



# Is the effectiveness of lecture capture related to teaching approach or content type? ☆



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## ABSTRACT

The purpose of two related studies was to explore the relationships between course characteristics (teaching approach, content type, and level of curricular coordination), lecture-capture implementation, and learning in a veterinary medical education environment. Two hundred and twenty two students and 35 faculty members participated in the first study, which surveyed respondents regarding their perception of lecture-capture use and impact on learning. Four hundred and ninety one students participated in the second study, which compared scores on a standardized test of basic science knowledge among groups experiencing various levels of lecture-capture implementation. Students were most likely to view captured lectures in courses that moved quickly, relied heavily on lecture, were perceived as highly relevant to their future success, and contained information not available in other formats. A greater percentage of students than faculty perceived lecture capture as beneficial to learning. Higher views of captured lectures were associated with higher test scores in disciplines that relied most heavily on a *straight-lecture* teaching approach and had a *basic science – research* teaching context. The number of lecture-capture views was not significantly related to test scores in disciplines that relied less heavily on straight lecture for instruction and had a *basic science – applied* teaching context.

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## 1. Introduction

For nearly as long as film and video have existed, they have been used for teaching. However, only in the past decade has it become routine to capture audio and video from traditional classroom lectures and automatically make those recordings available to enrolled students. These captured lectures vary in nature from relatively sophisticated video and audio productions to simple audio recordings that accompany a separate file containing presentation slides. The wide variations in lecture-capture technologies and implementation strategies have precipitated diverse studies examining lecture capture, with a variety of results. We reviewed only English-language studies, and focused on studies in post-secondary settings that used captured lectures as an adjunct to face-to-face instruction, so as to be comparable to the setting in which the present studies occurred. The cited studies were all conducted in the United States, Great Britain, Canada or Australia, and occurred in a variety of disciplines including medicine, physics, business, engineering and genetics. We could not identify any systematic meta-analyses providing a consensus regarding the relationship between lecture-capture use and learning outcomes in a post-secondary or any other learning context. In general terms, we identified a mixture of outcomes, with some studies reporting no clear relationship between lecture-capture use and learning (Bacro, Gebregziabher, & Fitzharris, 2010; Brotherton & Abowd, 2004; Franklin, Gibson, Samuel, Teeter, & Clarkson, 2011; Solomon, Ferenchick, Laird-Fick, & Kavanaugh, 2004; Spickard, Alrajeh, Cordray, & Gigante, 2002), some reporting a mixed or negative relationship (Fernandes, Moira, & Cruickshank, 2012; Franklin et al., 2011; McNulty et al., 2009, 2011; Owston, Lupshenyuk, & Wideman, 2011), and some reporting a positive relationship (Bridge, Jackson, & Robinson, 2009; Dey, Burn, & Gerdes, 2009; Elsasser, Hoie, Destache, & Monaghan, 2009; Shaw & Molnar, 2011; von Konsky, Ivins, & Gribble,

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2009). Regardless of findings from objective learning outcomes measures, students themselves tend to believe overwhelmingly that having access to captured lectures helps learning (Bacro et al., 2010; Brotherton & Abowd, 2004; Cardall, Krupat, & Ulrich, 2008; Dey et al., 2009; Franklin et al., 2011; Heilesen, 2010; Holbrook & Dupont, 2011; Lovell & Plantegenest, 2009; Mattick, Crocker, & Bligh, 2007; Pilarski, Johnstone, Pettepher, & Osherooff, 2008; Scutter, Stupans, Sawyer, & King, 2010; Solomon et al., 2004; Spickard et al., 2002; von Konsky et al., 2009; Yudko, Hirokawa, & Chi, 2008). Neither learning outcomes nor student perception seemed to vary systematically by discipline or by the country in which the study was conducted, though a systematic exploration of those factors was beyond the scope of the present study.

### 1.1. Related research

Among the potential mechanisms by which lecture capture influences learning, some studies suggest that flexibility and efficiency play a role. In one case, students reported studying less in a lecture capture enabled class, while maintaining equivalent grades (Brotherton & Abowd, 2004). In another study, medical students reported that captured lectures helped them learn for reasons such as being able to select learning methods that worked for them, being able to watch lectures at any time of day, thereby improving productivity and sleep, and being able to watch lectures at their own pace. The same students reported increasing how much they could study in a given time frame by changing lecture playback speed or by selectively watching only lecture segments they missed (Cardall et al., 2008). Using such strategies, students in an online lecture group were shown to learn just as much as students in a face-to-face lecture group in significantly less time (Spickard et al., 2002). For non-native language learners, captured lectures produced learning gains, presumably because they allow students to slow down or repeat difficult, unfamiliar, or fast-moving content that would otherwise have been lost (Scutter et al., 2010; Shaw & Molnar, 2011; Simpson, 2006). In the words of one author, “the medium of video capture was found to create an impression of intimacy simultaneously cleansed of environmental distractions, an experience not necessarily consistent with live attendance.” (Simpson, 2006, p. 527). Students cite other advantages of lecture capture, including the ability to review key points, obtain additional clarity, make up for unavoidable conflicts, and review for tests (Simpson, 2006; Wilson & Weiser, 2001; Winer & Cooperstock, 2002; Yudko et al., 2008).

### 1.2. Aims of the present studies

While existing studies form a useful foundation, much is still unknown about the use and impact of lecture capture. For instance, it is unclear what relationships exist between specific course characteristics such as teaching approach or content area and the perceived or actual value of the captured lectures. This paper describes two related studies that seek to address this deficiency by answering the following research questions:

1. What is the relationship between instructor teaching approach and the attitudes that instructors and students have toward lecture capture? (First study)
2. What is the relationship between curricular coordination and the attitudes that instructors and students have toward lecture capture? (First study)
3. What is the relationship between course content type and the attitudes that instructors and students have toward lecture capture? (First study)
4. What is the relationship between use of lecture capture and learning? (Second study)

We identified teaching approach, curricular coordination, and content type as factors that might affect how students perceive and use lecture capture using a process described in Section 2.1.2.

### 1.3. Context

The studies described herein occurred at a college of veterinary medicine located in the Midwest region of the United States. Beginning in 2007 the college introduced lecture-capture technology using the Echo360 system. Each captured lecture combined three sources of data. First, a fixed video camera mounted in the ceiling in each of the school's three main lecture halls recorded the area behind the podium generally occupied by the instructor. Second, a wireless microphone captured the instructor's voice for the Echo360 recording and for the classroom sound system. Finally, a computerized workstation captured all information that the instructor demonstrated to students via the data projector, including slide presentations, videos demonstrated in class, and so forth. Students accessed captured lectures by clicking links available within the course webpage. Captured lectures were displayed in a resizable internet browser window with a navigation panel and included one frame showing video of the instructor and another showing the content projected by the instructor while lecturing. Additionally, instructors could opt to make downloadable podcast (audio only) and vodcast (audio and video) recordings of the captured lectures available to students for off-line use.

Initially the college implemented Echo360 such that all lectures were captured for all core courses, but these captures were made available to students only if the instructors specifically chose to opt in to the program. After approximately one year of implementation, this opt-in policy was changed to an opt-out policy, in which all lectures were made available to students unless faculty specifically requested that they not be made available. Implementation gradually increased from semester to semester as faculty became more comfortable with the idea of students using captured lectures and as students increasingly requested access to captured lectures. Even after making the regular Echo360 streams available to students within the password-protected course webpage, many instructors did not release podcasts or vodcasts because of intellectual property concerns. There was no institution-wide teaching approach or attendance policy, though attendance was generally not a requirement in lecture sessions.

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