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Using Videos to Teach Online Accounting Courses: Lecture-Recorded Videos vs. Non-Lecture-Recorded Videos

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Abstract

Online course delivery suddenly became imperative with the onset of the Covid-19 pandemic. One way to enhance these courses is to provide course videos. There are currently two types of course videos, one recorded from live lectures and the other prepared by professors outside of a classroom setting. This paper compares the pros and cons of the two basic types of videos from instructor and student perspectives, based on a review of the literature and experiences in tax accounting courses at a major regional university. Interestingly, the findings suggest that students in both undergraduate and graduate courses prefer non-lecture-recorded videos over lecture-recorded videos. Reasons for this preference include shorter time per video and continuous flow of content. The findings suggest that online teaching with non-lecture-recorded videos made by professors is a good alternative to synchronous online teaching via platforms such as Zoom and is preferred by many students.

Keywords: online teaching, lecture-recorded videos**,** non-lecture-recorded videos

Introduction

The COVID-19 pandemic led to a shuttering of campuses across the globe, rendering online learning critical (Sangster, Stoner and Flood, 2020) and videos an important part of the learning process. Course videos provide a possible solution for the lack of lectures and may come in two forms: (1) videos directly recorded from actual lectures (lecture-recorded videos), and (2) videos made separately by professors (non-lecture-recorded videos). Lecture-recorded videos can improve the learning effectiveness of online courses, but conditions in some cases make such recordings impossible, thereby making non-lecture recorded videos the only option. This article aims to provide some insights into the relative pros and cons of the two types of videos from instructor and student

perspectives and offers course design implications for educators and practitioners who are interested in adopting videos for online instruction.

Prior studies examining the learning effectiveness of online education relative to the traditional delivery mode (Chen, Jones & Moreland, 2010; 2017; Farley, Jain, & Thomson, 2011; Dendir, 2016) have yielded mixed results, with some suggesting that the effectiveness gap has narrowed (Chen and Jones, 2007; 2008). One major drawback to online courses is the lack of face-to-face lectures for clarification and elaboration (Chiu, Gershberg, Sannella & Vasarhelyi, 2014; Lento 2017), which may partially or largely account for the mixed results. While course videos provide a possible solution for the lack of lectures, the choice of which type involves tradeoffs from the perspective of both instructor/institution and student.

We synthesize existing literature on the use of technology and contribute to the literature in several ways. First, despite examining the effectiveness of video lectures for online accounting courses, studies usually focus on one type of video technology; this study is the first one of which we are aware that compares two different types of lecture videos. Second, this study shows that non-lecture-recorded videos are not only an alternative, but possibly an even better option than lecture-recorded videos. Finally, earlier literature in accounting education usually involves introductory or intermediate accounting courses and very few studies examine taxation courses, arguably a unique area of accounting. This study is also the first one to examine how lecture videos could improve such taxation courses.

In this study, the instructor provided both lecture-recorded (from a previous semester) and non-lecture-recorded videos that covered the same lecture notes in online undergraduate and graduate tax courses. The instructor separately prepared non-lecture-recorded videos. Students then completed surveys to provide feedback on these two types of lecture videos. Overall, both undergraduate and graduate students preferred non-lecture-recorded to lecture-recorded videos. Most students preferred the shorter length of non-video-lecture videos and did not appear to view student questions in the lecture-recorded videos as adding sufficient value.

The remainder of this study is organized as follows. The next section reviews the prior literature. Following the literature review, the next three sections discuss the methodology, results, and limitations of this study.

Literature Review

Results of studies about the efficacy of video-based lectures have been mixed, possibly owing to instructor differences, the ever-increasing sophistication of the technology, the learning curve for instructors associated with using the technology, the subject matter, or some combination of these factors. Wen (2016) examined the learning effectiveness of recording live lectures in an in-class advanced accounting course. Qualitative student feedback suggested that the video-based lectures were informative and helpful in understanding the materials. The use of lecture videos improves the learning quality and outcomes in an online learning environment.

Lento (2017) discussed the use of whiteboard voice-over video (WBVO) technology as a supplemental resource in a blended classroom design for financial accounting classes. The WBVO was used to create pre-recorded mini lectures ranging from 10 to 15 minutes. The study aimed at designing active learning strategies due to the CPA exam's increased emphasis on higher-order cognitive skills. Students watched lecture videos outside of class and then later applied the concepts learned in class exercises. The results show that videos are associated with higher grade point averages. Students prefer lecture videos over publisher's online homework manager in that case, although they arguably should complete the exercises contained in the homework manager regardless of whether they watched a video. Student feedback indicates that lecture videos are more interactive than reading on their own, thereby acting as a lecture at home.

Drouin (2014) investigated the effect of using lecture capture videos with undergraduate students in a psychology class. The lecture capture videos are recordings of live lectures with students in the classroom. Interestingly, the results showed that the class with access to lecture videos had lower attendance rates and final grades. Also, these

students had lower participation in class activities and assignments. On the other hand, Bosshardt and Chiang (2016) investigated the use of lecture (video) capture in an economics principles course. The live class sessions were recorded, and these video lectures are made available online. Their findings suggest that exam scores for students in a lecture capture class were almost the same as those who took a face-to-face course, excluding any potential effects associated with self-selection into a particular delivery mode.

Sloan and Lewis (2014) examined the use of lecture capture technology in an undergraduate operations management class. The results indicate that access to lecture capture videos is associated with higher exam scores, consistent with the aforementioned findings by Bosshardt and Chiang (2016). Efforts to promote access to lecture capture videos resulted in higher usage of these lecture videos.

In summary, results regarding the use of lecture capture videos were mixed. There were positive effects such as increased satisfaction and understanding of materials (Lento 2017; Sloan and Lewis 2014) and improved learning (Drouin 2014; Wen 2016). However, there were also some negative effects such as lower class attendance, participation in class activities and grades (Drouin 2014). There may be a learning curve for instructors and potential hardware and software costs to implementation (Newton et al. 2014).

Non-Lecture-Recorded Videos/Non-Lecture vs. Lecture-Recorded Videos

The advancement of video technology has increased video lecture options available for professors. Such video options include voice-over-slideshow, screen cast, lecture capturing, and recording using a camera or a webcam (Inman and Myers, 2018). While prior studies have examined the effectiveness of lecture videos and their effectiveness on students' learning experiences, these studies usually focus on one specific video format instead of a comparison of different video options (Lento 2017; Sloan and Lewis 2014; Drouin 2014; Wen 2016). In particular, many papers focus on lecture-recorded videos (Sloan and Lewis 2014; Bosshardt and Chiang 2016), likely due to the fact that lecture-recorded videos are used more frequently than other video formats given its relative ease and effort of recording. Other types of non-lecture-recorded videos such as webcam recording and voice-over-slideshow all require professors to spend significant amount of their own time to make.

Non-lecture-recorded videos are more focused and do not include student questions. Answering questions may allow professors to clear up any confusion earlier in the learning process. However, this effect may not be as desirable when students are watching lecture recordings. Dolan, Prodanov, and Taufik (2012) surveyed students in online courses with lecture-recorded videos and asked whether they missed being able to ask questions during classes. They found no particularly positive or negative consensus and attributed this finding to the fact that most students are not particularly comfortable asking questions themselves in a lecture.

Second, lecture-recorded videos are likely longer than non-lecture-recorded videos due to the presence of student questions and instructor responses (Day, Foley, Groenweg, & van der Mast, 2005; Day, 2008; Filius & Lam, 2009, 2010). Although these questions may be helpful in lectures, they can make these videos less effective due to increased length. Past research shows that students generally prefer shorter videos, and the learning effectiveness is higher (Slemmons et al., 2018; Guo *et al*., 2014; Risko *et al*., 2012). For example, Guo et al., (2014) showed that student engagement decreased as the length of video lectures increased.

Finally, instructor presence refers to lecture videos that include the instructor's face and could make students feel like they are in the classroom. Wang and Antonenko (2017) show that instructor presence improved information recall and increased learning effectiveness and satisfaction. Lecture-recorded videos such as those using Mediasite usually include a screen for professors, thus providing instructor presence. However, not all non-lecture-recorded videos have instructor presence. For instance, voice-over-slideshow does not have instructor presence, but software such as Kaltura allows professors to record themselves on a separate screen and provide instructor presence. As long as professors make non-lecture-recorded videos with a separate screen for themselves, non-lecture-recorded videos should not present a disadvantage with respect to instructor presence.

Three articles in a recent issue of *Businessweek* report the results of a survey of 3,532 MBA students from 95 schools around the world. They concluded that, while many students did not view online education as an effective replacement for in-person instruction, students tend to appreciate the availability of videos for later review as a complement to live lectures. Pre-recorded (non-live) lectures were viewed even more favorably than were lecture-recorded videos; students valued them as a learning tool to watch prior to class so that class time could be spent on more directed discussions (Solomon 2020). Interestingly, the higher the school ranks worldwide, the notion of shifting fully or partially to online delivery tends to be less acceptable (Benhamou and McIntyre 2020). Perhaps importantly, however, students at these schools wanted to see videos made available even after in-person classes resume.

Many schools find themselves experimenting with different software, changing from one to another periodically as they grapple with the balance between cost and effectiveness/efficiency issues in course delivery. Such changes, while sometimes better for the long-term at the school, are likely to be associated with a temporary loss of learning for the instructor who has become accustomed to one software package. As discussed above, non-lecture-recorded videos, especially those with a separate screen for professors, are shorter in length, more focused, and likely offer better video quality than lecture-recorded videos. How students view these two types of lecture videos, if offered both, is an important empirical question with implications for course planning. Following is our discussion of the courses and the software used to examine this question, along with indications about feedback.

Course Administration and Issues – Instructor Perspective

For this study, the instructor incorporated both lecture-recorded videos and non-lecture-recorded videos in two online tax accounting courses at a major regional university. Specifically, ACC 420 and ACC 550 are Introduction to Federal Income Taxation at the undergraduate and graduate levels, respectively, offered in the fall semesters of 2017, 2018, and 2019. ACC 420 and ACC 550 were also offered in an in-class format in the winter semesters of 2017, 2018, and 2019, and the instructor recorded these live lectures using Mediasite, a comprehensive video-recording software package integrated with the classroom equipment. At the same time, the instructor created non-lecture-recorded videos using another software package, Kaltura. PowerPoint slides were the same for both online and in-class sections.

Both lecture-recorded videos using Mediasite and non-lecture-recorded vides using Kaltura were given to students at the beginning of the semester on Blackboard. Students thus had access to two different types of video lectures that covered the same content throughout the semester. Students were not required, but were highly encouraged to watch these videos. These two courses were completely online without in-class meetings and were not part of a flipped classroom. Students had the freedom to watch either or both formats of videos. The instructor could not track whether a student watched a specific video or how many minutes a student watched that video because Blackboard did not offer those capabilities. Therefore, the instructor could not examine how lecture videos affected student engagement.

While lecture-recorded videos were updated every winter semester when these two courses were offered in-class, non-lecture-recorded videos were updated in 2018 after the Tax Cuts and Jobs Act of 2017. Tax courses are unique among accounting courses because tax brackets change each year and there are sometimes major updates after presidential elections and economic recessions. However, it is not necessary to update non-lecture-recorded videos every year. The purpose of these videos is to teach students how to apply tax brackets and deductions rather than memorizing the numbers. Although non-lecture-recorded videos may use the brackets from the prior year, students can calculate taxes similarly using future tax brackets. This video updating issue is likely somewhat unique to tax courses because other accounting courses are less likely to require updates when using either format of video recording.

Student feedback was collected via a built-in survey function that allows instructors to give surveys to students, separately from the school-wide course evaluation that uses a third-party service. Responses were anonymous and could not be attributed to an individual student. The instructor then compared the student feedback with respect to

lecture-recorded videos and non-lecture-recorded videos. The following paragraphs will discuss such issues as equipment requirements, user interface, video storage, and editing issues, from the instructor's experience and perspective. We will follow up with a tabular summary and, finally, a presentation of student feedback.

Lecture-Recorded Videos Using Mediasite

Equipment Requirements

While many types of software allow recording of live lectures, infrastructure is the most important feature. Good lecture recording requires a dedicated classroom that has various equipment for recording. Such equipment includes a motion-tracking camera that follows the professor in the classroom and automatically zooms in and out when needed. This camera also needs to have high definition for picture quality.

Second, a good microphone system is needed. Classrooms need to have microphones installed on the ceiling to capture student comments and questions. The professor also needs to have a personal microphone or speaker with a long battery life of at least 45 minutes and multiple batteries for charges. Third, the cameras, projectors, and sound systems need to be integrated with the main classroom computer that the professor can use, test, and monitor. Fourth, all the recordings need to be properly stored in a local hard drive or the cloud. Finally, the entire system needs to be regularly updated and checked by technical experts to ensure smooth recordings. Mediasite is one of many software packages that support lecture recording and will be featured in this article.

User Interface for Students

Mediasite allows users to watch the videos in four different formats. As shown in Figure 1 (instructor identity obscured), these four different formats include side-by-side views and embedded views. While the PowerPoint screen contains the relevant information, the professor screen shows the professor speaking in real-time, providing a greater simulation of instructor presence. For side-by-side videos, students can watch them on two separate monitors if desired. Students have flexibility in choosing the relative size and positioning of video and of the information being discussed.

Video Length

Lecture-recorded videos are typically longer than non-lecture-recorded videos for many reasons. First, students usually ask questions in the class, and these questions take more time to clarify because professors need to explain a concept in multiple ways to help students understand. Second, professors may discuss materials not on the PowerPoint slides to clarify some questions and to reduce student boredom that could result from appearing to merely read slides. Third, actual lectures sometimes include time given to students to try practice questions. Lastly, instructors sometimes tend to speak more slowly in an actual lecture than when facing the computer screen. Most lecture-recorded videos using Mediasite were between 45 minutes to one hour long and covered multiple learning objectives[1] while non-lecture-recorded videos using Kaltura were about 15 minutes on average and usually covered only one learning objective.

Quality and Storage Issues

The video quality of Mediasite recordings depends on the cameras in the classroom. In the courses included for this study, the camera is high definition (720p), with no option to choose video quality for recordings. Also, a large hard drive is required for storing high quality videos. As a result, the university may not want videos to be in quality above high definition due to greater required storage space. Since students mostly watch the videos on personal

[1] Not all class time is used for lectures. Some classes are used for exams, presentations, and explanations of homework questions and exams. Also, some class time is used to go through topics of general interest such as accounting careers and current events. These sessions are not recorded.

computers, the additional visual benefits from higher definition recordings such as 1080p are not evident on personal computer screens.

Another challenge in classroom recording is the sound quality. The instructor may need to wear a specific microphone for better recording and sound quality. Further, if the microphones in the ceilings are not able to clearly capture students' comments and questions, the recording will not be clear.

While many types of software allow professors to install the software on their personal computer for recording purposes, recordings of live lectures are likely stored in a university-owned computer or in the cloud. Therefore, professors thus may not have full access to the recordings, making the editing of videos less convenient. An IT specialist is needed to ensure proper functioning of the system and full access to all recordings.

Non-Lecture-Recorded Videos Using Kaltura

User Interface

Unlike lecture-recorded videos, non-lecture-recorded videos do not need sophisticated equipment. Generally, a personal computer with a camera and microphone is sufficient. Kaltura is an example of such a program and was used in this study. Similar to Mediasite, Kaltura also allows users to watch the videos in four different formats. As shown in Figure 2, these four different formats include variants of side-by-side views and embedded views.

Video Length, Quality, and Storage

Unlike lecture-recorded videos, non-lecture-recorded videos are shorter, and the instructor may limit these to shorter times, with each video covering a specific learning objective or a practice question. Videos may be recorded in 720p or 1080p. However, recordings using 1080p require much more storage space. Also, since the recording merely involves the professor talking, there are no significant visual benefits using 1080p to record. If the video is recorded in a quiet office, the sound quality in the recording is usually quite clear. Videos recorded using Kaltura are stored on the professor's personal computer. Thus, the professor can easily edit the videos and arrange them in various folders.

Overall Comparisons of Mediasite and Kaltura Videos-Instructor Perspective

As discussed above, from the perspective of instructors, lecture- and non-lecture recorded videos have different advantages and disadvantages. With the exception of learning and adapting to the use of classroom technology, lecture-recorded videos do not require as much extra work and professors only need to have the equipment set up and tested to make sure everything is running correctly while recording, However, in reality, technical issues often occur and support from IT staff becomes critical. Also, since lecture-recorded videos include student questions, it is generally difficult to follow the planned time for a specific chapter; for this reason, recordings may go much longer than expected.

Non-lecture recorded videos, on the other hand, requires much more work than lecture-recorded videos. It may be necessary to record several times for a specific video due to mistakes, or to become proficient in "patching", where possible. However, once videos are initially created, it is easy to edit and upload them to the learning management system and share them with students. The instructor is also able to control the flow of the teaching materials when recording and have consistently good sound quality. Table 1 provides a side-by-side comparison.

Student Feedback

Descriptive Statistics

Students completed a survey at the end of each course. The survey contained questions regarding both lecture-recorded videos and non-lecture-recorded videos. Enrollments in the undergraduate tax courses were 13, 14, and 20 in 2017, 2018, and 2019, respectively. Of the total enrollment of 47 students, 44 students completed the survey, resulting in a completion rate of 93.6%. Enrollments in the graduate tax courses were 12, 12, and 16 in 2017, 2018, and 2019, respectively. Of the total enrollment of 40 students, 39 students completed the surveys, for a completion rate of 97.5%. Table 2 shows the survey questions and responses relative to videos.

As shown in Table 2, both types of videos met with favorable responses overall. Nearly 89% of students in ACC 420 (undergraduate tax) agreed or strongly agreed that Mediasite (lecture-recorded) videos were helpful to their learning experience. That percentage increases to 100% for Kaltura (non-lecture recorded) videos. The majority of ACC 550 students (graduate tax) also rated Mediasite favorably, although 38.5% were noncommittal in their impressions. On the other hand, similar to the undergraduate students, graduate students were unanimous in their positive views of Kaltura. In short, both undergraduate and graduate students rated both video types favorably, but showed a marked preference for Kaltura.

Table 3 shows the student-reported number of hours spent viewing videos, and Table 4 shows responses to the direct question of which video type students prefer**.** As shown in Table 3, on average, undergraduate and graduate students spend only 1.0 hour and 0.7 hour, respectively, watching each chapter of Mediasite videos. In contrast, undergraduate and graduate students spend 1.9 hours and 2.1 hour, respectively, watching Kaltura videos. Table 4 shows that more than 60 percent of undergraduate students prefer Kaltura to Mediasite and the number increases to almost 90 percent for graduate students. In other words, although Mediasite videos are longer than Kaltura videos (Table 1), students actually spend less time watching Mediasite videos than Kaltura videos.

Student Comments

Table 5 shows student comments about both types of videos made available to them. Their comments largely support the previous suggestions in that both video types received some positive feedback. Positive comments about Mediasite tend to center around such benefits as hearing and seeing the instructor answer questions from other students and making them feel more like they were in a class. Also gleaned from the comments is that sometimes the student viewing the video does not hear the questions clearly, which seems to cause the lecture-recorded video to be –rated somewhat lower. Consistent with the previously reported results, there appear to be more favorable comments about Kaltura.

Conclusions and Discussion

The results of this study indicate that students found both types of video lectures useful and informative. Mediasite and others, such as Zoom, can be used to record live lectures and provide perceived ‘social presence’ due to interaction in the classroom. Studies have generally found social presence to have a positive effect on learning outcomes (Delfino & Manca, 2007; Zhao, Sullivan & Mellenius, 2014). However, many students – in particular, graduate students – preferred Kaltura videos over Mediasite videos as indicated by their comments. In general, one of the best features of lecture-recorded videos is the ability to benefit from other students’ questions. However, student interaction increases the length of each video, is sometimes difficult to hear, is distracting, and breaks the flow of a lecture. Kaltura, in contrast, offers succinct and organized videos for students. Graduate students, in particular, appreciated the short and to-the-point videos using Kaltura.

It is important to note that, although this study provides a comparison of two specific technological resources, others are available. For instance, Camtasia and Studio also offer non-lecture recorded video technologies. Many of the general advantages and disadvantages (e.g., student questions, editing and storage issues, microphone issues) can be

extrapolated across other programs that we have experienced, either lecture- or non-lecture recorded videos. All of these resources will likely continue to evolve and improve, and there is seemingly no perfect solution for all. Costs may vary widely depending on such factors as the size of the institution, the number of professors/students adopting the technology, and increasing budgetary strains already present before COVID-19 make it necessary to weigh the costs against the incremental benefits.

The study provides implications for the design of courses that use online course delivery. Student engagement is very critical to learning effectiveness (Bryant, Kahle, Schafer, 2005). The integration of video-based lectures into online courses can potentially reduce the perceived "distance" and enhance students' motivation for deeper learning of complex and challenging concepts and practices. As suggested in the aforementioned *Business Week* article, even traditional face-to-face students in a post-COVID environment may expect videos as a supplemental resource. However, as noted, some have found that attendance and participation decline with the availability of these tools, possibly contributing to a decline in performance.

Some programs, such as Top Hat, provide a way to "force" participation by allowing the instructor to easily insert unannounced questions into a presentation, whether in-class or in a synchronous Zoom session. Recently, Top Hat also adapted their "virtual classroom" feature such that recordings can be made without Zoom. Students can use either a laptop or a smartphone to respond, and the program will automatically assign points for participation and correctness based on the instructor's preset points for a question. The question format can easily be varied between multiple-choice, true/false, and word/discussion types. Those who do not participate simply miss the points, or the instructor can easily go in and adjust participation points if considered appropriate based on the student's reasoning for missing.

Limitations and Implications for Future Research

Although the survey results provide timely insights regarding students' preferences between video types for online accounting courses, there are some caveats that we would like to mention. First, this study was conducted by one professor teaching two specific courses, so the results may be affected by the teaching styles and preparations of this professor. While the results may differ when other professors teach other courses, the presence of the same instructor for all courses and holding the materials constant to the extent possible arguably provide controls and allow more meaningful comparisons for purposes of this study. Second, neither Mediasite nor Kaltura allows the instructor to accurately measure how long each student watches each video. Therefore, video viewing time is self-reported by students. Third, this study does not have numerical indicators such as exam scores that differentiate the effectiveness of both types of videos, or the incremental benefit of either type over no video. To do so, the instructor would need to have a control and treatment groups or offer one type of video to students in one semester and the other type to students in another semester.

Despite these limitations, the results of this study have implications for the design of online courses and possibly even post-COVID in-class courses. Chen, Jones and Moreland (2013) found that course level could have an effect on learning outcomes in online classes. Future research might be conducted in comparing the impact of video-based lectures on learning outcomes of advanced level versus lower division courses in an online learning environment. Further, extant studies have examined the association between students' styles of learning and learning outcomes (Chen, Jones and Xu 2018; Felder and Silverman 1988; Sandman 2014). Future studies could examine whether students' styles of learning affect video preferences.

References

Benhamou, M. and McIntyre, A. (2020). A Sudden Jolt for MBA Students. *Bloomberg Businessweek*, (September 21), 41-42.

Bosshardt, W., & Chiang, E. (2016). Lecture capture learning: Do students perform better compared to faced-to-face classes? *Southern Economic Journal*, *82*(3), 1021–1038.

Bryant, S., Kahle, J., & Schafer, B. (2005). Distance education: A review of the contemporary literature. *Issues in Accounting Education, 20*(3), 255–272.

Farley, A., Jain, A., & Thomson, D. (2011). Blended learning in Finance: Comparing student perceptions of lectures, tutorials and online learning environments across different year level. *The Economic Society of Australia*, *30*(1), 99–108.

Chen, C., & Jones, K. (2007). Blended learning vs. traditional classroom settings: Analyzing students' satisfaction with inputs and learning processes in an MBA accounting course". *Advances in Accounting Education*, *8*, 25–37.

Chen, C., & Jones, K. (2008). Blended learning in a graduate accounting course: Student satisfaction and course design issues. *The Accounting Educators' Journal, 18*, 15–27.

Chen, C., Jones, K., & Moreland, K. (2010). Distance education in a cost accounting course: Instruction, interaction, and multiple measures of learning outcomes. *The Journal of Educators Online, 7*(2): 1–20.

Chen, C., Jones, K., & Moreland, K. (2013). Online accounting education versus in-class delivery: Does course level matter? *Issues in Accounting Education*, *28*(1): 1–16.

Chen, C., Jones, K., & Moreland, K. (2017). How online learning compares to the traditional classroom: Measuring accounting courses outcomes. *The CPA Journal*, *87*(9): 44–47.

Chen, C., Jones, K., & Xu, X. (2018). The association between students' style of learning preferences, social presence, collaborative learning and learning outcomes". *Journal of Educators Online*, *15*(1).

Chiu, V., Gershberg, T., Sannella, A., & Vasarhelyi, M. (2014). Does a live instructor matter? *Journal of Emerging Technologies in Accounting*, *11*, 1–25.

Day, J., Foley, J., Groenweg, R., & van der Mast, C. (2005). Enhancing the classroom learning experience with web lectures.https://smartech.gatech.edu/bitstream/handle/1853/65/04-18.pdf;jsessionid=B384295625263A744D5C878DCE4610D7.smart2?sequence=1

Day, J. (2008). Investigating learning with web lectures. http://hdl.handle.net/1853/22627

Dendir, S. (2016). An online premium? Characteristics and performance of online versus face-to-face students in Principles of Microeconomics. *Journal of Education for Business*, *92*(2), 59–68.

Delfino, M., & Manca, S. (2007). The expression of social presence through the use of figurative language in a web-based learning environment. *Computers in Human Behavior, 23*, 2190–2211.

Dolon, D.S.L., Prodanov, V.I., and Taufik, T. (2012). Student perception of lecture video Use as a means to increase time for in class problem solving applications. *Working paper*.

Drouin, M. (2014). If you record it, some won't come: using lecture capture in introductory psychology. *Teaching of Psychology*, *41*(1). 11–19.

Felder, R., & Silverman, L. (1988). Accommodating individual differences in the design of online learning environments: A comparative study. Learning and teaching styles in engineering education. *Engineering Education, 78*(7), 674–681.

Filius, R., & Lam, I. (2009). Rapport evaluatie weblectures. Universiteit Utrecht. https://www.researchgate.net/publication/42318881_Rapport_evaluatie_weblectures_Universiteit_Utrecht.

Filius, R., & Lam, I. (2010). Ervaringen met weblectures. *OnderwijsInnovatie, 12*(1), 30–34.

Guo P. J., Kim J, & Robin, R. L. (2014). How video production affects student engagement: an empirical study of MOOC videos? *L@S '14: Proceedings of the first ACM conference on Learning @ scale conference*, *2014*(March), 41–50. https://doi.org/10.1145/2556325.2566239

Inman, J., & Myers, S. (2018). Now streaming: Strategies that improve video lectures. *IDEA Paper* #68, March 2018.

Lento, C. (2017). Incorporating white board voice-over video technology into the accounting curriculum. *Issues in Accounting Education*, *32*(3), 153–168.

Newton, G., Tucker, T., Dawson, J., & Currie, E. (2014). Use of lecture capture in higher education - lessons from the trenches. *TechTrends*, *58*(2), 32–45.

Parker, J., & Cunningham, B. (1998). Using an electronic tutorial to enhance students' knowledge of advanced tax accounting. *Issues in Accounting Education*, *13*(2), 395–407.

Sandman, T. (2014). A preliminary investigation into the adaptive learning styles of business students. *Decision Sciences Journal of Innovative Education, 12*(1), 33–54.

Risko, E. F., Anderson, N., Sarwal, A, Engelhardt, M., & Kingston, A. (2012) Everyday attention: Variation in mind wandering and memory in a lecture. *Applied Cognitive Psychology*, *26*(2**)**, 234–242.

Slemmons, K., Anyanwu, K., Hames, J., Grabski, D., Mlsna, J., Simkins, E., & Cook, P. (2018). The impact of video length on learning in a middle-Level flipped science setting: Implications for diversity inclusion. *Journal of Science Education and Technology***,** *27*, 469–479.

Sloan, T., & Lewis, D. (2014). Lecture capture technology and student performance in an operations management courses. *Decision Sciences Journal of Innovative Education*, *12*(4), 339–355.

Solomon, C. (2020). The Upside of Online Learning. *Bloomberg Businessweek* (September 21), 43.

Staples, J., Chandler, C., & Lowe, S. (2018). Accounting student perceptions of tablet technology for academic success. *Journal of Business and Accounting, 11*(1), 127–139.

Sangster, A., Stoner, G., & Flood, B. (2020). Insight into accounting education in a Covid-19 world. Accounting Education, *20*(5), 431–562.

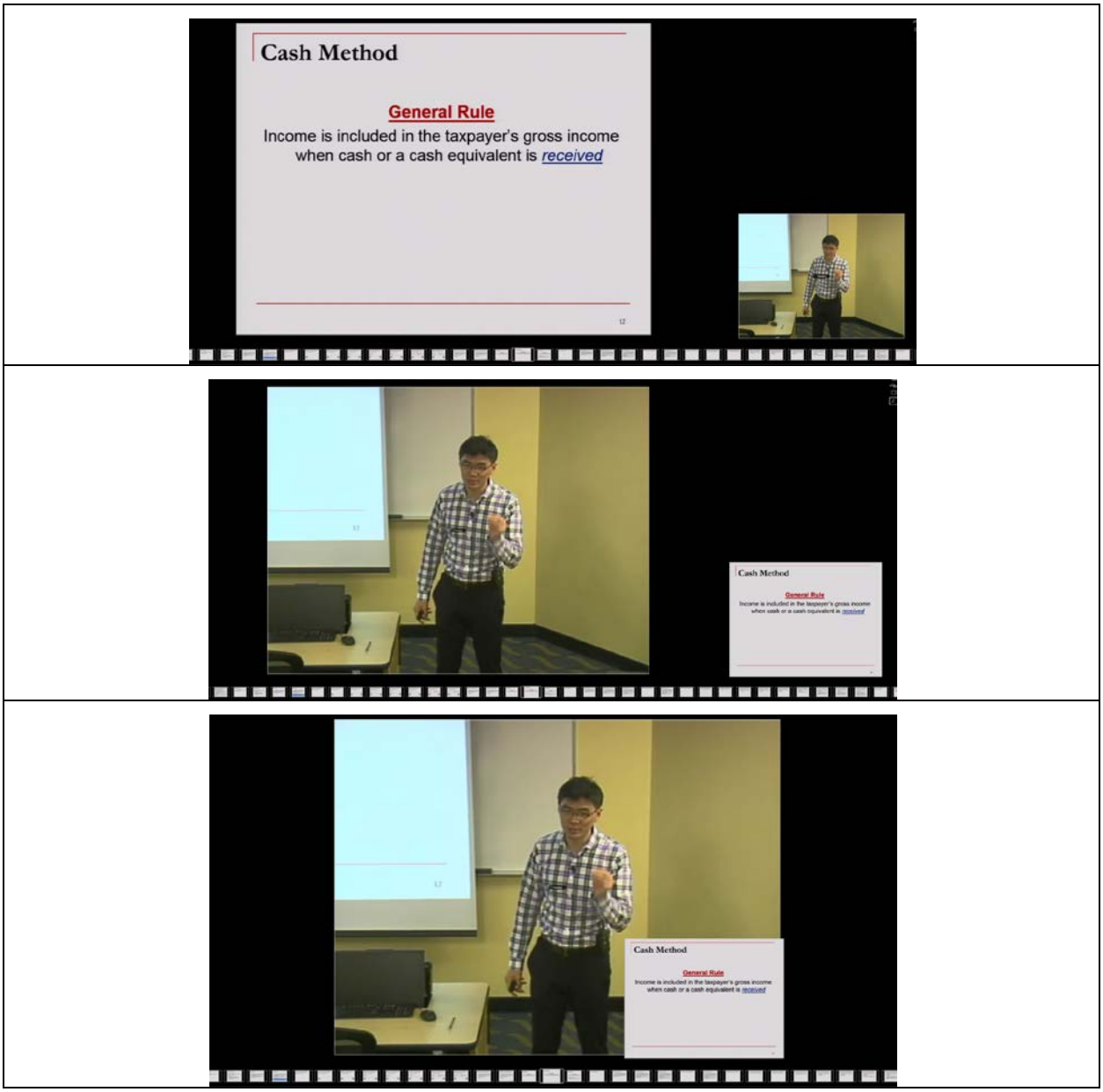
U.S. Department of Education (2015). Demographic and enrollment statistics of nontraditional undergraduates: 2011–2012. https://nces.ed.gov/pubs2015/2015025.pdf

Wang, J., & Antonenko, P.D. (2017). Instructor presence in instructional video: Effects on visual attention, recall, and perceived learning. *Computers in Human Behavior*, *71*, 79–89.

Wen, L. (2016). Integrate video-based lectures into online intermediate accounting II course learning. *Business Education Innovation Journal*, *8*(2), 104–109.

Zhao, H., Sullivan, J., & Mellenius, I. (2014). Participation, interaction and social presence: An exploratory study of collaboration in online peer review groups. *British Journal of Educational Technology*, *45*(5), 807–819.

Figure 1: Examples of Mediasite Student Interface



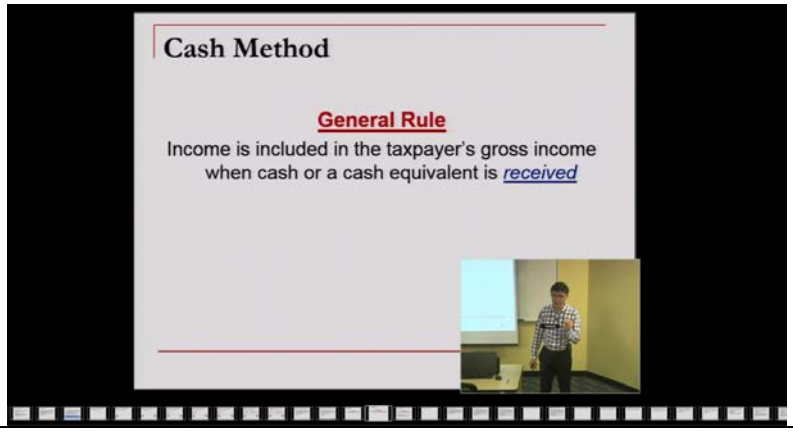
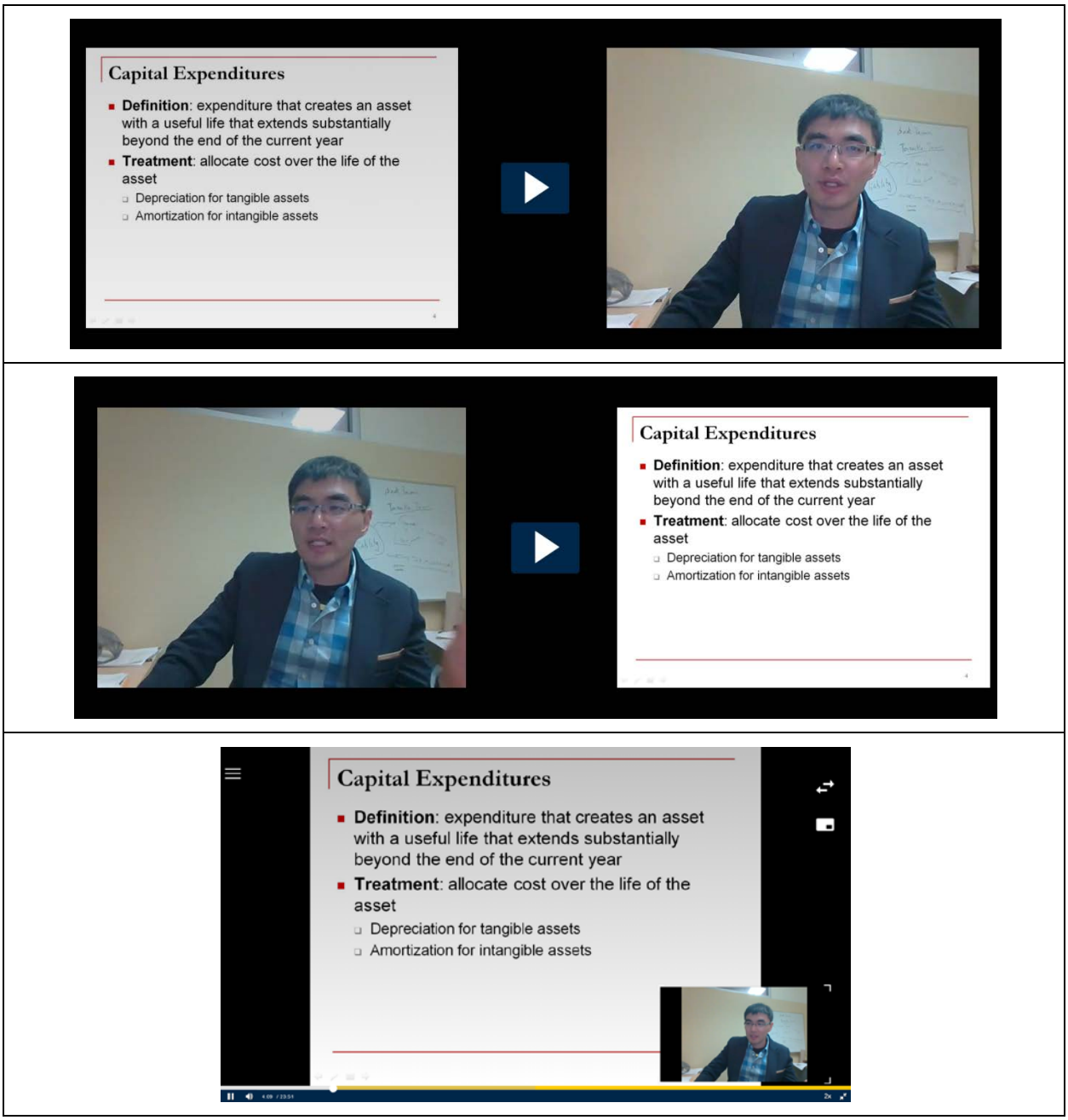

Cash Method
General Rule
Income is included in the taxpayer's gross income when cash or a cash equivalent is received

Figure 2: Examples of Kaltura Student Interface



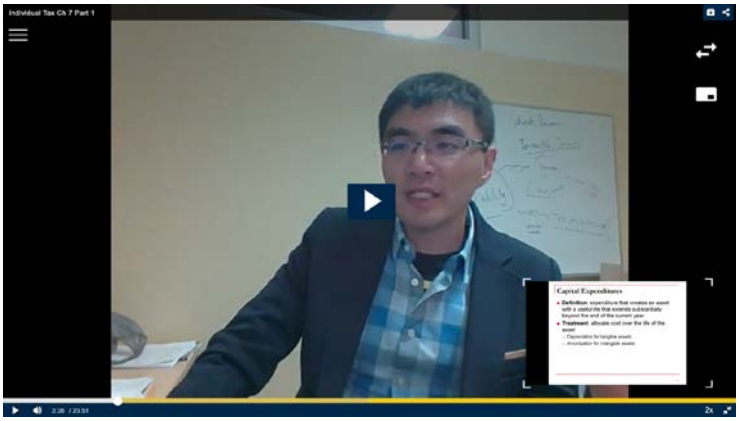

Individual Tax Ch 7 Part 1
Capital Expenditures
2x

Table 1. Lecture-Recorded vs. Non-Lecture-Recorded Videos

	Lecture-Recorded Videos	**Non-Lecture-Recorded Videos**
Software	Mediasite	Kaltura
Total length of videos	About 22 hours	About 13 hours
Average length per video	45 minutes	15 minutes
Equipment requirement	High	Low
Ease of recording	Low	High
Ease of editing	Low	High
Ease of storing	Low	High
Extra time needed to prepare videos	Low	High
Ease of update	Low	High
Student interaction	Yes	No
Frequency of technical issues	High	Low
Sound quality	Medium	High
Video quality	Depends on technology	High
Student interface may include both PPT slides and the professor	Yes	Yes
Captioning capability	Yes, with limited accuracy	Yes, with limited accuracy
Classroom needed	Yes	No
Cost	Relatively higher	Relatively lower
Smoothness and continuity	Less	More
Likelihood of microphone issues	High; limited battery life concerns about location	Less likely once set up correctly

Table 2. Student Responses Relative to Videos in Undergraduate and Graduate Courses

	Strongly agree	**Agree**	**Neither agree nor disagree**	**Disagree**	**Strongly disagree**
Mediasite lecture videos are helpful for your learning					
ACC 420	40.90%	47.70%	11.40%	0.00%	0.00%
ACC 550	25.60%	35.90%	38.50%	0.00%	0.00%
Kaltura lecture videos are helpful for your learning					
ACC 420	75.00%	25.00%	0.00%	0.00%	0.00%
ACC 550	89.70%	10.30%	0.00%	0.00%	0.00%

Table 3. Relative Time Students Spent on Videos

	0-1	1-2	2-3	3-4	4-5	Average
Average hours watching Mediasite lecture videos for each chapter						
ACC 420	59.10%	34.10%	6.80%	0.00%	0.00%	1
ACC 550	79.50%	20.50%	0.00%	0.00%	0.00%	0.7
Average hours watching Kaltura lecture videos for each chapter						
ACC 420	25.00%	29.50%	29.50%	11.40%	4.50%	1.9
ACC 550	15.40%	30.80%	33.30%	17.90%	2.60%	2.1

Table 4. Preferences for Video Types

Do you prefer Mediasite or Kaltura?	**Mediasite**	**Kaltura**
ACC 420	38.60%	61.40%
ACC 550	10.30%	89.70%

Table 5. Student Comments about Mediasite and Kaltura

Undergraduate Students:
• The Mediasite video format was easier to navigate accurately, if looking for a specific slide, although Kaltura felt like it had a smoother and more user friendly interface. • The feel of the Mediasite video made me feel like I was in the class but the Kaltura was nice because I could go through the videos faster and the fact that I could go to each one instead of having to find it in the other video • I liked Kaltura better because the order and video break down seemed far easier to follow. • I definitely liked Kaltura because I was able to use lip reading to understand the lecture better. Since I can't hear very well I use closed captioning or lip reading. • I like Mediasite. I felt more like you were in the class. The only complaint was hard to hear students' questions. • I like using the Kaltura better. I just found it easier to use. • I liked both forums. Mediasite was good when you wanted to sit down and get the whole thing done, but if you didn't have time to complete the whole lecture practice in one sitting the Kaltura allowed an easier way to break down the process. Both were effective in the process though. I liked being able to see the PowerPoint clear on the screen as well as hearing comments that students had within the professor that Mediasite allowed. • Personally, I feel like the Mediasite would offer the students to learn from FAQ's if the students asked any questions during the time the lecture was recorded. Kaltura seems like it would be more personal and the professor has control over what material to focus on during the lecture. I don't have a preference between the two, but I would much rather prefer any type of lecture video over simply being instructed to read the chapter and try to sift through the notes provided. • I'd rather watch the Kaltura videos, as opposed to watching a recording. Having the option between one and the other might be nice. • I like Kaltura videos, but I run into issues with playing them through blackboard. The videos freeze or glitch. If I pause for too long (e.g. pausing to complete a practice problem) I have to close and reload the video, which is extremely annoying. • Kaltura has a better flow and is more organized, at first I didn't like it but it is much better than the Mediasite
Graduate Students
• I preferred the Kaltura. • I prefer Kaltura because I didn't have to go out to a separate website. • Both are great - it's about the information and professor exposure, not necessarily about the format. If I had to choose - the Kaltura, but I would say that whichever is easiest for you is best. • Kaltura is more to the point and a better overall tool for learning. • They were both the same for me. • Mediasite seemed too disorganized. The PowerPoint slides at the bottom were very distracting. Kaltura is very easy to use and simple. • I like the Kaltura videos, although it took me a while to figure out how to get my computer to play them. They are nice because there are no distractions of students, although some of the videos on Mediasite were not too bad. • I like the Kaltura. If just video of actual lectures would be more distracting (class interruptions, other student questions). Between lectures and assignments, the topics were covered. • I prefer Kaltura. I like that the instructor is speaking directly to you in the Kaltura rather than to a large group in the Mediasite. The Mediasite is nice however for listening into student questions or concerns

about material as the instructor typically answers them. But the short and sweet instruction of the Kaltura method is what I'd prefer.

- I feel as though Mediasite can be distractive to the viewer, and can make the lecture video take longer. Also, it was difficult to hear the question being asked by a student at the time of recording, so I didn't understand what the instructor was addressing when they answered. With the Kaltura, it is only the instructor, and any important side notes can be given throughout the lecture without the interruption of other students. I find that the Kaltura software, when compared to the Mediasite software, is the most beneficial to my learning.
- I really like the instructor explaining of the lectures verses having it be an actual lecture. Actual lecture recordings are much harder for me to understand than the professor just talking.
- Since the course does not include residency sessions, the Mediasite videos are more helpful. Sometimes, the questions students asked in class helped to enhance my understanding of the material. Not having the professor available to ask questions regarding certain principles can be a hardship when the videos do not include student interaction and/or when I need more details that are not answered in the videos.