 75.7 and students in the video class scoring an average of 75.74. On the following two exams, students in the PowerPoint plus lecture notes class performed higher than students in the PowerPoint plus video class with the third exam being 6 points higher for students in the lecture notes class. However, on the final exam students in the PowerPoint plus video class scored nearly two points higher. The mean for both courses showed a 72 or higher exam grade (C or better) throughout the testing period.

Table 2*PowerPoint plus Video and PowerPoint plus Lecture Notes*

Course Elements Rated by Students	PowerPoint plus Video Course			PowerPoint plus Lecture Notes		
	Strongly Agreed	Agreed	Total	Strongly Agreed	Agreed	Total
Liked the way the course was organized	26.3%	47.4%	73.7%	38.1%	42.9%	81%
Learned new concepts in class	26.3%	57.9%	84.2%	47.6%	42.9%	90.5%
Felt prepared for exams	15.8%	52.6%	68.4%	14.3%	47.6%	61.9%
Found review guide posted was helpful	26.3%	36.8%	63.1%	19%	57.1%	76.1%
Thought exams were fair	26.3%	47.4%	73.7%	14.3%	52.4%	66.7%

Note. Information is based on Evans (2014) research.

Although this study is over six years old, the questions it raises are as important today as at the time of the study. In general, Evans concluded that PowerPoint plus lecture notes may be the better instructional strategy for four-week semesters. However, videos could be incorporated effectively into online courses as supplements, not requirements. One of the primary reasons for this conclusion was the amount of student viewing hours that were tracked in the study. Students in the video class spent an average of 24.8 hours online while students in the lecture notes class spent an average of just 18 hours. It is possible that spending fewer hours online allowed the students in the lecture notes class more time to study for tests and, therefore, earned better grades on some exams. It is also possible, according to the author, that introductory students could be over-stimulated or distracted by lecture videos and, therefore, students earned lower scores on two of the four exams. Another possibility is that students did not watch all videos completely which could have also

resulted in lower exam grades. What content students viewed while online cannot be confirmed as no data was collected. Although exam performance did not yield statistically significant differences, the general findings seem to be that both versions of the same class could yield similar test results for four-week classes.

Instructor Digital Storytelling for Prerecorded Lectures

Choi (2018) surveyed and tested 133 undergraduates from a large Midwestern university who had previous experience with online courses. The study measured students' level of engagement when experiencing what the author identifies as digital storytelling techniques used by instructors. Digital storytelling is a strategy that has been used in K-12 to add more dimensions to learning experiences using technology. Students add images, audio, and video to reinforce subject matter, share experiences, and present

information in unique and thought-provoking ways. In the Choi study, university instructors used common digital storytelling techniques in their lectures. The researchers then measured student response in order to determine what digital storytelling techniques would create the most effective prerecorded lecture videos for online, asynchronous courses.

Students viewed an eight minute video about psychology. Students were asked how often instructors in the video used digital storytelling in the prerecorded video, what digital storytelling techniques were most effective, and which digital storytelling techniques increased instructor credibility. Credibility was determined by having the students select adjectives from pairs like intelligent/unintelligent, unfriendly/friendly,

and dishonest/honest. Levels of student engagement and student willingness to reengage with this type of lecture video were measured as well. In addition, students were tested on content recall.

How often lecturers used the types of digital storytelling techniques is listed in Table 3. There were a number of important findings. First, student engagement increased when instructors used digital storytelling techniques in the lecture video. Second, students associated instructor credibility with four digital storytelling techniques: real-life examples, creative examples, instructor storytelling, and high quality video footage. The author noted that three of the four top ranked techniques were first-person narration techniques.

Table 3

Frequency of Use: Digital Storytelling Techniques

Instructor Digital Storytelling Techniques	Rank
Real-life examples	1
Interactive lectures	2
Creative examples	3
Instructor demonstrations of content	4
Instructor storytelling	5
High-quality video edits	6
High-quality video footages	7
Attention getters to generate interest	8
Humor	9
Viewer feedback	10

Note. Information is based on Choi (2018) research.

Further significant findings by Choi indicated when pre-recorded lectures did not hold students' attention, yet many students were willing to retake these types of classes. Students recalled 63.93% of the video content in this study. Students scored 76.7% for the beginning and 70.7% for the ending of

the video content, but students scored 44.4% for the middle. The author emphasized the importance of paying extra attention to the middle of the video to maintain student engagement. No video timestamp was provided for the use of each digital storytelling technique in the

study. However, viewer feedback had the most significant decrease in student engagement for the pre-recorded video; therefore, that would be the least likely technique to encourage engagement in the middle of the video. Overall, students showed an increase in engagement and there was a significant relationship between students' willingness to retake the class with instructors who used digital storytelling techniques.

Choi observed that instructors who used the most effective digital storytelling strategies were the instructors who were rated as most authentic by students. More authentic instructors shared life experiences that revealed genuine emotion and included instructors' unique experiences and struggles in their lives. The author summarized the top five ranked digital storytelling techniques in Table 3 as instructors being vulnerable and showing genuine emotion. These techniques correlate with increased student engagement. In addition, according to students in this study, instructors' credibility also increased when using instructor storytelling, and real-life and creative examples. The author's position is that if instructors demonstrated the top five ranked techniques then students viewed the instructors as more personal and relatable.

The bottom five ranked items showed that students have become better judges of video quality but the author does not suggest that instructors become video experts. The basic video requirement is that the quality is high enough to view content easily. The viewer feedback techniques were, essentially, considered a wasted effort by students for prerecorded videos. Online viewer feedback has been used in real time to increase open-ended questions and discussions using chat and online student polls. However, the author suggested that

viewer feedback for prerecorded videos made little difference to students. This resulted in a significant negative impact on student engagement. There did not seem to be an effective interactive communication technique that was useful to students in this asynchronous recorded video, but complementary online education tools like discussion boards in course learning management system can provide opportunities for communication. Engagement throughout the video must be addressed since student test scores were significantly lower for the middle of the video as compared to the beginning and ending. In this study, it is unclear if video length had an impact on student engagement.

Video Length

Ozan and Ozarslan (2016) conducted a study to determine ways to improve online video lectures based on how students interact with certain types of video lectures. They observed 2927 students in Turkey who enrolled in 13 online courses where they experienced 18,144 video events. These courses were divided into three categories: human sciences, cultural awareness, and social responsibility. They were a part of the common curriculum for undergraduate students. Overall, the courses combined written instructions, textbook readings or articles, video lectures, and a self-evaluation test. The intention of the study was to examine student behaviors as the students watched three styles of video presentations to determine ways to improve online video lectures. One type of video presentation was an interview style using a format similar to a lecturer with a guest speaker. The second type of video presentation was a talking head style that

focused on a teacher who spoke directly to the camera. The third type included PowerPoint presentations and visuals or audio of instructors. All students were required to take a final exam at the end of the course. Students could choose to study from textbooks or from video lectures.

The success measurement for this study was the extent to which videos were watched completely. It is no surprise that videos of ten minutes or less in length were more likely to be watched completely than longer videos. In fact, 58% of students completely watched less than 10 minute videos, 40% completely watched 10-30 minute videos, and only 2% completely watched longer than 30 minute videos. Findings by video lecture type included 25.6% of students completely watched interview style video lectures, 17.9% completely watched talking head style video lectures, and 15.0% completely watched presentation style lectures. Overall, 43% of total videos were not watched at all.

When mean scores were calculated on final exams, researchers discovered that learners who watched the videos completely had the highest scores on final exams than those who watched partially or not at all. The reason why students are more likely to completely watch shorter videos is clear, this saves time. The reason why students watch certain styles of videos is not as clear. The interview style included dialogue with a guest expert and was the most completely watched style. The authors believe that students may have found this style more relatable due to the body language. The talking head style video lecture included an instructor who spoke directly to the camera. The talking head style was the most passive of the three styles, and although the authors believed this could be the most boring of the lecture styles, the talking head style was the second

most completely watched. The presentation style video lecture included PowerPoint presentations and visuals or audio to facilitate information and could include instructors' images. More research is needed to more completely understand why students chose to view certain styles of video, but the authors assumed that students who did not watch videos completely in style or length preferred printed material.

Engagement and relationships with instructors were not a part of this study, but the authors acknowledged that other studies should be consulted on these subjects. This study gives some direction for planning video length and determining a preferred style of online lecture instruction. However, there are times that video lectures must be longer than 10 minutes, and students must watch them. The question then becomes how students can be encouraged to completely view videos more than 58% of the time.

Tagging Videos

Gorissen, van Burggen and Jochems (2015) conducted an experiment with 255 students in the Netherlands to determine how tagging videos impacted viewing habits. A tag interface in this context is similar to a video table of contents along with the time stamp to enable students to choose what they watch. The students in the study viewed 18 video lectures that were 40-45 minutes in length, live or on demand. The time period of the study was November 2011 through January 2012. The control group watched the same videos with no tagging, known as a regular interface (RI). The average number of recordings for one course was 16, but some courses could have as many as 54 recordings. The first part of the courses

focused on empirical research and second part focused on hands-on training. The tagging option was added by an outside expert and included keywords and phrases that were linked to a specific timestamp location on the video. Students were given the option to use the tag interface (TI) with videos to reference important lecture information.

The authors found that there was a difference between when students watched (RI) and reviewed (RI plus TI) lecture videos. Students watched (RI) the recorded lectures and took notes during the lectures. Then students used the timestamps (TI) on the recorded lectures and reviewed material that was relevant to prepare for their exams. The authors believed that effective note-taking contributed to student success whether students used RI only or RI plus TI video lectures.

There were some major results to consider when longer videos are a part of online course requirements. First, TI saved students' time. As click counts doubled for TI, the average amount of video viewed per recording decreased 34.2%, from 20.05 to 13.20 minutes. Second, students used TI as an exam review tool. The highest incidence of using both TI and RI was during the last weeks before final exams. Third, students did not need additional training to use TI. TI average tag click counts over time more than doubled from 8.80 to 18.34. The authors speculated that students may have gotten more comfortable with the TI interface over time.

There are a number of variables that were not measured in this experiment, but findings were that tagging (TI) increased student interactivity and saved students'

time. Hiring a professional tagger for every video lecture is unrealistic; however, there may be other ways to guide students through videos. For example, although not technically tagging, Zoom video conferencing has an audio transcript that includes timestamps, and that information can be downloaded into a searchable document. In addition, if a longer video is used for more than one semester, it may be a good use of instructors' time to create a video table of contents with time stamps for certain topics.

Online Discussion Forums in the Sciences

In a 2017 study, Jayaratne and Moore surveyed 92 graduate and undergraduate students at North Carolina State University's College of Agricultural and Life Sciences to determine their online instructional preferences. Their options included three online activities: quizzes, instructional videos, and PowerPoints with or without recorded narratives. These three online activities were somewhat to most preferred as seen in Table 4. Student-to-student interactive discussion forums were least preferred of all online activities.

The authors acknowledged that the value of online discussion forums is up for debate. The students in this study, however, did not prefer discussion forums. This discrepancy in findings may be related to the students' academic disciplines. The authors noted that testing methods are different between sciences. Some use multiple choice, true/false, and some essay-type questions, and courses that require more writing use essay-type questions and other forms of writing.

Table 4
Online Class Activities Most Preferred

Online Instruction Activities	Not or Least Preferred	Somewhat Preferred	Preferred or Most Preferred
Quizzes	5%	34%	61%
Instructional Videos	5%	14%	81%
PowerPoint (no recorded narrative)	8%	14%	78%
PowerPoint (with recorded narrative)	13%	14%	73%
Hands-on Applications Learning	23%	34%	43%
Reading Materials	25%	35%	40%
Video Recording of Live Lecture	26%	19%	55%
Case Studies Learning	31%	33%	36%
Instructional Audios	34%	24%	42%
Word Puzzles	40%	24%	36%
Real Time "Live" Class Viewed Online with Interactive Capability	40%	18%	42%
Book/Article Critiques	44%	35%	21%
Discussion Forums	51%	24%	25%

Note. Information is based on Jayaratne and Moore (2017) research.

Face-to-Face and Recorded Lecture Combination

A study by Bos, Groeneveld, van Burggen, and Brand-Gruwl (2016) looked at how online and face-to-face lectures contributed to university student success in the Netherlands. The researchers gathered information on how many students chose and how much time students spent with three lecture delivery types. In addition, the authors researched how that choice could impact exam performance. Seventeen, 90-minute, face-to-face traditional lectures, delivered at the same time of day and in the same location, were recorded over 8 weeks. The first assessment included 397 first-year university psychology students. Thirty students dropped out of the study by the second assessment which left 367 students. One chapter was discussed from the textbook for each lecture. The lectures were also available online after the scheduled class time. Students could choose their lecture

preferences. Students had three choices for lectures: face-to-face only, online only, or a mix of both. There were two assessments to measure how recorded lectures impacted face-to-face lecture attendance and exam performance for each mode of delivery. The first assessment during the first four weeks covered knowledge base development or learning theories. The second assessment during the last four weeks covered higher order thinking or evaluating and critical thinking.

Just over half (53%) of students in the first assessment viewed a combination of face-to-face lectures and recorded lectures (see Table 5). Students who attended face-to-face lectures and viewed recorded lectures were defined as supplementers by the researchers. Overall, the highest number of students chose to be supplementers in the both the first and second assessments compared to

those who chose just one of the lecture delivery options. However, researchers found that supplementer and face-to-face only students decreased compared to the first assessment. The number of online only students, however, more than doubled in the second assessment. The authors suggested that the reason for the lecture delivery shift

was students were more likely to view online only because they became more familiar with recorded lectures by the second half of the course. In addition, students preferred more interactivity and the ability to pause, skip, and play as needed.

Table 5
Number of Students by Lecture Type

Lecture Type	First 4 week assessment		Second 4 week assessment	
	Number Students	Percentage Students	Number Students	Percentage Students
Face-to-Face only	104	26.3%	68	18.6%
Online only	47	11.9%	107	29.2%
Supplementer (Face-to-Face and Online)	210	53.0%	143	39.1%
Non-user	35	8.8%	48	13.1%

Note. Information is based on Bos, Groeneveld, van Burggen, and Brand-Gruwl (2016) research.

According to the authors, there was a significant difference in exam performance on the first assessment which measured knowledge base learning, but not on the second assessment which measured higher order thinking. In Table 6, the supplementers scored significantly higher on the knowledge base, or declarative knowledge, test than students in the other groups. Supplementers also spent an average of 232 more minutes attending some form of lecture type than just one lecture delivery option. The researchers correlated final exam scores with time spent

by students who were supplementers and students who were face-to-face only. According to the authors' calculations, the amount of time supplementers dedicated to the coursework resulted in proportionately smaller returns per minutes spent as compared to face-to-face only students' returns. In addition, students who attended face-to-face performed better when knowledge base learning was covered than students who used online only instruction.

Table 6*Face-to-Face and Recorded Lectures Exam Trends*

Lecture Type	First 4 week assessment Exam Performance	Second 4 week assessment Exam Performance
Face-to-Face only	5.22 mean score	5.50 mean score
Online only	4.80 mean score	5.85 mean score
Supplementer (Face-to-Face and Online)	6.37 mean score	5.99 mean score
Non-user	3.86 mean score	4.24 mean score

Note. Information is based on Bos, Groeneveld, van Burggen, and Brand-Gruwl (2016) research.

Although the 4.80 mean is lower for online viewer exam performance, this is not considered significant compared to mean scores for face-to-face viewers. Furthermore, online viewing was even more effective when paired with face-to-face. Therefore, face-to-face attendance is not necessarily required for students to succeed. Although, there was a significant difference in exam performance on the first assessment, there were no significant differences in student performance for any lecture type in the second assessment.

Researchers observed that students shifted to different viewing strategies when preparing for the first and second assessments. The number of online only students in the second assessment more than doubled compared to the first assessment. The researchers found that when all online viewers were combined, there was an average increase of 169 minutes (26%) of viewing in the second assessment compared to the first assessment. On the other hand, the number of face-to-face only students in the second assessment decreased by 35% compared to the first assessment. When all face-to-face students were combined, there was an

average decrease of 130 minutes (14%) of viewing in the second assessment when compared to the first assessment. Overall, the decrease in face-to-face students and participation and increase in online students and participation did not have an adverse impact on exam scores in the second assessment. There were no significant exam score findings for higher order thinking in the second assessment whether online or face-to-face. Why students chose recordings or attended face-to-face is unclear. However, the general finding in this study is that the combination of face-to-face lecture and recorded video of that lecture can enhance student learning.

Community College Students' Online Performance

Xu and Jaggars (2014) conducted a study that followed 40,000 community college students seeking degrees during five academic years. The study included a total of nearly 500,000 online and face-to-face individual courses in 34 community or technical colleges in Washington State. The primary measurements for success were persistence and grades.

Prior to the pandemic emergency shutdown, online learning enrollment increased quickly in community colleges that serve a large portion of the population of nontraditional students. Although distance education through online coursework expands opportunities for all students, it is reasonable to assume that it is often very appealing to nontraditional students whose lives are overloaded with challenges and responsibilities. The issue in face-to-face and online delivery is that

community colleges often observe lower persistence rates and course grades in online courses.

The groundbreaking part of the Xu and Jaggar study was the sample size when analyzing online course success. The sample size included approximately 50,000 online courses. Table 7 summarizes where students chose to register online by academic concentration and includes 36 academic subject areas.

Table 7

Percentage of Online Enrollment by Academic Concentration and Subject Area

Academic Concentrations	Academic Subject Areas	Percentage Enrollments Online
Humanities	History, Cultural Studies, Other	19.40%
Social Science	Geography, Economics, Psychology, Philosophy, Sociology, Anthropology, Political Science, Other	18.29%
Education	Education	15.15%
Computer Science	Computer Science	14.99%
Allied Professions	Business, Law, Nursing and Medical Assistance	12.89%
English	English	11.58%
Mass Communication	Mass Communication	10.63%
Natural Science	Agriculture, Biology, Chemistry, Astronomy, Geology, Physics, Other	8.42%
Health & Physical Education	Health & Physical Education	8.11%
Math	Math	6.61%
Applied Knowledge	Home Making & Family Living, Emergency Management, Art & Design, Mechanics, Masonry, Other	5.64%
Foreign Language and Literature	Foreign Language and Literature	4.81%
Developmental Education & ESL	Developmental Education & ESL	3.85%
Engineering	Engineering	.89%

Note. Information is based on Xu and Jaggars (2014) research.

Online persistence, or students who received a grade in the course, was 91.17%. Face-to-face persistence was 94.45%. The online average grade was 2.77. The face-to-face average grade was 2.97. There is no argument that students in face-to-face courses have higher persistence and grades, however, the community college challenge is to improve online delivery formats to better serve those students who will enroll online.

Other major findings from this analysis on the performance of traditional and non-traditional students' must be considered. First, older students (age 25 and older) persisted in online courses at higher rates than younger students did. On the other hand, younger students were more likely to persist in face-to-face courses than older students. Second, the grades for non-traditional older students were lower in online courses than they were in face-to-face courses; however, older students were more likely to complete the online course. The first two points could be interpreted to mean that non-traditional, older students prioritized home and work responsibilities over higher social interaction on college campuses lower. Third, the online performance of males, Black students, and students with lower academic preparation were significantly lower compared to more advantaged groups. This gap in performance is also found in face-to-face classrooms. The authors here expressed concern that online delivery will most certainly expand and could also lead to greater educational inequities.

Despite the discouraging results of this study for non-traditional students, the reality is that they will continue to pursue online coursework due to its flexibility, so academic institutions must explore options to increase these students' persistence and grades. The authors suggested a number of ways to improve student performance. One proposal

was that online learning be considered a student privilege that would require screening. One screening could include permitting only students with better GPAs to enroll in online courses. Another screening option could be requiring students to demonstrate mastery of certain online skills prior to enrollment. Another proposal was to have an early warning system to guide struggling students to helpful student services. Additional proposals were to incorporate scaffolding and self-directed learning skills into online materials, assignments, and other pedagogical processes.

Face-to-face delivery will not be replaced by online delivery, but online delivery serves a need for community college students and will continue to grow. There are equity issues, however, particularly for non-traditional students across both face-to-face and online delivery. Looking specifically at student online enrollment, the authors suggested that community colleges could use their data to consider strategies to improve student outcomes in these courses. Additionally, the authors suggested that community colleges conduct research to understand how to close the student performance gaps online, and how to increase student persistence and course grades in online courses.

Summary and Conclusion

In March 2020, a pandemic caused emergency college and university closures worldwide. Within weeks of the shutdown, academic institutions were required to adapt all courses to online instruction. Although instructional skills varied, online courses quickly became the primary course offering to maintain enrollment. Now, online instructional

capabilities must be fast-tracked for a number of reasons. First, negative student opinions of online courses must be reversed. Second, students' demand for flexible options requires the availability of online courses. Third, non-traditional students' gaps in performance must be addressed when enrolled in online courses. Online delivery may not be adaptable to all academic subject areas, but academic institutions must rise to the challenge to maintain and increase persistence when online delivery is possible.

The literature analyzed serves as puzzle pieces to generate ideas for successful online blends of activities. This research found that human connections between student-to-student and student-to-instructor were required for academic and social development in online courses. The available research suggests that some online instructional techniques result in better student attitudes toward online learning as well as improved student online performance. Instructors should consider implementing the following best practices when designing online courses.

- Provide frequent and in-depth instructor feedback.
- Scaffold learning concepts to help students with diverse backgrounds master online coursework and close gaps in performance.
- Consider media-rich PowerPoints that include instructor video images and conversational audio.
- Create media-rich PowerPoints that are sensitive to student cognitive load.
- Use PowerPoints in mini-term courses that are media-rich or include lecture notes only.

- Adopt digital storytelling techniques during lectures that include personal life experiences.
- Offer video lengths that are less than 10 minutes for higher student viewing.
- Offer longer videos that are more than 10 minutes with tags for higher student interactivity.
- Complement online activities with discussion boards.

Online activities, and even the way instructors' communicate with students, must be strategically thought through in course design. It is the instructors' job to select a combination of tools that best accomplish course objectives.

Once college and university emergency closures are lifted, face-to-face delivery will be reinstated; however, online methods of delivery will be more important when the new normal is established. Does research conclude that online delivery will replace face-to-face delivery? Not necessarily. From a demand perspective, some will want more online experiences, and some will want fewer or no online experiences. However, research does suggest that certain academic subjects can be adapted effectively to online only delivery or face-to-face with online activities supplements. Students with fewer advantages than others must also be considered, particularly those who lack access to computers and networks. The challenge is that one strategy does not fit for all courses. Community colleges and practitioners in the classroom must come to as clear an understanding as possible on online course design, as quickly as possible, and optimize online best practices to serve their specific disciplines' and students' needs.

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