

## Improving the Podcast as a Lecture Content Delivery Method

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**Abstract:** The most common method of instruction in large-enrollment courses is lecturing. In recent years, a growing trend is to instruct lecture classes by podcasting course content. ICS 101, a beginning computer science course, at the University of Hawaii at Manoa utilizes podcasting as a mode of lecture content delivery. The method used to podcast evolved during the course from a traditional podcast to an enhanced podcast. Therefore, the researchers explored the two modes of podcasting and found that there is little statistical difference between the two. However, having visual aids, whether through an enhanced podcast or including a PDF with a traditional podcast, improves students' perception of podcasting and lecture content. The researchers recommend focusing on the pedagogy behind the instruction as opposed to the addition of new features due to the minor gain in achievement.

### Introduction

Many different approaches to teaching have been used over the years. The most common method of teaching in large-enrollment courses is lecturing. However, a group of the country's higher education leaders met to discuss redesigning instruction in these courses to improve learning outcomes while decreasing cost (Twigg, 1999). Twigg also stated that approximately 35% of university students were enrolled in these large-enrollment courses. Therefore, improving learning outcomes in these courses would improve institutions as a whole.

The University of Hawaii at Manoa has an introductory computer science course (ICS 101) that has been redesigned in the fall 2005 semester to account for issues in large-enrollment instruction. One of the major changes in the redesign included the use of podcasts as a method of lecture content delivery. Geoghegan and Klass defined podcast as "audio content available on the Internet that can be automatically delivered to your computer or MP3 player" (Geoghegan & Klass, 2005, pg.5). The lecture podcast evolved, from a traditional podcast to an enhanced podcast. Enhanced podcasts feature

interactive material including images, hyperlinks, and video ("Small News," 2006). However, some features (i.e. hyperlinks) are not available in portable media players. Therefore, some of these features require a computer to be utilized in full.

### **Large-enrollment Instruction**

Issues in large-enrollment instruction include different learning styles, inadequate student interaction with learning materials, and inconsistent learning experiences (Twigg, 1999). Other issues with large-enrollment courses include a lack of interaction with the instructor or other teaching assistants (Terman, 1978). The lack of interaction was also attributed to a lack of self-assurance in large lecture classes (Marbach-Ad & Sokolove, 2002). Marbach-Ad & Slove used e-mail in their, which increased interaction while participating in the large-enrollment course.

Podcasting lecture content in a large-enrollment course improved many of the issues that existed in large-enrollment courses (Ogawa & Nickles, 2006). Ogawa and Nickles found that podcasting improved students' perceptions of large-enrollment courses and increased accessibility to course content. They used quizzes based on the lecture podcasts to increase the amount that students interacted with course content. The use of podcasts also lowered the level of inconsistency amongst different sections of the course.

### **Background of the Study**

Fall 2005 Semester: Lecture Podcast. In the fall 2005 semester, the ICS 101 course was redesigned to utilize podcasting as the method for lecture content delivery. There were 17 sections of the course, which enrolled over 500 students. Each of the lab sessions was held in a laboratory in the computer sciences department. Students were also required to listen to one lecture podcast a week and complete a 10-question on-line quiz. Therefore, this hybridization model included podcasted lectures, weekly on-line quizzes, and two meetings a week in the computer laboratory with a teaching assistant. Students were given three attempts to take the 10-question quiz.

The students' only required face-to-face interaction with the course instructor was the orientation, midterm, and final examination, which were completed in the lecture hall. Many of the questions in regards to the podcasted lecture were answered by laboratory teaching assistants.

Each of the lecture podcasts were approximately 30 minutes in length, while the lecture classes in the previous semester were one hour and 15 minutes. The instructor noted that the lecture podcasts were condensed to improve the likeliness that students would listen to the entire podcast. Each podcast included a short interlude of music every two to three minutes to help chunk information for students as opposed to having 30 minutes of information without breaks. Students reported being satisfied with the interludes. One student stated, "I like having the little music breaks because it helps my brain take a break from studying too much." The instructor also included a portable document format (PDF) file with the slides that accompanied the lecture podcast because some students

reported having difficulty understanding the concepts presented without visual aids. Students also requested the ability to view the visual aids within the podcast itself, rather than viewing them as a PDF file. Therefore, the instructor took some of the requests made by the students and implemented them in the spring 2006 semester.

Spring 2006 Semester: Enhanced Lecture Podcast. Most of the lecture portion of the course remained the same in the spring 2006 semester, with the exception of the lecture podcast being updated. The instructor updated the lecture podcast from a traditional podcast to an enhanced podcast to ensure students were able to have visual representation of what they were learning on their portable media players. The examinations and on-line quizzes remained the same across the two semesters.

### **Problem Statement**

Since the podcasts were updated from traditional to enhanced podcasts, the researchers conducted a study to determine if the enhanced podcasts were more conducive to student learning than the traditional podcasts. Therefore, the research questions are as follows:

1. Does the method of instruction (podcast or enhanced podcast) have an impact on student learning?
2. What other impacts does enhanced podcasts have when compared to traditional podcasts?

### **Methods**

The researchers used a mixed method approach to answer the research questions. The researchers used a quasi-experimental design, as the students' scores were compared across semesters. To answer the first research question, an analysis of variance was conducted to determine if there was a difference in learning outcomes based on the mode of instruction (podcasted or enhanced podcasted).

To answer the second research question, the researchers conducted an anonymous course survey at the end of the fall 2005 and spring 2006 semesters. The survey included both likert-scale and open-ended questions. For this study, only the following open-ended questions were coded and analyzed:

- Which aspects of the lecture portion of the course were most valuable?
- Which aspects of the lecture portion of the course were least valuable?
- Other comments

Since the open-ended questions were not specifically about podcasting, the researchers only coded and analyzed data regarding podcasted lecture content.

The researchers also interviewed teaching assistants to determine what students thought about the traditional and enhanced lecture podcasts. The researchers decided to interview the teaching assistants because they were the first point of contact for students enrolled in the course. The teaching assistants were also the only individuals that met with the

students on a regular basis. The teaching assistants were purposely sampled, as the teaching assistants with the most experience were interviewed. The teaching assistants with the most experience were interviewed based on their knowledge of the course and how it evolved over time. The interview guide included the following questions:

- In the fall semester, what questions and comments did students have regarding the lecture podcast?
- In the spring semester, what questions and comments did students have regarding the lecture podcast?

## Results

Podcast and Enhanced Podcasts. The descriptive statistics for the podcast lecture examination scores are summarized in Table 1. There were 493 participants in this group with a minimum examination score of 16 and a maximum examination score of 100. The average score was 77.44 out of 100. The range and standard deviation indicated that there was a variation in data. The skewness and kurtosis also suggested that the data was normally distributed.

**Table 1.** Descriptive Statistics for Podcast Examination Scores

N	Min	Max	Mean	Std. Dev.	Skewness		Kurtosis	
					Statistic	Std. Error	Statistic	Std. Error
493	16	100	77.44	12.78	-.68	.11	.59	.22

The descriptive statistics for the enhanced podcast lecture examination scores are summarized in Table 2. There were 441 participants in this group with a minimum examination score of 38 and a maximum examination score of 100. The average score was 78.40 out of 100. The range and standard deviation indicated that there was a variation in data. The skewness and kurtosis also suggested that the data was normally distributed.

**Table 2.** Descriptive Statistics for Enhanced Podcast Examination Scores

N	Min	Max	Mean	Std. Dev	Skewness		Kurtosis	
					Statistic	Std. Error	Statistic	Std. Error
441	38	100	78.40	12.26	-.46	.12	-.25	.23

Analysis of Means. The difference in means between the podcast lecture group and the enhanced podcast lecture group was 0.96. The difference between groups was also not significant ( $p > .05$ ). Therefore, delivering course content via a podcast with a PDF file of the lecture slides or using an enhanced podcast did not substantially change the learning outcomes.

Other Impacts of Enhanced Podcasts. After coding the data from the interviews and student surveys, the researchers found two major themes. The first theme that emerged was that students were satisfied with having the PDF documents supplied with the lecture podcasts. The teaching assistants indicated that the students were initially dissatisfied with podcasted lectures that completely lacked visuals. However, the students enjoyed the podcasted lectures once the PDF slides were included with the podcast. In the spring 2006 semester, enhanced podcasts were introduced, with visuals built in to the podcast. The students who owned media players that supported the enhanced podcasts were pleased that the visuals were also supplied in this format. One teaching assistant reported, "There were several students who loved that they could see the slides on their iPod, but most students still print the PDFs." Therefore, the teaching assistant suggested that most of the students preferred the PDF as opposed to the visuals included with the enhanced podcast. Only the students with an iPod that was capable of viewing the enhanced podcast reported being satisfied with the enhanced podcast. One student reported, "I love seeing the slides on my iPod. Now, I actually have a use for the photo and color part of my iPod." Therefore, having the podcast in an enhanced format and PDF slides available for students ensures that the widest audience can be reached.

The second theme that emerged from the data was that the enhanced podcasts were very difficult to view on smaller media players, like the iPod Nano. The teaching assistants reported students' frustrations with the difficulty to view images on the iPod Nano. One teaching assistant stated, "One student brought her iPod Nano to me and said that the slide was so small that she couldn't tell what it was." Therefore, students with media players that have a small form factor may have difficulty in viewing the content. The teaching assistant further reported, "The student was happy that slides were available as PDFs." One student stated, "My iPod Nano is so small! I can hardly see anything... I don't even know why they have those pictures with the podcast." However, no students gave negative comments in regards to having the PDF slides available.

## **Conclusion**

In conclusion, using an enhanced podcast format as opposed to a traditional podcast lecture format with lecture PDF slides available did not produce significant differences in examination scores. The examination scores of the enhanced lecture podcast were 0.96% higher than those who received instruction based on a traditional podcast and PDF files of the lecture slides. However, the difference was not statistically significant.

Even though the enhanced lecture podcasts did not generate increased scores, the researchers found that students who had a media player with the capability to view the enhancements were pleased. However, those with a media player with a small display, like the iPod Nano, preferred to have the lecture slides in PDF format. Therefore, the researchers believe that solely having the enhanced lecture podcasts will reduce accessibility of course content.

## Implications for Practice

The researchers recommend focusing on the pedagogy behind the podcast as opposed to focusing on the different features of podcasting. Even though the researchers employed enhanced podcasts, it did not yield statistically or substantially improved results. Therefore, concentrating on pedagogy and using concepts like appropriate chunking of information will assist students in learning content more than the features available in the podcast. The researchers recommend having visual aids available, as visual aids yielded much positive feedback from students. In this study, the PDF file of the slides that were available to the students was preferred to the enhanced podcast.

If one has time to create the enhanced podcast, the researchers believe that it is worth pursuing, as some students prefer visual aids in this format. However, the inclusion of PDF files of the slides will ensure the widest range of students having access to the visual aids that complement the lecture podcast. When creating enhanced podcasts, the researchers also recommend conducting an audience analysis to determine which media players to create the podcasts for, as there are different media player models with different sizes and capabilities.

## References

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