University and the Classroom: Can Podcasts Replace Professors?

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ABSTRACT

The University, a website with downloadable educational podcasts, can provide students the opportunity to obtain professors' lectures when students are unable to attend class. To determine the effectiveness of audio lectures in higher education, undergraduate general psychology students participated in one of two conditions. In the lecture condition, participants listened to a 25-min lecture given in person by a professor using PowerPoint slides. Copies of the slides were given to aid note-taking. In the podcast condition, participants received a podcast of the same lecture along with the PowerPoint handouts. Participants in both conditions were instructed to keep a running log of study time and activities used in preparing for an exam. One week from the initial session students returned to take an exam on lecture content. Results indicated that students in the podcast condition who took notes while listening to the podcast scored significantly higher than the lecture condition. The impact of mobile learning on classroom performance is discussed.

Keywords: Media in education, Multimedia/hypermedia , Post-secondary education, Distance education, Pedagogical issues

Introduction

The concept of electronic classrooms continues to evolve and change as the technology expands in many directions. One recent introduction The University, a website with downloadable educational podcasts,. The idea of educational podcasts that are easily accessible takes mobile learning, or m-learning, to the next generation. Apple points out that the benefits of University

include that it is easily accessible 24 h per day, students can listen to the podcasts whenever and wherever they choose, and it helps to keep the students motivated because it engages them in a way that is very familiar to them (University is a link on the website). Although these benefits seem to make educational podcasts appealing to students, the question of the educational benefits of m-learning remains to be answered. Thus, in this paper, we address the question of whether m-learning actually provides educational benefits, or at the very least, does not harm students that opt for a podcast instead of the actual in-class lecture. Examining previous research on the educational benefits of computers and technology in general points to a complex picture. A meta analysis of computer-based instruction for college students indicates small but positive effects (Kulik, Kulik, & Cohen, 1980).

Other researchers have also found no educational advantage for the use of PowerPoint slides (Apperson et al., 2006;Susskind, 2005), but Austin, Lee, and Carr (2004) found that lectures with slides resulted in superior notes. Further evolution of technology and computers in educational settings has resulted in stand-alone web-based courses, where all learning takes place outside of the traditional classroom. Evidence for educational advantages for web-based courses also appears to be mixed, as it seems to depend upon the type of course, and what educational activities are included (Maki & Maki, 2002). Other research examining the effects of teaching with multimedia, where the multimedia included audio, video, animation, graphics and text, found that the multimedia resulted in better recall than traditional lectures with PowerPoint slides (Hallett & Faria, 2006). However, for multimedia learning to be effective, the overall cognitive load for the pictorial and verbal material needs to be taken into account (Mayer & Moreno, 2003). In general, the mixed results of all of these types of studies indicate that other variables may be crucial factors in explaining how computers and technology influence educational outcomes.

The addition of University as a resource for students in the classroom is interesting because it gives students a chance to listen to a lecture for the first time (if they missed a class) or listen to a

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lecture that they attended in person additional times after the class session is over. Since note-taking has been shown to influence achievement, the current study is interested in examining whether students would take notes when listening to a podcast of a lecture that they may have missed. It is clear that for a traditional lecture given in a classroom, students are expected to take notes. Peer example, and possibly pressure from professors, may create this expectation, students have also learned that academic achievement is greater when notes are taken in class. One recent study did examine students' attitudes about using podcasts for revising existing notes from a previous lecture (Evans, 2008). Students believed that the podcasts helped them revise their notes more effectively than the textbook. Although the students seemed receptive to learning through podcasts and agreed with the advantage of being able to listen to podcasts when and where they chose, only 20% of the students actually listened to the podcasts on a mobile device. The remaining 80% listened to the podcasts on their computer. Thus, while all students in this study seemed to value the flexibility and mobility of m-learning, the majority of the students did not actually take advantage of the mobility of the podcast. Other recent research indicates a preference by students for traditional lectures over computer-based lectures, including a podcast-like condition on the computer, where a PowerPoint lecture was narrated auditorily (Stephenson, Brown, & Griffin, 2008).

In their study, PowerPoint slides with audio clips were available on computer for students to use as a tool for reviewing lectures. Students who did use the 'virtual lecture' for 100 min or more scored higher on a subsequent test. Additionally, perceptions of these students about the 'virtual lecture' were quite positive. Thus, when we examine the limited existing research on podcasts, or podcast-like conditions, we find mixed results with regard to attitude. One possible explanation is the particular use of the podcast. The two studies that found positive attitudes regarding podcasts or 'virtual lectures' used these conditions as a tool to help students revise their notes from already existing lectures (Cramer et al., 2007; Evans,2008). The remaining study where the traditional lecture was preferred assigned students to either an 'e-lecture' (podcast-like condition), a traditional lecture, or to a 'virtual lecture' condition which consisted of a multi-

media presentation online (Stephenson et al., 2008). For each condition, the lecture material was only available in the assignment format, thus students had to rely solely on the electronic delivery of the necessary information, rather than just using the podcast to help revise already existing notes. Yet none of these studies had a podcast condition where all students in that condition truly participated in mobile-learning. Thus, we are interested in investigating what the attitudes of students will be when they participate in a true m-learning condition, that is, where the podcast is only available to them on a mobile device that allows them to take the lecture with them anywhere they go. Finally , the research examining educational outcomes has only used podcast-like conditions, but even here the results are mixed.

2. Matrials and Method

2.1. Participants and design

Participants were general psychology students attending a small, liberal arts college in New York state. They were given extra credit in a psychology course of their choice for their participation. In addition, participants in each condition were told that the highest score in each experimental condition on an exam given during session two of the experiment would be given a $15 iTunes gift card. This gift card allowed participants to download audio books or music, or to rent a movie, all of which could be viewed or listened to on their I POD or on their own computer; thus, an I POD was not necessary to utilize the gift card. This compensation was given to help motivate students to try hard to do well on the exam. The design of the study was a non-equivalent group, post-test only quasi-experimental design. Students participated in either the podcast condition or the in-class lecture condition. Forty students attended session one of the experiment in each condition. However, the critical component of the experiment was attending session two, the follow-up exam. Thirty-two students completed both sessions of the in-class lecture condition; thirty-four students completed both sessions of the podcast condition. Students self selected into the two different conditions because assignment in the podcast condition was

based on student ownership of anmp3 player. Students in this condition knew they were signing up for an experiment that would require the use of their mp3 player, and they were asked to bring it to the experimental session.

With this type of quasi-experimental design, one of the methodological questions that needs to be addressed is whether the two conditions were different before the treatment was administered. Thus, participants in the two conditions were evaluated with respect to existing differences in GPA and SAT scores.

Materials and procedure

Session one

Lecture materials for the experiment were taken from an introductory psychology textbook chapter on perception. The lecture was constructed to be approximately 25 min in length. This was shorter than a typical course lecture, but still contained plenty of testable material. In an effort to keep the initial experimental session less than an hour to match academic course scheduling on our campus, this time limit was chosen. A PowerPoint slide show was constructed based on the lecture material. In addition a 50-point exam was created from this lecture content. The exam consisted of multiple choice, matching, and fill-in-the-blank questions. This format was chosen as it is the typical format used in large survey courses.

Students in the in-class lecture condition were told that they would be listening to a lecture on perception. Students began the session by receiving a copy of the PowerPoint slides that would be presented during the lecture. The printouts were four slides to a page, with accompanying lines to the right of the slides that students could use to take additional notes during the lecture. Students were also given several blank pages of paper that they could use for note-taking if they preferred. The students in this condition were told that the purpose of the study was to assess

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how they responded to technology in the classroom, specifically the use of PowerPoint slides in a lecture. Before the lecture began, students completed a questionnaire on demographics (class standing, major course of study, etc.), their study habits, and their ownership and use of mp3 players. In addition, they were asked if they had ever listened to podcasts of classroom lecture material.

After the questionnaires were collected, students were instructed that they would now receive a lecture that would be approximately 25 min in length. They were also told that they would be coming back for a second session in one week's time for an exam over the material covered during the lecture today and so they should take notes as they normally would when they knew the material covered would be on an exam. Students were told to interact with the professor as they normally would in a classroom setting (feel free to ask questions, to tell the professor to slow down the presentation for note-taking purposes, etc.). At the end of the lecture, the students were given a handout that they were to use over the course of the week to record their study sessions of the notes and PowerPoint slide handouts from the lecture.

One potential criticism of the method used to encourage students to try hard for the exam is that in the podcast condition, students may have felt they were competing against students in an in-class lecture format. Thus it is possible, given their desire to try the new technology, they may have more incentive to try harder on the exam than their in-class lecture counterparts. This concern was addressed in two ways. First, the in-class lecture condition students were led to believe they would be compared to a group of peers in a traditional lecture condition that did not use PowerPoint slides. (Given the limited subject pool at our college, we did not in fact run this condition.) Second, the instructions were equally designed for each group to be competing against other members in their same group in order to be the winner of the gift card.

Software (version 2.2), which allows video syncing of PowerPoint slides along with recorded audio. They were told that the podcast they were receiving was a copy of an actual lecture that

had been presented earlier in the week. Students that had mp3 players with video capabilities were told that the slides from the lecture would appear on the screen as the lecture progressed. Students who had mp3 players that did not possess video capabilities were told that during the lecture the professor would make reference to the slides in the PowerPoint handout, and that they should be able to follow along by having the handout available when they listened. In addition, students were told that if they chose to take additional notes while listening to the podcast, they could do so on the lines provided on the PowerPoint handouts, or that they could use separate paper if they preferred. They were told to bring back the handouts and any additional notes they made to session two. Students were then given a copy of the study session tally. As in the other condition, students were told to be honest in their recording. This was the same study session tally sheet that was given to the in-class lecture condition, containing spaces for six study sessions. Students were told to record how they used the podcast during each session (if they took notes, if they only listened but did not take notes). They were also told to record if they just studied the copies of the PowerPoint slides or copies of any notes they may have made from the podcast, but did not listen to the podcast again. They were given session two reminder slips and dismissed.

Session two

One week after their initial session, students returned for session two. In both conditions, students were instructed to pull out the notes and copies of PowerPoint slides from session one, and were given 5 min to study these notes. At the end of that time, all of their materials from session one, as well as their study session tally sheet were collected. They were then given the 50 point exam over the lecture material. After taking the exam, students in the in-class lecture condition were given a debriefing sheet and dismissed. After taking the exam, the students in the podcast condition were given an additional questionnaire that asked them specifically about ways they used the podcast. They were asked how many podcasts they had previously listened to, and specifically, if they had ever listened to podcasts of classroom lecture previously. (This question

was a repeat from the initial questionnaire that all students were given during session one.) It also asked them what they did when they initially listened to the podcast (listened while doing other things, listened while not doing other things but did not take notes, listened and took notes just as they would have in a classroom setting, etc.). It also asked about subsequent listening sessions. Lastly, it asked about their preference for the way to get material from lectures if they were to miss a class (get a podcast or get a copy of notes from a friend). After completing this additional questionnaire, students in this condition were given a debriefing sheet and dismissed.

Results and discussion

Questionnaires

Due to the descriptive and exploratory nature of the questionnaires, only percentages and means were calculated from the questionnaire data. Of the 66 students that completed the experiment, 57 of them owned mp3 players (86%). Twenty-eight out of the 57 also had video capabilities on their players (49%). While 57 of the participants had mp3 players, only 3 students in the study had ever listened to podcasts before (5%), and none of the students had ever listened to a podcast of a classroom lecture. The average amount of time the students who had mp3 players spent listening to them each day was 1.67 h (SD = 1.20 h). The most common answer to the question of time spent listening was 1 h per day. Thirty-four students completed the podcast condition, and thus filled out the podcast usage questionnaire during the second session. Eighteen of the 34 participants had mp3 players with video capabilities (52.9%). We asked participants that had video capabilities if they felt having the PowerPoint slides on the screen matching the audio feed was helpful. All but 5 found this feature helpful (72.22%). In addition, one feature of using ProfCast software to record the lecture that was true regardless of mp3 video capabilities was the addition of chapter markers into the podcast. With each change of PowerPoint slide, a chapter marker was created. Several students commented that these chapter markers were very useful for studying and reviewing desired sections of the podcast. It also helped those without video

capabilities to coordinate with the PowerPoint handouts provided. The 16 participants who did not have video capabilities on their mp3 players were asked if they were able to follow along with the lecture and match the PowerPoint handouts to the lecture easily.

Exam performance

An initial t-test revealed that the students in the podcast condition scored significantly higher on the exam in session two than the students in the in-class lecture, $t(64) = 2.12$, $p < .05$. Students in the podcast condition had an average score of 71.24% (SD = 16.50%), whereas students in the in-class lecture condition had an average score of 62.47% (SD = 17.03%). This result was The data from the podcast condition was then sorted into two groups: students who took additional notes on the PowerPoint slide handouts or on additional pages of paper, and students who took no additional notes of any kind. Of the 34 participants in the podcast condition,22 students had taken additional notes, and 12 students had not. Results of a t-test on this data revealed a significant difference in performance between the two groups, $t(32) = 2.59$, $p < .01$. Students who took additional notes scored significantly higher, 76.23% (SD = 13.61%) than students who merely listened to the podcast but did not take additional notes, 62.08% (SD = 17.93%). The mean of the students that merely listened to the podcast but took no additional notes was not significantly different than the in-class lecture students, $t(42) = .06$, $p > .05$. differences in specific tasks done during study or preference for studying alone or in groups.Lastly, the answers on the podcast questionnaire were examined to see if there may have been anything specific in these answers that could help explain the significant advantage students in this condition showed on the exam. Table 2 shows the results of the podcast

Table 1 : Mean score on exam by experiment condition and note-taking category

	Average notes	minimal notes	average notes	extensive notes

In class lecture	N-0	N-15 M-57.87 SD = 16.85	N-17 M = 66.53 SD = 16.62	N-0
Podcast	N = 12 M= 62.08 SD= 17.93	N = 1 M = 63 SD = −	N = 17 M = 77.12 SD = 13.94	N = 4 M = 76.00 SD = 14.02

Table 2: Number and time of listens by participants in the podcast condition.

Never	Once	Twice	Three	Five	Seven	Total
Number of total times podcast was listened to						
1	11	8	11	2	1	34
Time of day of all listens						
8 am–2:55 pm	3 pm–8:55 pm	9 pm–later	no am/pm	never listened	Total	

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16	31	16	11	1
75				

Conclusion

The results of this study are in no way an indication that audio copies of lectures could or should replace actual professors, or even regular class attendance. The advantage the students in our study received was only when the student took notes as they would do during a lecture, and when they listened to the lecture more than once. In essence, the same things a student does during the actual lecture, they would need to do to show a benefit of the podcast. This study is small in nature, but it is the only study we found that examined podcasts in a format that incorporated true m-learning conditions accompanied by educational outcomes. The finding that students in the podcast condition did significantly better than students who attended the in-class lecture was unexpected and somewhat novel in the body of literature on the use of technology to aid learning.

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