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To Be Here or Not to Be Here, That is the Question. Use of recorded lectures in healthcare education: A review

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Abstract

The use of recorded lectures in the health professions classroom is on the rise in recent years. It is important for educators to know why students are watching, which students are watching, and when students are watching these lectures. In addition, does the use of recorded lectures affect student performance on assessments or attendance of live content? This review is intended to shed light on these questions with the intent to help faculty tailor their pedagogy and for academic programs to modify their curricula to the students of today.

Keywords: *recorded lectures, live lectures, health professions, perceptions*

Introduction

The classrooms that students are part of today look vastly different from the typical classroom of years past. As the classroom has changed from “chalk talks” to slides and overhead projectors to the use of PowerPoint and most recently recording lectures for off-site viewing, lecture styles have evolved to meet the changes seen in the classroom. In the landscape of modern education, students now face a choice between attending live lectures or seeking alternative methods of learning. This paper is a review of the use of recorded lectures in healthcare education. This potentially controversial topic has become relevant at many institutions in the past decade but especially because of the required modifications to pedagogy during the COVID-19 pandemic.

Why are students using recorded lectures?

Live lectures have served as the cornerstone of traditional education and they offer the advantages of an interactive learning environment, a structured approach and networking opportunities for students. Despite the benefits, there are many reasons a student would prefer to view a recorded lecture. Some reasons are as straightforward as not liking a faculty’s lecture style, or the subject being presented.[1] Other reasons can be more complicated such as weighing the time spent in a live lecture to using that time to study for other exams. Some students even view the time spent traveling to class as wasted time and inconvenient.[2]

Online resources and digital learning platforms have made it possible for students to access lecture material remotely. Hussain et al. found that of 103 medical students surveyed, 78% of the them used the recordings when they missed class due to illness or another school related activity such as shadowing a clinical preceptor.[3] Topale reports that of 281 medical student respondents, 58.7% of surveyed students

indicated missing class necessitated the use of recorded lectures.[4] Interestingly, Emahiser et al. surveyed 145 medical students and found more first-year medical students admitted to skipping class to study for another class's exam than second-year students even though more first-year students would attend mandatory classes.[1]

Virtual alternatives offer the ability to tailor the learning experience to individual preferences. A survey by Topale et al. indicated students use recordings because it gives them flexibility to view or review content at their own pace and allows them to use other resources at the same time when viewing the recordings. Of the students surveyed, 55.9% use the recordings to clarify material after attending the lecture and 43.8% would use recordings to clarify material before an assessment. These same students also indicate that the recordings can lead to too much wasted time, and they can be frustrating since the recordings can be incomplete and not always reliable.[4] Hussain et al. found that not only are students using the recordings to relearn difficult material, but they are also using them to rewrite class notes.[3]

Physically attending lectures can provide valuable networking opportunities to form connections with peers and faculty members. The vast majority of the 101 medical students surveyed in a study by Eisen et al. indicated that the social expectation of attending live lectures was their main motivational reason. This is interesting because they also found that less than one-third of the students preferred recorded lectures. Some students did indicate that the presence of recorded materials was one of the reasons for not attending live lectures.[2]

Balancing the demands of rigorous coursework and personal commitments often leaves students with limited time. Analysis of student perceptions on the use of recorded lectures often indicates that students think the recorded lecture can increase their "efficiency." Students like to increase the playback speed, stop the lecture to record notes, or search other resources to clarify information presented in the recording. Students were able to stay more focused on the material and could learn more according to a study of 204 medical students by Cardall et al.[5]

The COVID-19 pandemic forced a change in pedagogy and the result was an unplanned increase in data that allowed researchers to compare 'the why, the which and the when' students used online learning. Dost et al. compared the use and reasoning of 2721 students who used online learning before and after this change. Flexibility was indicated as the greatest advantage, but the presence of family distractions and internet connection issues were the largest barriers.[6] These student perceptions are echoed elsewhere.[1,7,8]

Students often express the ability to modify the playback speed as one of the main reasons they prefer using recorded lectures. However, a change in the playback speed could affect the students' ability to comprehend the material being presented. Song et al. compared scores of a written assignment of two groups (54 total students) who watched a recording lecture on ultrasonography artifacts. The group who watched the recording at 1.5X speed had significantly lower scores than the group who watched the recording at normal speed.[9]

Which students are using recorded lectures?

A student's performance level might be one indicator about who is using recorded lectures. Arain et al. found that one-third of the 209 medical students they polled were satisfied with using online learning methods, but fewer higher-performing students indicated that was the method they preferred.[10] A similar trend has been observed in optometric education. Not only do higher-performing students spend less time watching recorded lectures than the lower-performing students, but a poll found that the higher-performing students preferred to learn via live lectures rather than the recordings. Lower-performing students on the other hand preferred the recorded lectures over the live lectures.[7]

Gupta and Saks surveyed 213 medical students and found that first-year medical students will attend more live lectures than second-year medical students despite both groups having an equal number of views of the recorded lectures.[11] This would suggest that some second-year students decided that the recorded lectures were as effective as live lectures at conveying the presented material. Gupta and Saks also found that more female students attended the live lectures and thus used the recordings less.[11] Barco et al. found the opposite in that males used lecture recordings less than females but when the males did view lectures, they spent more time watching them.[12]

Professional students have diverse learning styles. We know that students will use recordings in place of attending class, but do students also use recordings to supplement what they learned in class? Daud et al. found that 80% of dental (n = 202) and medical students (n = 680) will use the recordings even if they went to class.[13] Azab et al. on the other hand found that dental students who regularly attend class are less likely to watch recorded lectures.[14] Recorded lectures offer the ability to tailor the learning experience to individual preferences. Lovell and Plantegenest surveyed 351 first-year and second-year students at a medical school in the US. Almost 80% of the first-year students and a little more than half of the second-year students used the recordings in addition to attending the live lecture.[15]

Differences in viewership observed might also be the result of the subject being taught as suggested by Barco et al. who surveyed first-year US medical students. They found that about 66% of the students in Cell Biology/Histology and Physiology courses viewed lecture recordings. Of the 66% of students who viewed lecture recordings, almost half of them were low frequency viewers. A Neuroscience course in the same curriculum had an 82% viewership with only 35% of the students classified as low frequency viewers.[12] A survey of 222 students by Danielson et al., however, found that the subject did not influence the veterinary students' decisions to use recorded lectures. The researchers did note that students who used recordings in basic science courses scored better on assessments than students who did not use the recordings. This difference in assessment scores was not observed in non-basic science courses.[25]

When do students watch recorded lectures?

Would it be beneficial to give students assigned times to watch recorded lectures? A study of 80 dental students by Jackson et al. would suggest that students do not use that allotted time for viewing recorded lectures. The dental students were given four lectures as recordings and had time set-aside in the academic schedule for the students to watch the recordings. They found that no student watched more than 30% of the recordings during the allotted time. Most students watched less than 20% of the recordings during the designated viewing time.[16]

If students do not use time that has been set aside for them to review recordings, then when do they watch them? Jackson et al. saw a significant increase in the number of views right before an assessment as compared to several days before that exam.[16] A medical school survey conducted by Topale revealed that 29.2% of students did not or rarely use the recordings while only 5.7% would use the recordings just before an assessment. This same study indicated the frequency of use with 39.1% using the recordings more than 3 times a week and 26% using the recordings once or twice a week.[4] A curious result by McAndrew et al. found that 80% of the 94 dental student respondents they surveyed indicated that they have more productive studying in the morning, but most indicated they did their studying in the evening or at night.[17]

Faculty concerns for the use of recorded lectures

The student perception of the availability of a recorded lecture is for the most part a positive one, but many faculty have several concerns. Some faculty feel that the cost of implementing and then maintaining the recording system is too costly for some institutions and that the presence of the recordings "adversely affects the morale of educators".[18] Kwiatowski and Demirbilek identified four

reasons that faculty resist recording their lectures despite students demanding them to be recorded:

- the recording is incompatible to their pedagogy
- the faculty have technical concerns
- the faculty are unaware of how to use the technology or that it was an option to use
- concern for a reduction in class attendance[19]

Other studies also suggest faculty are hesitant to record their lectures for fear of the reduction in class attendance.[18] These observations lead to two related questions: does the availability of recorded lectures reduce class attendance and does a reduction in class attendance or increase in recording views result in a reduction in class performance?

Many studies have been performed to answer the question of whether access to recorded lectures diminishes attendance during the live lecture. The results of these studies are so varied that it is hard to come to a consensus. These studies are also from many different disciplines and years of study. For example, medical schools located in the US[20,21], medical schools located in other countries[22] and dental schools[14] show no significant difference in attendance when lectures are recorded or only available live. Bollmeier et al. had 72% of their 122 surveyed pharmacy students indicate that the presence of online material did not influence their decision to attend the live lecture.[20]

Other studies have reported significant differences in attendance when recorded lectures are available. Kauffman et al. found that in a second-year medical pathophysiology course, only 25% of the 48 students who completed the survey would attend a live lecture and 33% did not attend any lectures.[23] A recent study of medical students gives us some insight into the change in class participation. Topale found that 88.3% of students surveyed indicated that they would regularly attend class prior to matriculation into medical school, but once in medical school, that number drops to 68.3%.[4]

Student reactions to the ability of recorded lectures to substitute for live lectures are also varied. A study of medical and dental students in the United Kingdom indicated that 66% and 76% respectively thought that live traditional lectures should not be mandatory because the recorded lectures were adequate.[13]

Reports on the effects of recorded lectures on performance also vary, but some of the differences could be the result of student perceptions. Orellano and Carcamo compared the results of 25 medical students' comprehension of material present both as recorded and face-to-face lectures via pre- and post-tests. They found no difference in knowledge gained between the different delivery methods.[36] The lack of performance differences between students who watch recordings and those who attended live lectures observed by Orellano and Carcamo has also been recognized by others.[12,20,24-30] McHulty et al. on the other hand did find a relationship between students who used more recordings resulting in poorer performance.[31] This results in a chicken vs egg scenario: do poorer performing students need to use more recordings or does use of more recordings lead to a poorer performance?

Of note, students who used a mixed method of live and lecture capture recordings had worse academic outcomes than students who strictly used live or recorded lectures. Zureick et al. report no difference in performance between the live only lecture and recording only groups of 439 medical students surveyed. One possible explanation that the researchers allude to is that the students using the mixed strategy might be less focused because of social media use, interruptions in watching the recordings and feeling sleepy.[32] As Jackson et al. discovered, it does not matter if the students were given scheduled time to view recording lectures. There was no significant association between accessing lectures during an allotted time and course performance.[16]

Others have observed statistically significant differences between groups of students who use recorded lectures and those that do not. Demir et al. found that 235 students that were taking a second-year

medical physiology course did score significantly better on questions from lectures they attended as compared to questions from lectures they viewed as recordings. They went on to point out that this increase in score was present not only for students who were taking the course for the first time but also for students who were repeating.[33] Kaufmann et al., however, saw a better performance from students who did not attend the live lecture. They did point out that most of the students who did not attend had higher MCAT scores and GPAs than the group who did attend the lecture, so this group may be a stronger cohort of students.[23]

What about students who have access to the live lecture that was also lecture captured for viewing later by the student? Baillie et al. compared student performance between two cohorts of students in which one received a live lecture (n = 414) that was also lecture captured and another cohort in which the lecture was only available live (n = 433). They found that students that had access to the lecture capture material showed a decline in performance on exams and the overall final grade in the course. It should be noted that the presence of the lecture capture did not influence student attendance at the live sessions.[34] This could possibly suggest that some students view the lecture capture as a safety net and might not remain as focused during the live lecture.

Interactive virtual platforms can facilitate real-time engagement during a recorded lecture. One possible technique for faculty to use with recorded lectures is to include polling questions embedded within the recording. Vuk et al. found that giving pre-clinical medical students self-paced polling questions during a recorded lecture increased student comprehension of the material and improved exam scores.[35] As with many aspects of recorded lectures discussed in this review, others have observed no difference in student outcomes if inserted questions are present or absent.[36]

Discussion

The landscape of higher education has witnessed a significant shift with the widespread adoption of recorded lectures in healthcare education. This transition, largely accelerated by the COVID-19 pandemic, technological advancements and the demands of a modern, flexible learning environment, has sparked a debate among students, educators and policymakers alike.

The obvious benefits of recorded lectures offer students greater flexibility and the freedom to access course content at their own pace, accommodating diverse learning styles and individual schedules. The unique responsibilities of a graduate student in a healthcare program, including personal and professional obligations, benefit significantly from the flexibility that recorded lectures provide. Accessibility, decreased travel time, and faster playback speeds allow students to manage and utilize their time at their discretion including course prioritization and possible illness.

The convenience of recorded lectures allows students to revisit recorded material to reinforce their understanding of complex topics, contributing to enhanced retention and comprehension. Having the live lecture recorded for review can supplement the knowledge acquired in the initial live attendance. This reinforcement is invaluable for graduate students engaged in advanced coursework, where in-depth understanding is crucial for success. The recorded lecture also allows students to tailor their viewing to suit their time constraints, whether they have free mornings or evenings, and of course, before the assessment on the material.

Not attending live lectures, however, does have its drawbacks. Studies have shown that higher performing students prefer the live lecture environment; meeting their classmates, developing a relationship with their professors and the opportunity to ask questions about the presented material are lost in the secluded home environment. Graduate education often thrives on dynamic discussions and the asynchronous nature of recorded lectures may hinder the immediacy of student-teacher engagement.

The autonomy granted through the availability of recorded lectures leads to challenges in terms of student accountability. Some students may procrastinate or struggle to stay disciplined without the structure of traditional, live lecture despite asynchronous scheduling. Improper time management in conjunction with the uprising of social media generates unprecedented obstacles for this generation of health professional students.

Along with the uprising of social media, the heightened utilization of technology in education may result in connectivity, software or hardware issues potentially disrupting the learning experience. Many schools do not have adequate technical support and resources that are essential to ensure a reliable recorded lecture format. Striking a balance between flexibility and interactive engagement is key to maximizing the benefits of this educational approach. This ongoing discourse surrounding the role of recorded lectures in health professional education reflects a broader conversation about the future of learning and the adaptability of academic institutions in the digital age.

Conclusion

This review highlights some aspects of higher education that health profession educators might want to consider when designing or redesigning their courses. First, which instructional style should be used by the professor? Much of this can depend on the professor's style, course content or course structure. Second, whether the lecture is going to be a traditional live face-to-face or recorded for the student to view at any time and whether or not the use of live lecture capture is warranted? Many pros and cons exist for the affirmative use of recordings, but other studies suggest that lecture capture may have a negative effect on learning. Neither students nor instructors can agree. It is important to think about how the students learn. Students often prefer one style but might learn better with another. In addition, no two students are exactly alike in their learning styles. We recommend offering live lectures that are livestreamed and lecture captured for later viewing. As discussed above, this does run into the risk of students not attending class, students not keeping up with the lecture material, or students sacrificing performance in one class for another. However, we feel live lectures with live streaming and lecture capture gives the most options to students. We would still highly encourage students to attend the live lecture since some research indicates this results in fewer distractions to the student and better overall performance in the course. In fact, some faculty in our program will administer low-stakes in-class quizzes to encourage students to attend lectures. If a recorded lecture is the only option for course content delivery, we recommend implementing self-paced quizzes that students would use while watching the recorded lecture. This would ensure they stay on track and perhaps motivate them to not only watch the lecture but also stay engaged in the lecture content.

As most educators are aware, it can be very difficult to change the mindset of a student, especially on topics of study habits and lecture attendance. Simply stating recommendations to the students on lecture attendance is not enough. Optometry programs should dedicate time during orientation activities to highlight research results showing the benefits of attending live lectures. Programs can also use this opportunity to indicate how recorded lectures should be used as an additional learning tool or making up a missed lecture because of illness and not as a primary source for collecting information.

For recorded lectures to have any benefit to the pedagogy of an optometric educator, the educator needs to have as much support as possible with these new and emerging technologies. Universities and programs need to provide the necessary internet access and bandwidth to allow for live streaming and the recording of lectures. In addition, the school needs to be willing to invest in the newest technologies, which could enhance the learning experience. If possible, these technologies should allow for control and monitoring of student utilization of recordings such as playback speed and provide options for self-paced polling questions during the lecture to help maintain student focus on the material. We also want to highlight that for this technology to be effective, students are required to have adequate computers, etc. themselves. Optometry schools should have minimum computer requirements with appropriate

hardware and software for students matriculated into their programs if they do not already have it. Faculty need to advocate for as much support as they can get since they can only give to the students as much as they are supported themselves.

Research and answers to these questions proposed above are only starting to emerge. As stated earlier, the COVID-19 pandemic and instructional style changes that had to occur for outside the classroom viewing resulted in a vast amount of comparative data to be collected. The examination of the topics mentioned above should be a priority within healthcare education so we can maximize the information our students will retain and thus make them better healthcare providers. To our knowledge, only one study in an optometry school has been published looking at student exam outcomes comparing information presented in live verses recorded lectures. This study looked at a basic science course. Would the same results of this study hold true for a course with optometry specific or clinically related content such as clinical skills? From the literature reviewed and discussed here, the takeaway message is that we have much to learn about how to best educate our health profession students.

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