

RESEARCH

Student and Faculty Member Perspectives on Lecture Capture in Pharmacy Education

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Objectives. To examine faculty members' and students' use and perceptions of lecture recordings in a previously implemented lecture-capture initiative.

Methods. Patterns of using lecture recordings were determined from software analytics, and surveys were conducted to determine awareness and usage, effect on attendance and other behaviors, and learning impact.

Results. Most students and faculty members were aware of and appreciated the recordings. Students' patterns of use changed as the novelty wore off. Students felt that the recordings enhanced their learning, improved their in-class engagement, and had little effect on their attendance. Faculty members saw little difference in students' grades or in-class engagement but noted increased absenteeism.

Conclusion. Students made appropriate use of recordings to support their learning, but faculty members generally did not make active educational use of the recordings. Further investigation is needed to understand the effects of lecture recordings on attendance. Professional development activities for both students and faculty members would help maximize the learning benefits of the recordings.

Keywords: educational technology, lecture capture, lecture recording, attendance

INTRODUCTION

The use of technology to support traditional face-to-face instruction in higher education is expanding, sometimes with limited understanding of the learning benefits. However, there is compelling evidence suggesting that a lecture-capture program can not only help students learn difficult concepts but also overcome obstacles of time, place, and space.¹⁻³ The literature also suggests that faculty members often hesitate to adopt lecture-capture technology for fear of decreasing attendance and in-class participation, committing intellectual property violations, and negatively impacting student learning.⁴

Sharing information outside the constraints of time and space is increasingly important for students. Tools that support asynchronous learning increase the opportunities for students to engage with the material while accommodating different learner preferences.^{5,6} Further, asynchronous learning affords what has been termed the *segmenting principle*, which suggests that the essential processing required to learn concepts decreases when

multimedia messages are presented in self-paced segments rather than as a continuous flow of information.⁷

When lectures are recorded and made available to students, a large majority still attend and prefer face-to-face lectures and use the recordings as supplementary learning materials for examination preparation.^{3,8-10} Between 20% and 40% of students view the recordings regularly and almost all students view them at some point. With the availability of lecture recordings, the expected decrease in attendance is between 10% and 20%.¹¹⁻¹³ The availability of recorded lectures, whether viewed or not, has a positive effect on student learning by allowing students to increase their focus and attention in the live lectures rather than concentrate on note-taking.^{11,14,15}

Students are better able to solve problems when they can self-pace and receive just-in-time support, especially if the concepts are more difficult and require higher-order skills. Students claim that recordings are just as effective as a live lecture, especially for materials that require increased focus on the content and instructions.¹⁶ Students express increased satisfaction and motivation when courses combine lecture recordings with face-to-face instruction.¹⁷⁻²⁰ Lecture capture allows students to navigate complex concepts at their own pace, enabling them to clarify confusions and increase their understanding of the material.^{2,3,10,21,22} While some studies have

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shown no significant correlation between lecture capture and student grades, others have shown that students scored higher on their final examination as a result of accessing lecture recordings, but their overall course grades did not significantly improve.^{9,17,23}

The Faculty of Pharmaceutical Sciences at the University of British Columbia (UBC) has a long history of technology innovation and usage to support and enhance student learning, and educational development in its entry-to-practice program.²⁴⁻²⁶ With the rapid expansion of various technologies to support face-to-face and asynchronous instruction, a few instructors have experimented with various recording programs to create podcasts of their lectures, which have been well-received by students. In the fall of 2010, faculty members, through its Office of Educational Support and Development, partnered with UBC IT/AV, the university's central information technology support unit, to initiate a project to record lectures in 1 classroom where most first-, second-, and third-year (P1, P2, and P3, respectively) courses in its 1 + 4 bachelor of science pharmacy degree program were scheduled. The recordings included both audio and visual components, specifically the instructor's voice recorded using a wireless microphone and any digital content projected to 1 of 2 screens in the room. The camera recordings of the instructors were removed based on both student and faculty member preferences. Faculty members could opt-in to the program, and course coordinators had to negotiate permission for recording with guest lectures. The entire capture process was automated, based on evidence that instructors prefer a lecture-capture mechanism that requires minimal preparation.²⁷ The recordings were typically withheld for a period of 72 hours to allow for editing, primarily to remove "dead air" and any copyrighted images that were permissible to show in class but not to record. Once the recordings were posted, students could access them through a password-protected learning management system. The recordings could be viewed but not downloaded.

This paper describes a research project to evaluate students' and faculty members' use and opinions of the recordings. Specific research questions included: (1) What are the patterns of students' usage of lecture recordings? and (2) What is the value of lecture recordings to students and faculty members?

METHODS

Most of the lectures in the required courses of P1 (3 of 5), P2 (9 of 13), and P3 (12 of 14) were recorded using MediaSite (Sonic Foundry Inc, Madison, WI). Data regarding student accesses to the recordings were obtained from MediaSite's analytics, including the number

of times each recording was accessed, the date and time of access, and the duration of viewing time. MediaSite collected no information that would uniquely identify a user, so it was not possible to determine individuals' patterns of use.

Survey instruments were used to determine users' perspectives on the recordings. Prior to beginning this portion of the study, approval was obtained from the university's research ethics board. Using findings from the literature as a guide, separate survey instruments were developed for students and faculty members with items related to awareness and use, learning impact, and effect on class attendance. The survey instruments also requested brief demographic details, including gender, age, and year level for students, and gender, years of teaching experience, and academic rank for faculty members. Only faculty members who participated in the lecture-capture program completed the entire survey instrument. Nonparticipants were automatically directed to the exit page after demographic data were collected. No personal information that would uniquely identify study participants was collected. No incentive for participation was offered to either the students or faculty members. Where possible, the 2 survey instruments contained parallel items to facilitate comparison of student and faculty perspectives. Both survey instruments permitted respondents who did not use the recordings to skip the questions that were not relevant to them.

Most questions were scored on a 5-point rating scale ranging from "strongly disagree" to "strongly agree," and in most cases, space for open-ended comments was provided. The student version was pilot-tested by 4 student volunteers who completed the online survey instrument and provided feedback on structure and wording. The student version was administered in the spring of 2011, and after analysis was completed, it was determined that it would be beneficial to compare student data with that of the participating faculty members in order to achieve a complete faculty member understanding regarding the impact of the lecture-capture program. The faculty version of the survey instrument was administered in the spring of 2012, with variables such as room location, technology capability, courses offered, and instructing faculty members remaining constant. The survey instruments were administered online using FluidSurveys (Chide.it, Inc, Ottawa, ON), and all P1, P2, and P3 students (n=449) and all faculty members (n=47) were invited to participate. After the initial invitations to participate were sent, the survey instruments remained open for 2 weeks, during which time 2 reminders to respond were sent.

Survey data were downloaded in both FluidSurvey's proprietary format and into a Microsoft Excel spreadsheet

for analysis. Responses on rating scales were quantified from 1 (strongly disagree) to 5 (strongly agree) in order to calculate the mean and standard deviation for each item. Missing responses were omitted from these calculations. Open-ended comments were analyzed to identify themes and data discrepancies, and to explain responses on rating scales. For example, the comments helped to determine whether participants interpreted the items as intended and provided a range of reasons for the ratings they assigned to a particular item.

RESULTS

Between October 2010 and April 2011, 308 lectures were recorded compared with 285 between September 2011 and April 2012. Statistics from MediaSite’s analytics for student accesses to the recordings are reported in Table 1. Recordings were viewed at all hours of the day and night. The recording with the largest viewing time was a tutorial on the use of library resources.

Completed survey instruments were received from 239 students, for an overall response rate of 53%. Based on distribution by gender (35% male, 65% female) and year level (36% P1, 36% P2, 29% P3), the respondents were representative of the student body. Most students (90%) were aware that the recordings were available, and 83% had viewed at least 1 recording. Most students (61%) reported viewing between 2 and 20 recordings, while 12% reported viewing over 30 recordings. Of those who viewed the recordings, 85% did so independently, whereas the remaining 15% viewed the recordings as part of a study group. There was general agreement that sufficient explanation and technical support had been provided, but students expressed frustration that there was lag time between the live lectures and the posting of recordings, that recordings missed some aspects of the lectures (eg, laser-pointer tracks and hand drawings on whiteboards), and that some lectures were not recorded. Student reports of the effects of having access to the recordings on their note-taking and class participation and attendance are shown in Table 2.

Ten percent of students indicated using the recordings as an alternative to attending classes. When asked to specify how many classes they chose to miss, given the

Table 2. Students’ Self-Report of the Effect of Lecture Recordings on Their Classroom Behaviors

When recordings are available, I...	Students, %
Note-taking	
Take the usual quality of notes while in class	87
Take more detailed notes in class	5
Take less detailed notes in class	8
Increase the quality of notes while viewing a recording	80
Participation in class discussions	
Participate as usual	93
Participate more	6
Participate less	1
Attendance	
Attend the usual number of lectures	92
Attend fewer lectures	7
Attend more lectures	1

availability of the recordings, 94% reported missing less than 1 class per week. Only 3 students (2%) reported missing 3 or more classes per week. Among those who provided comments, most stressed that they still attended all their lectures and considered the recordings to be a supplemental resource but appreciated having access to the recordings when they missed classes for legitimate reasons, such as illness.

The most common uses of the recordings reported by students were to review something missed in class (85%), to review concepts they did not understand (79%), to study before an examination (78%), and to catch up on a lecture missed because of illness or other unavoidable circumstance (77%). Students indicated that viewing the recordings benefited their learning in various ways (Table 3). When asked whether they would like to see the lecture-capture program continue, 93% of students strongly agreed. Several of the students’ comments indicated that they were very pleased with the lecture-capture system and that it had increased their understanding of concepts presented in lectures.

Completed survey instruments were received from 34 of 47 faculty members, for an overall response rate of 72%. Based on distribution by gender (54 % male, 46 % female) and academic rank (from lecturer to full professor), the respondents were representative of the faculty members at the study institution. Most (71%) had participated in the lecture-recording initiative. Of these, most (80%) were either comfortable or very comfortable with being recorded, and all (100%) intended to continue being recorded. Most agreed that asynchronous learning was important to their teaching (67%). Some incorporated the recordings into their educational approach (36%)

Table 1. Statistics for Student Viewings of Lecture Recordings

Viewing Parameter	Academic Year	
	2010-2011	2011-2012
Recordings accessed, No.	304	276
Individual accesses, No.	16,144	9,331
Viewing time per recording, hours	0.01-640	0.02-465
Total viewing time, hours	15,550	17,622

Table 3. Students' Self-Report of the Effect of Lecture Recordings on Their Learning

Using the recordings helped me to...	N	Rating, ^a Mean (SD)
Improve understanding of lecture content	184	4.5 (0.7)
Retain information delivered in lectures	183	4.4 (0.8)
Independently resolve questions about lecture content	182	4.3 (0.8)
Increase attention paid to the lecture during class	183	4.1 (1.0)
Control the pace of learning to allow deeper understanding	182	4.4 (0.9)

^a Based on rating scale on which 1=strongly disagree, 2=somewhat disagree, 3=neither agree or disagree, 4=somewhat agree, 5=strongly agree.

and used the technology to prerecord content (31%). Most felt that access to the recordings had made no difference to the quality of students' comments and questions (62%), participation in class (88%), or grades (82%). Most (69%) also felt that absenteeism, particularly during midterm examination periods, had increased. Faculty members' perception of the degree to which the recordings affected student attendance is illustrated in Figure 1.

The degree of concern about student absenteeism varied. One faculty member observed that although the availability of lecture recordings had decreased class attendance, midterm grades demonstrated that the students were learning the material as the instructor intended. Another faculty member thought it was inconsiderate of 40% to 50% of students to skip guest lectures because of midterms or other reasons in favor of viewing the recordings. Overall, most faculty members felt that it was important for students to attend class (4.1 ± 1.1) and did not feel it was possible to learn as well from recordings as from face-to-face classes (2.5 ± 1.1). Faculty members' perceptions of the benefits of the recordings to students' learning are shown in Table 4. Faculty members further commented that the recordings helped students learn the more difficult conceptual material, may have alleviated content overload in the program, and that the recording program was a positive support for student learning. When asked whether they intended to continue to be

recorded, 100% indicated that they would. Given the program's usefulness to students, faculty members expressed support for continuing the program, provided it did not negatively affect students' class participation.

DISCUSSION

Students and faculty members were well aware of the lecture-capture program at the time they agreed to participate in this study. The large number of student accesses and total viewing time, the use of the recordings at all hours of the day and night, and use by study groups suggest that students were actively using the recordings to reinforce their learning. MediaSite analytics revealed that student use of the recordings changed over time. During the first year, the number of individual accesses was high, but many recordings were viewed only for a short time, which may be attributable to the novelty of the technology. During the second year, the number of individual accesses was 42% lower than during the first year, but the viewing time for all recordings was 13% longer, indicating that students were making more selective use of the recordings. This finding is consistent with research that suggests an extrinsic motivator, such as access to a new learning tool, provides an initial motivation boost because of its novelty but the effect is often short lived. The true benefits of the tool appear shortly thereafter, as students become intrinsically motivated by the actual learning benefits.^{28,29}

The high comfort level with the technology reported by faculty members and the willingness of students to participate in class as usual are likely attributable to the unobtrusiveness of the recording process. MediaSite technology allowed for prescheduling and provided no indication in the classroom that a recording was occurring so that class participation could proceed uninhibited. The decision to capture audio but not video recordings of the instructors helped faculty members overcome their initial hesitation about being recorded and also was consistent with literature suggesting that video is educationally redundant.^{3,7,30-32} No students who participated in the study commented on the absence of video recordings of the instructor. However, the passivity of the recording process

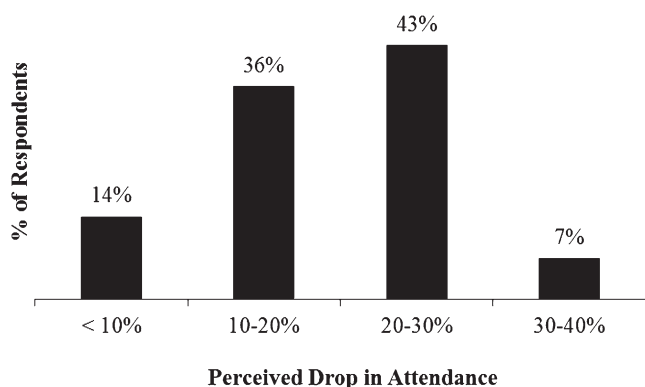


Figure 1. Faculty Members' Report of the Effect of Lecture Recordings on Students' Attendance

Table 4. Faculty Members' Ratings of the Learning Benefits of Using Lecture Recordings (N=16)

Using the recordings...	Rating, ^a Mean (SD)
Enables those with different learning styles to study more effectively	4.1 (1.0)
Allows students to focus more on the lecture than on taking notes	3.6 (1.2)
Increases student engagement in class discussion	2.9 (1.0)
Increases student learning by allowing review of important concepts	4.5 (0.7)

^a Based on rating scale on which 1=strongly disagree, 2=somewhat disagree, 3=neither agree or disagree, 4=somewhat agree; 5=strongly agree.

might also be the reason that most faculty members did not deliberately incorporate the recordings into their educational approach.

Before the lecture-capture program began, faculty members had concerns about the recordings reducing class attendance and in-class participation, as well as detrimentally affecting students' note-taking. However, after participating in the program, most students reported that they felt more engaged in class and that viewing a recording enabled them to enhance their notes. Although most faculty members agreed that lecture capture allowed students to focus more on in-class content, they reported little change in these in-class behaviors as a result of lecture capture. This finding may be related to faculty members' passive approach to and students' asynchronous use of the recordings. Faculty members may not have noticed a change in in-class engagement because they lacked an awareness of students' use of the recordings.

There was disagreement between students and faculty members regarding the effect of the lecture-capture program on lecture attendance. Consistent with the literature, most students reported no decline or only a modest decline in attendance.^{12-14,33} However, half of the faculty members perceived that attendance had declined by 20% or more. This large discrepancy is likely attributable to the fact that although students mostly attended classes as usual, a substantial number may have chosen to miss a particular class because of competing events, such as a midterm examination in another course. Thus, the overall effect on individuals' attendance may have been modest, but the collective effect on a given day may have been more dramatic. Regardless, an unexpected benefit of the lecture-capture program revealed in students' comments was that many students appreciated having access to the recordings when they missed a class, as it decreased their stress about missing important material.

Most students and faculty members agreed that being able to review the recordings enhanced students' learning, especially of conceptually difficult material. Both also appreciated the potential of the recordings to support blended learning opportunities, such as online discussions, and enhanced preparation for examinations. Consistent with the literature, students indicated that the

just-in-time support afforded by the lecture-capture program allowed them to learn concepts at their own pace.^{4,7,34} Students' growing appreciation of the value of the recordings to their learning is suggested in the change in viewing habits over time. The decrease in number of accesses and increase in total viewing time may be an indication that students were being more selective and watching the same recording more than once to clarify certain topics.

It is unclear whether these learning benefits resulted in any notable improvement in academic performance. Students were not specifically asked about this, and faculty members saw no difference in class grade averages compared with those achieved by previous cohorts. Nonetheless, students were appreciative of the lecture-capture program and passionate about their desire to see the program continue. Although faculty members were more indifferent, they were willing to continue participating in the program.

This study has the usual limitations of survey-based research, with participants self-selecting to respond and providing self-report of their attitudes and behaviors. No independent measures were used in this study to assess students' attendance, in-class engagement, or learning of course content. Additionally, this study examined collective rather than individual use and perceptions. MediaSite analytics did not permit tracking of individual use, so it was not possible to examine how lecture capture may have supported any given student's learning. Because the lecture-capture technology was available in only 1 room, the quantity and thereby the overall quality of recordings might have been limited if certain classes were not scheduled to be held in that specific room.

Given faculty members' perception that access to the recordings had a negative effect on attendance when there was a midterm in another course, it would be beneficial to consider ways to minimize this disruption. One potential strategy would be to set aside time during the semester for administration of midterms in all courses. Before such changes are made, however, further research should be conducted to determine if attendance is associated with particular events in the academic year. For example, other studies have found that attendance is

associated with academic maturity, with first-year students being more likely to miss classes than students in senior years.³⁵ Data from this study could be further analyzed to assess for differences in attitudes and behaviors based on students' gender and age or faculty members' years of teaching experience.

More active, deliberate use of the recordings by faculty members as well as attention to best practices for both faculty members and students should be encouraged. There is obvious potential for faculty members to make much greater educational use of the recordings. In particular, use of the technology to prerecord presentations would support flipped classroom models, which may help increase students' in-class engagement and concept attainment. Further research is needed to demonstrate actual rather than perceived benefits of lecture recordings in students' learning.

CONCLUSION

This study shows that both students and instructors found the lecture-recording program to be a valuable learning resource. Students actively used class recordings but did not rely on them exclusively. Rather, they felt the recordings were an adjunct to and not a replacement for attending classes. Faculty members were more passive in their use of the recordings, with only some taking further advantage of the recordings in their teaching. Faculty members and students differed in their perceptions of the effect of the recordings on attendance in class and other classroom behaviors. Students reported little change in their attendance and an increase in classroom engagement, whereas instructors reported a drop in attendance and no change in engagement. The lecture-capture program is considered a success in the Faculty of Pharmaceutical Sciences and will be continued.

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