

Podcasting



Sharing audio and video files on the Web has been possible for most of the last decade. Why, then, in the past two years, has podcasting become such a hot topic in educational technology?

Does podcasting enhance education? The answer to that question depends entirely on the educational context, including goals and appropriate learning activities, and on how the tool is implemented.

This paper explores educational podcasting in three realms: the creation and distribution of lecture archives for review, the delivery of supplemental educational materials and content, and assignments requiring students to produce and submit their own podcasts. It introduces a range of educational uses for podcasting, and summarizes findings from the limited number of formal evaluations completed to date.



Office of
Technology for
Education



Eberly Center for
TEACHING
EXCELLENCE

Working Definition

Podcasting is a means of publishing audio and video content on the web. There are three categories of activities and equipment involved in podcasting:

File Production

Podcast Publication

Delivery and Playback

Podcasting is a means of publishing audio and video content on the web as a series of episodes with a common theme. These episodes are accompanied by a file called a “feed” that allows listeners to subscribe to the series and receive new episodes automatically.

Some people use the term “podcast” to refer to any distribution of audio/video content on the Web, but technically speaking, the feed and subscription model of file delivery is what differentiates podcasting from simply posting files on the Web.

Think of podcasting like setting up an automatic bank draft to pay bills. For expenses that occur regularly over a prolonged period of time, like utility bills, the initial work of setting up a bank draft is worthwhile because it saves time and effort in the long run. If the expense occurs with less regularity, it is probably easier to just write a check.

Setting up a podcast is similar. For content that is published on a regular basis, like weekly homework reviews, the initial steps to create a podcast are worthwhile because they save students some effort in the long run. But for content that will only be published a few times during the semester, it probably makes more sense to simply post the files on a course web site—without the extra effort of setting up the feed and having students subscribe.

There are three general categories of activities and equipment involved in podcasting: file production, podcast publication, and delivery and playback.

File production

Generating appropriate and compelling content for a podcast is typically the most time- and labor-intensive part of the process. This step includes planning, writing, and recording content, as well as audio/video editing and file compression. Production requires recording hardware, like digital microphones and digital cameras, and software for editing audio and/or video segments.

In addition to the relevant audio/video files, the creator must generate an RSS feed. A feed is a simple XML file that lists the location of podcast episodes. It also includes information about the podcast, such as publish dates, titles, and descrip-

Technically, the feed and subscription model of file delivery is what differentiates podcasting from simply posting files on the Web.

tions of the series and of each episode. The podcast creator can write the feed manually, or use software that generates the feed file. A list of useful resources for creating podcasts appears in the Appendix.

Podcast publication

The audio/video file and RSS feed are then posted to a Web server. For the first podcast in a series, and for ongoing series that are always open to new subscribers, the podcast creator must notify the audience of the existence of the podcast by publicizing the location of the RSS feed. Many podcasters post a link to the RSS feed on their blogs, Web sites, or other public Web spaces. The podcast creator can also list information about the podcast in one of many directories that categorize podcasts alphabetically or by topic.

The listener is able to subscribe to the podcast series using a podcast aggregator (software that checks podcast feeds for updates at specified intervals). This step is only necessary the first time; once the listener has subscribed to the podcast, they will remain subscribed until they choose to unsubscribe.

Delivery and playback

When the listener adds a new RSS feed, the aggregator downloads all episodes referenced in the current RSS feed. At regular intervals thereafter, the aggregator checks the feed for updates and downloads any episodes added since the previous check.

Listeners can access podcasts directly on their computers, or on their portable MP3/video device. For those who prefer to listen on portable devices, most podcast aggregators will synchronize with portable devices automatically.

Podcasting: Technical Components and Interactions

Production



First Podcast Episode

Podcast creator produces audio/video file. Generating appropriate, compelling content for a podcast is typically the most time- and labor-intensive part of the process. This step includes planning, organizing, writing, and recording content, as well as audio/video editing and file compression.

Subsequent Podcast Episodes

Podcast creator generates the RSS feed file. An RSS feed is a simple XML file that lists the location of podcast episodes. The feed also includes information about the podcast, such as publish dates, titles, and descriptions of the series and of each episode.

Podcast creator updates the RSS feed file. Each time the podcast creator makes a new episode, he/she also must add relevant information about the new episodes to the existing RSS feed.

Publication

Podcast creator notifies audience of the location of the RSS feed. Many podcasters post a link to the podcast RSS feed on their blogs, Web sites, or other public Web spaces.

Podcast creator uploads audio/video files and RSS feed to a Web server. Once published, the location of these files is expected to remain constant. The podcast creator should choose a location to which he/she has continued access for the duration of the podcast series.



Listener adds location of the RSS feed to podcast aggregator software. A podcast aggregator is software that checks podcast feeds for updates at specified intervals. The most commonly used podcast aggregators are iTunes, Juice, and Doppler.

Delivery

Studies have shown that as many as 80% of students listen to or view podcasts at their computer, rather than on a portable device in a mobile environment.



Podcast aggregator downloads most recent episodes based on RSS feed. When a listener adds a new RSS feed, the podcast aggregator downloads all episodes referenced in the current RSS feed. At regular intervals, the aggregator checks the feed for updates and downloads any episodes added since the previous check.

Listener accesses podcast episodes. Some people prefer to listen to or view podcasts directly on their computers, while others will prefer to access podcasts with their portable MP3/ video devices. For those who prefer to listen on portable devices, most podcast aggregators can be set to synchronize with devices automatically when they are docked at the computer.

Important Acronyms

- XML** Extensible Markup Language, a format for structured information that includes both content and descriptors of what role that content plays.
- RSS** Really Simple Syndication, an XML format used to publish frequently updated digital content to subscribers.
- URL** Uniform Resource Locator, the address or location of a resource on the Internet.

Case Studies & Assessments

Is podcasting just a passing trend, or is there potential to improve the quality of the educational experience and outcomes? This paper explores educational podcasting in three realms:

Distribution of lecture archives for review

Delivery of supplemental educational materials and content

Assignments of student-created podcasts

Podcasting is a fairly new endeavor, so there are relatively few formal evaluations of its educational value at this point in time. Most papers to date are optimistically speculative about the potential impact of podcasting on the quality of educational outcomes and experience, but a handful of authors are much more cautious about the expectations that certain types of podcasting might establish.

Explorations of podcasting to date fall into three broad categories. The most commonly discussed is creating audio or video archives of classroom lectures. This use of podcasting is very similar to (or is arguably the same as) lecture webcasting, the topic of our January 2007 white paper.

The second category of educational podcasting involves the delivery of supplemental course materials. Supplemental materials might include pre-recorded lectures that must be accessed in advance of class time, summaries highlighting important information, video reviews of homework problems, or relevant podcasts produced by a third party.

Finally, many instructors have developed assignments that require students to produce and submit their own podcasts. This type of podcasting is most useful in classes where oral presentation and/or building technical competence in podcasting are closely related to course goals.

Lectures for Review

Recording and distributing class lectures is considered one of the most predictable uses for podcasts, but it is also probably among the most requested by students—and easiest to implement. Podcasting is particularly well suited as a delivery mechanism for recorded classroom lectures because they occur multiple times a week over extended periods of time. The subscription model of file delivery affords maximum convenience for students, saving the steps of checking Web sites for multiple classes to download files several times a week.

The minimal additional effort required for content production and publication is another reason podcasting class lectures is increasingly common. Many systems allow users to simply click a button to start and stop recording, with the rest

of the publication process completely automated. Technically and editorially speaking, podcasting a class lecture often requires much less effort than creating new content specifically for podcasts.

Lecture podcasting matches an existing and well-defined practice to the latest technologies and current product ecologies.

Recording class lectures for review purposes is a decades-old study strategy, although it has traditionally occurred primarily at the level of the individual student. Whether it is an effective or efficient strategy certainly factors into this discussion, but we have yet to find formal evaluations indicating any successes or failures. Nonetheless, podcasting class lectures is a simple practice that matches an existing and well-defined practice to the latest technologies and product ecologies.

However, podcasting lectures is not without its critics. While studies to date have shown little effect, positive or negative, in terms of educational outcomes, many instructors express concern about the expectations that might be established when institutions make archives available for a majority of lecture courses.

Findings for Digital Lecture Recordings

We refer primarily to lecture podcasting reports from three institutions: the University of Michigan (UM) School of Dentistry, Harvard Extension School, and the University of Washington (UW). To capture the voice of those concerned about the potential negative effects of lecture podcasting, we also refer to “Socrates in Earpods?: The Ipodification of Education,” an article from *Fast Capitalism*.

To a great degree, these lecture podcasting reports serve to corroborate findings from reports discussed in our previous white paper, “Lecture Webcasting.”

Both sets of studies answer questions that deal more with the availability of digital lecture recordings than with the delivery mechanism that allows students to access those recordings.

In general, it is safe to say that most students do not listen to each and every lecture podcast. Only 20% of students in the UW study listened to more than 75% of recorded lectures. In addition to picking and choosing which lectures to review, many students also scan the lectures, fast-forwarding to specific points or sections, and listening to particular portions multiple times (Lane, 2006).

Most students perceive lecture podcasts as a tool for review, rather than as a replacement for attending lectures (Malan, 2007). A small percentage of students indicate that the availability of recorded lectures might make them more likely to miss class, but none of the studies we reviewed report a significant impact on overall attendance (Brittain, Glowacki, Van Ittersum, and Johnson, 2006; Lane, 2006; Malan, 2007).

Many students who use recorded lectures for review believe the practice has a positive impact on their performance. In the UM study, 85% of survey respondents who used the lecture archives believed it had a positive effect on exam grades (Brittain et al., 2006).

Learning outcomes and student performance were not directly measured in this study; however, no studies to date have shown evidence of any effect, positive or negative, on learning outcomes. Some critics point to this disconnect between students' perceptions and reality as evidence that students might overestimate the usefulness of reviewing recorded lectures—possibly drawing them away from more effective study strategies.

Among the most commonly noted shortcomings of lecture recordings is the inability to hear questions from students or discussions that take place in the lecture hall (Lane, 2006). In spite of this limitation, students report fairly high levels of satisfaction with the resource overall (Brittain et al., 2006; Lane, 2006; Malan, 2007).

Findings Specific to Podcasting

All of the above findings echo the results from similar studies of lecture webcast-

ing. In addition to confirming findings from previous studies, the three lecture podcasting reports provide some insights specific to podcasting as a medium.

At the UM School of Dentistry, researchers conducted a pilot study to explore alternative media formats for lecture podcasts. They selected one course for the pilot based on “the difficulty of the content and the dependence on diagrams and other visuals during the presentation” (Brittain et al., 2006, p. 26). All lectures for the course were recorded and made available through the same course Web site in three formats: video, audio synchronized with images from the presentation slides, and audio only.

According to one study, audio is the preferred format for recorded lectures, and RSS subscription increases the odds that students will download files.

The audio-only format was twice as popular as the other two formats combined. Of a possible 105 student participants, 30 downloaded media over the course of the semester, and 70 completed a survey at semester's end. Two-thirds of survey respondents who used the lecture archives reported using and preferring the audio-only format (p. 27).

In a later pilot for the same study, students reported that “the convenience of obtaining files via RSS increases the likelihood” that they download lecture files (p. 30). At the end of the pilot in which RSS subscription was made available, twice as many students were participating by downloading lecture files as before RSS. Server logs showed that half of all file downloads occurred via RSS, or podcasting.

The UM study effectively demonstrated that audio recordings were the preferred format for lecture capture, and that the convenience of RSS subscription increases the likelihood that students download files. Questions remain about

whether the increase in downloads leads to an increase in actual review, and about the general effectiveness of lecture review as a study strategy.

At the Harvard Extension School, the instructors of an introductory Computer Science course chose to make lecture podcasts available to the general public in addition to those enrolled in the course. At the beginning of the course, they published the RSS feed in the iTunes podcast directory and other online directories. By the course's end, server logs suggested that the podcast had between 6,000 and 10,000 subscribers, with nearly 40% of those subscribers living outside the United States (Malan, 2007). Over the course of the semester, instructors received dozens of e-mails from grateful and enthusiastic subscribers.

“Podcasting offers to extend universities’ educational reach more than it offers to improve education itself...” David J. Malan

Although the response to lecture podcasts from students enrolled in the course was also “ultimately positive,” (p. 391) the instructor asserts that, for enrolled students, podcasting “is but a marginal improvement on trends long in progress” (p. 393). He contends that the true value of podcasting is its “potential not necessarily to educate better, but to educate further” (p. 390) by creating “new opportunities to teach, sans credits and degrees, those for whom attendance, enrollment, or education itself might not otherwise be possible” (p. 393).

From these studies, we have learned that RSS subscription is a convenient way to download frequently published material, and its availability increases the likelihood that students will download audio/video lecture files. We have also learned that podcasting can extend the reach of educational institutions by making material accessible to those who might not otherwise have access. And

we learned that dental students at the University of Michigan preferred audio-only lecture files to other formats.

But one of the most surprising findings from these studies—and the most consistently reported—is that a majority of students report using lecture podcasts at home or on a computer, rather than in a mobile environment with a portable device. At the UM School of Dentistry, 75% of students who downloaded media reported reviewing the files primarily from home (Brittain et al., 2006, p. 27). In the Computer Science course at the Harvard Extension School, 71% of students accessed lectures at their computers (Malan, 2007). At UW, 87% of survey respondents reported listening at their computers (Lane, 2006). The authors of these studies hypothesize about a range of possible causes for this behavior, but none included questions or observations that address the cause explicitly.

It is significant that the majority of students access lecture podcasts at home or on their computers, given that mobility and flexibility are the predominant arguments for podcasting recorded lectures. In our review of the literature, we have heard that podcasting is “a new leap in flexible learning, as students will no longer have to be anchored to a computer” (“MP3 Technology,” 2006, para. 2). It has “revolutionized education by allowing for the anytime-anywhere delivery of instructional content” (Molina, 2006, p. 122). It “allows education to become more portable than ever before” (“7 things...”, 2005, p. 2). And podcasts “can be listened to very easily while driving, walking, or working out at the gym” (Campbell, 2005, p. 38).

Each of the above statements represents what is possible with podcasting. What actually occurs—at least with recorded lectures—is apparently something altogether different. Indeed, many are puzzled by the push for “learning on the go,” because a significant body of research in cognitive psychology clearly demonstrates that “simultaneous processing” (or multi-tasking) diminishes performance with each additional task undertaken (Idux, Ivanof, Asplun, and Marois, 2006; Neisser and Becklen, 1975; Strayer and Johnston, 2001).

Objections to Lecture Podcasting

Primary among the objections to lecture podcasting is that the widespread availability of easily accessible lecture recordings justifies and excuses non-attendance at lectures. Despite the fact that studies have shown little or no impact on attendance when lecture recordings are made available on a class-by-class basis, it is impossible to predict how lecture podcasting institution-wide will affect campus culture—particularly with regard to the perceived value of lecture attendance.

Decreased attendance can lead to one or both of two potential negative outcomes. First, not attending lectures can diminish the quality of learning that takes place. Many argue that listening to a recorded lecture is simply no substitute for “the physicality and corporeality” (Brabazon, 2006, sec. 2 para. 5) of a positive educational experience in the classroom. Good lectures are “multi-modal formations, using sound, vision, gestures, and often scent and touch. As a space where people gather to think about complex ideas, the lecture has pivotal symbolic importance” (sec. 2 para. 1).

“Without connecting student behavior and scholarly consequences, teaching and learning will not function.”

Tara Brabazon

Whether or not lecturers regularly attain this level of engagement with students is a separate (but important) issue. If the quality of the lecture experience is poor, is it better to address what is lacking, or to accept mediocrity—or worse—and package it for remote consumption, even further removing students from what little engagement might have existed in the face-to-face setting?

Secondly, even if student performance is not adversely affected, there are concerns that the widespread availability of lecture podcasts removes the natural consequences of missing a class. If lectures are always available as podcasts, are we as educators sacrificing important oppor-

tunities for students to learn practical lessons, like prioritization, organization, discipline, and personal responsibility?

In addition to teaching theories and skills, the university plays an invaluable role in preparing students for the workplace, establishing a strong work ethic, and promoting a culture of accountability.

Lecture recordings can serve to exonerate students who miss class due to poor motivation, an inability to prioritize obligations, or a lack of organization. Certainly, there are other more valid reasons to miss class, but many believe that the student should be responsible for proactively taking steps to discover what was missed. The student can make arrangements to have a friend record the lecture, seek out notes from a classmate, visit the instructor or TA during office hours, or any combination of the above. Not only do these steps place the responsibility for the student’s learning where it belongs (squarely on his or her own shoulders), but they arguably lead to higher quality learning resources and more engagement with peers and instructors.

Questions of attendance aside, many who oppose the use of lecture podcasting also argue that students are becoming too reliant on materials that are intended as scaffolding, or tools to guide the development of understanding. While lecture recordings and presentation slides might serve as an outline of important concepts, they often carry too much weight in students’ perception and priorities.

These resources cannot replace other materials, such as textbooks and other required reading, meaningful engagement in class, and completion of practice questions and hands-on activities and assignments. The flexibility afforded by new technologies might eventually serve to diminish intellectual discipline resulting from an understanding of how to use the “network of...learning resources” (Brabazon, 2006, sec. 2 para. 9) that are crucial to a strong education.

Tara Brabazon summarizes many of the objections to widespread lecture podcasting (and webcasting) in her article. The article is well worth the read, as she challenges what she calls “the assumptions of flexible learning” (sec. 1 para. 7), and argues for a use of the podcast-

ing medium to “actualize the potential of sound” (sec. 3 para. 8). Like many others, Brabazon believes that the real potential of podcasting is best achieved by developing supplementary materials, designed specifically for the format.

Supplemental Material

Survey data from the studies referenced above and from related studies of lecture webcasting show that students appreciate the “safety net” of access to lecture archives. Whether or not that safety net is harmful or useful in the long run is a question that instructors and institutions should consider carefully before moving forward with lecture podcasting. Nonetheless, there is little evidence to date that the availability of recorded class lectures has any impact on learning outcomes or student performance.

Instructors at many institutions are also experimenting with the delivery of supplemental materials, often designed and produced specifically as podcasts. These materials range from brief, reflexive “sonic sessions” (Brabazon, 2006, sec. 3 para. 8) that interpret one or two important topics and offer questions for consideration, to listening exercises in language or medical diagnostics, to pre-recorded mini-lectures that must be viewed in advance of class time.

Supplemental materials have a much better track record of positively influencing learning outcomes and student performance. That record is not surprising, given that these types of materials are often much more thoughtfully approached, designed with clear educational goals in mind, and produced specifically to take advantage of the podcast format.

We will review two examples of podcasting supplementary materials, and try to identify some of the overarching reasons these examples are successful. The first example comes from Appalachian State University (ASU) where instructors of a software engineering course produced video podcasts that were required to be viewed in advance of class time (Kurtz, Fenwick, and Ellsworth, 2007). The second example is from the field of medical education, and brings

“Inverting the lecture and lab...by using video podcasts was a pedagogical success as measured by student performance.”

Barry L. Kurtz, et al.

excellent insights about the real potential of podcasting with a thoughtful and well-prioritized approach (Barrett, Kuzma, Seto, Richards, Mason, Barrett, and Gracely, 2004; Barrett, Lacey, Sekara, Linden, and Gracely, 2006).

Using Podcasts to Restructure Class Time

Instructors of a software engineering course at ASU conducted a two-semester study comparing student performance in a traditional lecture course to a course where students were required to view pre-recorded lecture podcasts in advance of class time. The podcasts served to free up valuable face-to-face time for more engaging and interactive exercises.

In Fall of 2005, instructors spent the majority of class time during the first half of the semester lecturing from slides. The material covered in lectures corresponded closely to the textbook, and the information was given as background material to prepare students for work on the course project. In the second part of the semester, there was greater emphasis on helping students complete the project.

In the Spring of 2006, the instructors inverted their approach. There was “absolutely no lecturing from slides in class; rather all lectures were viewed outside of class as video podcasts” (Kurtz et al., 2007, p. 485). Class time was devoted to activities typically reserved for labs: problem solving, document preparation, and working on the course project.

Students in the two semesters showed “no significant difference in exam performance,” but final project grades were 10% higher for students in Spring 2006 (p. 487). Presumably, the more hands-

on approach to class time in the second semester gave students stronger skills and more practice in synthesizing and applying knowledge as they approached the project.

Although the instructors do not report any formal survey data, they indicate that several students in the Spring semester “openly expressed dislike for the podcasts” due to the “‘extra’ work outside of class that should have occurred in class” (p. 488). However, many students also acknowledged that this was “the most realistic and practical class they had taken as undergraduates” (p. 489).

It is worthwhile to mention that in this case as well, the instructor found that “many (and maybe most) students elected to watch the podcasts on their computers at home,” rather than on the video iPods that were specifically provided for that purpose (p. 488).

Listening as a Technical Skill

The following case study from the field of medical education involves the use of audio files that were not delivered as podcasts. Nonetheless, it has received significant media coverage as a successful example of teaching with iPods. We include it here because it illustrates several important lessons about teaching with supplementary audio materials.

Cardiac auscultation is the practice of listening to the heartbeat with a stethoscope for diagnostic purposes. Traditionally, the approach to teaching cardiac auscultation is a 1- to 2-hour lecture, sometimes accompanied by the opportunity for students to listen to irregularities in a volunteer patient. Constraints of the physical setting and patient availability meant that students are able to listen for fewer than 2 or 3 minutes each.

The results of this approach are demonstrably poor, with as few as 20% of students able to accurately diagnose murmurs. Dr. Michael Barrett hypothesized that the approach failed because “the recognition of cardiac murmurs is a technical skill,” not an intellectual theory or concept that can be taught in a standard classroom setting (Barrett et al., 2004, p. 470).

He argues that these types of skills only improve with intense repetition—like learning to tie surgical knots, or

practicing the free throw in basketball. In 2004, Barrett and a team of researchers published the results of a study testing the effect of intense repetition on students’ ability to accurately recognize different types of murmurs.

Using a heart sound simulator, Barrett and a team of researchers created audio recordings that represented “classical examples” of various types of murmurs. They interspersed those sounds with “clinically relevant comments such as the location, timing, and shape of that murmur” (p. 471). These clips were recorded onto a one-hour audio CD that included 250 repetitions for each type of murmur.

“[T]he recognition of cardiac murmurs is a technical skill that, like learning to tie surgical knots, requires repetition.”

Michael J. Barrett, MD, et al.

Students who listened to approximately 500 repetitions of each type of murmur fared nearly three times better on post-tests than students in the control group, who had only the traditional instruction. (Students in the intervention group recognized murmurs with about 85% accuracy, while those in the control group were only about 30% accurate.) This study was released with little fanfare outside the medical community.

As Barrett and his research team continued their studies, students began to copy the audio files from CDs onto their iPods. He has since decided to make the files available in two versions: CDs and MP3 files available for direct download.

Once iPods entered the equation, media outlets outside of the medical community began to take notice. Headlines touted the effect of the iPod on the accuracy of diagnosis: “iPods help doctors improve stethoscope skills,” “iPods are good for your heart,” and “Study: Dr. iPod can double successful heart-condition diagnoses” (“iPods help,” 2007; “iPods are good,” 2007; Gitlin, 2007).

There are several important lessons that can be gleaned from Barrett's studies. First, media response to the findings in the original CD study as compared to when iPods became involved demonstrate decisively that too much of the excitement surrounding podcasting is excitement about technology itself, not about demonstrated improvements in student learning.

Secondly, Barrett's approach was ideal in that he focused on a clear educational goal (improving accuracy of diagnosis) and identified a clearly-related learning activity (intense repetition of listening exercises). The most convenient way to facilitate that activity was making MP3s available, and the most convenient way to access those MP3s in many cases happened to be on an iPod.

Too often, we see the reverse process take place. Educators or educational technologists begin with a specific product or potential communication channel. We then determine what kinds of activities that product or channel can support, and work backwards to identify what educational goals those activities might help achieve. Although reversing the process can sometimes lead to interesting applications of technology, it frequently results in "technology for the sake technology," with little or no actual effect on outcomes in student learning.

The Office of Technology for Education and Eberly Center for Teaching Excellence advocate an educational approach centered on articulating clear educational goals, and determining whether technology can play a role in helping achieve those goals.

We advocate an approach centered on articulating clear educational goals, and determining whether technology can play a role in helping achieve those goals.

Podcast Assignments

The previous two sections have addressed case studies where the instructor distributes audio or video educational materials to students using podcasts. While this is the most common approach, many instructors have identified creative ways to flip this model, using podcasts generated by students. In some cases, the students create podcasts for the instructor as a means of assessment. In others, students are responsible for producing podcasts for their classmates.

We have been unable to locate any formal evaluations of student-generated podcast assignments, as reports to date are mostly anecdotal in nature. The two reports reviewed here serve as solid examples of student-created podcasts.

Student Summaries of Course Lectures

In the spring of 2006, Mark Frydenberg taught IT 101 in the business college at Bentley College. For the first six weeks of the semester, Frydenberg made audio recordings of his lecture available as a podcast. He noticed as the weeks passed that a majority of students were not using the podcasts, and hypothesized that the length of the recordings (60 minutes) was too long for students to spend reviewing podcasts.

Frydenberg surveyed his students to determine the most "reasonable duration" for a podcast, and most chose 6–10 minutes (with more than 70% of respondents choosing a duration between 3 and 15 minutes). He asked students to produce these abbreviated podcasts for the remainder of the semester "as extra credit, and every student accepted the challenge" (Frydenberg, 2006, p. 4). Working in pairs, students created 6- to 10-minute video podcasts "sharing something that they learned" during the previous class session (p. 4).

Frydenberg considers the experiment a success. He notes that a "friendly competition" arose as students "tried to be more creative with their final products than those who came before them" by using advanced recording features and video effects. He also reports that students often "showed their classmates how to use the advanced features" and worked

together to overcome technical challenges, like poor quality screen captures (p. 5).

Student-generated podcasts made sense for Frydenberg's class because an understanding of podcasting technology and technical competence in podcast production and publication complemented the content and reinforced important topics in the course.

Podcasting Literary Criticism

Peter Schmidt and Liz Evans at Swarthmore College collaborated to develop a series of podcast assignments for Schmidt's English literature course. The course, "U.S. Fiction, 1945–Present," is "designed to introduce students to a wide range of authors, historical contexts, and interpretive techniques" (Evans, 2006, para. 1).

At various points in the semester, students were required to produce a "podcast pair" (two 5-minute podcasts). In the first podcast, the student read a brief passage from a novel. In the second, the student was instructed to provide "discussion of that passage: why the student chose it, what details were most important, what themes and issues the passage raised, and how the passage related to the rest of the novel" (para. 3). All students were then required to listen to several of their classmates' podcasts related to the current reading assignment before coming to class.

At first blush, this may not seem an overly useful implementation of podcasting. Why have students go through the extra efforts of creating podcasts, when they just as easily could have submitted written summaries and commentary to the instructor?

Evans and Schmidt chose to use podcasts because "thinking about cultural works is a collaborative process that happens in dialogue, not only in isolation. Cultural objects (including novels) are not static; they circulate, they are events" (para. 3). In other words, their goals for the podcast assignments were not only for the students to read, analyze, and comment on the readings, but also for them to engage in a dialogue with their peers.

A few decades ago, this kind of critical dialogue would most likely take place in a written format. But Evans and Schmidt acknowledge that new channels for critical

New channels for critical discussion exist, and it is important help students develop competence in making their voices heard in those channels.

discussion exist, and moving forward, it is important to help students develop some degree of competence in making their voices heard in those channels.

In addition to encouraging thoughtful classroom discussion, students reported "that the readings brought the passages and the novels to life—and that when they heard passages aloud, they noticed many more things than when they just read an assignment before class" (para. 8).

This case study shows that student-created podcasts can be valuable for a variety of reasons, including the development of technical competence, listening (audio) and presentation (verbal) skills, and an understanding of how new media affect social and professional dialogue.

Conclusion

Whether and how podcasting impacts educational outcomes depends largely upon how the technology is put to use.

This report is intended to serve as an introduction to various educational uses for podcasting, and to summarize findings from the limited number of formal evaluations completed to date.

Podcasting does not contain any inherent value. It is only valuable inasmuch as it helps the instructor and students reach their educational goals.

As with any educational technology, whether and how podcasting impacts the quality of the learning experience and/or educational outcomes depends largely upon how the technology is put to use.

Does podcasting enhance education? The answer to that question depends entirely on the educational context,

including goals and appropriate learning activities, and on how the tool is implemented. Podcasting does not contain any inherent value. It is only valuable inasmuch as it helps the instructor and students reach their educational goals, by facilitating thoughtful, engaging learning activities that are designed to work in support of those goals.

Support

If you are an instructor at Carnegie Mellon and are interested in discussing the use of podcasting in your class, please contact the:

Office of Technology for Education
ote@andrew.cmu.edu
412-268-5503

Our consultants will be happy to assist you with any phase of planning, designing, implementing, funding, and evaluating the use of technology tools and strategies for teaching.

References

- Barrett MJ, Lacey CS, Sekara AE, Linden EA, Gracely EJ (2004) "Mastering Cardiac Murmurs: The Power of Repetition." *Chest* 126, 470–475. <http://www.chestjournal.org/cgi/content/abstract/126/2/470> [last access: 05.24.2007]
- Barret MJ, Kuzma MA, Seto TC, Richards P, Mason D, Barrett DM, Gracely EJ (2006) "The Power of Repetition in Mastering Cardiac Auscultation." *American Journal of Medicine* 119, 73–75.
- Brabazon T (2006) "Socrates in Earpods?: The Ipodification of Education." *Fast Capitalism*, 2(1). http://www.uta.edu/huma/agger/fastcapitalism/2_1/brabazon.html [last access: 05.24.2007]
- Brittain S, Glowacki P, Van Ittersum J, Johnson L (2006) "Podcasting Lectures." *EDUCAUSE Quarterly*, Vol. 29 No. 3, 24–31. <http://www.educause.edu/ir/library/pdf/eqm0634.pdf> [last access: 05.24.2007]
- Campbell G (2005) "There's Something in the Air: Podcasting in Education." *EDUCAUSE Review*, Vol. 40 No. 6 (Nov/Dec 2005), 32–47. <http://www.educause.edu/ir/library/pdf/erm0561.pdf> [last access: 05.24.2007]
- Evans L (2006) "Using Student Podcasts in Literature Classes." *Academic Commons, Center for Teaching and Learning*. <http://www.academiccommons.org/ctfl/vignette/using-student-podcasts-in-literature-classes> [last access: 05.24.2007]
- Frydenberg M (2006) "Principles and Pedagogy: The Two P's of Podcasting in the Information Technology Classroom." In *The Proceedings of ISECON 2006*, v 23. <http://isedj.org/isecon/2006/3354/> [last access: 05.24.2007]

References (continued)

Gitlin J (2007) "Study: Dr. iPod can double successful heart-condition diagnoses." *Ars Technica*, 26 March 2007. <http://arstechnica.com/journals/science.ars/2007/03/26/study-dr-ipod-can-double-successful-heart-condition-diagnoses> [last access: 05.24.2007]

Idux PE, Ivanof J, Asplun CL, and Marois R (2006). "Isolation of a Central Bottleneck of Information Processing with Time-Resolved fMRI." *Neuron*, 52, 1109-1120. <http://cecelia.physics.indiana.edu/journal/fmri.pdf> [last access: 05.24.2007]

Kutz BL, Fenwick JB, Ellsworth CC (2007) "Using podcasts and tablet PCs in computer science." In *Proceedings of the 45th Annual Southeast Regional Conference*, 484-489. <http://portal.acm.org/citation.cfm?id=1233428> [last access: 05.24.2007]

Lane C (2006) "UW Podcasting: Evaluation of Year One." Report by *Office of Learning Technologies*, University of Washington. http://catalyst.washington.edu/research_development/papers/2006/podcasting_year1.pdf [last access: 05.24.2007]

Malan DJ (2007) "Podcasting computer science E-1." In *Proceedings of the 38th SIGCSE Technical Symposium on Computer Science Education*, 389-393. <http://portal.acm.org/citation.cfm?id=1227446> [last access: 05.24.2007]

Molina PG (2006) "Pioneering New Territory and Technologies." *EDUCAUSE Review*, Vol. 41 No. 5 (Sep/Oct 2006), 112-135. <http://www.educause.edu/ir/library/pdf/erm0659.pdf> [last access: 05.24.2007]

Neisser U, Becklen R (1975) "Selective looking: Attending to visually specified events." *Cognitive Psychology*, 7, 480-494.

Strayer DA, Johnston WA (2001) "Driven to distraction: Dual-task studies of simulated driving and conversing on a cellular phone." *Psychological Science*, 12, 462-466. <http://www.blackwell-synergy.com/doi/pdf/10.1111/1467-9280.00386> [last access: 05.24.2007]

"7 things you should know about...Podcasting." *EDUCAUSE Learning Initiative*. <http://www.educause.edu/ir/library/pdf/ELI7003.pdf> [last access: 05.24.2007]

"iPods are good for your heart." *Macworld*, 05.26.2007. <http://www.macworld.co.uk/ipod-itunes/news/index.cfm?newsid=17603> [last access: 05.24.2007]

"iPods help doctors improve stethoscope skills." *Science Daily*, 05.26.2007. <http://www.sciencedaily.com/releases/2007/03/070325111532.htm> [last access: 05.24.2007]

"MP3 Technology: A New Wave in Learning." From the Office of Corporate Communications & Public Relations at Murdoch University. <http://www.ccp.murdoch.edu.au/opportunity/mp3.html> [last access: 05.24.2007]

Note: Cover image courtesy of <http://www.podcastlogo.com/> [last access: 05.24.07]

The purpose of the *Teaching With Technology White Paper* series is to provide Carnegie Mellon faculty and staff access to high-quality, research-based information with regard to a given classroom technology. These papers offer a general overview of the technology topic, summarize findings from available assessments and evaluations, and give direction toward further reading and online resources.

This series does not introduce original research findings from technology assessments or evaluations conducted at the Office of Technology for Education and/or Carnegie Mellon University. The papers serve as literature reviews, intended to provide scholarly integration and synthesis of the most sound and comprehensive studies documented at the time of publication.



This work is licensed under:

Creative Commons Attribution-Noncommercial-No Derivative Works 3.0 United States License.

To view a copy of this license, visit: <http://creativecommons.org/licenses/by-nc-nd/3.0/us/>

write to: Creative Commons, 171 Second Street, Suite 300, San Francisco, California, 94105, USA.

Understanding Feeds

Appendix One

Podcasting might seem like magic, but it is actually based on very simple technology. Below is an example of a basic RSS feed file (`HistoryofScience.rss`) and how information from that feed is displayed in a podcast aggregator (in this case, iTunes).

Once the RSS feed file is made available online, a listener can subscribe by giving the podcast aggregator the location, or URL, of the feed. The aggregator then checks the feed file periodically for updates, and automatically downloads any new “items,” or episodes.

The screenshot shows the iTunes interface with a podcast feed titled "History of Science". The feed contains two episodes:

Podcast	Time	Release Date	Description
History of Science		6.17.07	The History of Science podcast covers some of the key...
Episode 1: Early Scientific Cultures	16:42	6.10.07	This episode introduces the foundations of science in ...
Episode 2: The Middle Ages	15:23	6.17.07	This episode highlights the most significant scientific ...

The RSS file (`HistoryOfScience.rss`) is shown below:

```
<?xml version="1.0"?>
<rss version="2.0">
  <channel>
    <title>History of Science</title>
    <link>http://www.cmu.edu/~historyofscience/</link>
    <description>The History of Science podcast covers some of the key moments in the evolution of the body of empirical and theoretical knowledge we call "science." Each 10-20 minute episode investigates the context of some of the most significant shifts that have shaped current scientific thought.</description>
    <pubDate>Sun, 17 Jun 2007</pubDate>

    <item>
      <title>Episode 1: Early Scientific Cultures</title>
      <link>http://www.cmu.edu/~historyofscience/episode1.mp3</link>
      <author>Professor James Stephenson</author>
      <enclosure url="http://www.cmu.edu/~historyofscience/episode1.mp3" length="14500000" type="audio/mpeg"/>
      <description>This episode introduces the foundations of science in early societies, including the Fertile Crescent, the Hellenic World, India, and China.</description>
      <pubDate>Sun, 10 Jun 2007</pubDate>
    </item>

    <item>
      <title>Episode 2: The Middle Ages</title>
      <link>http://www.cmu.edu/~historyofscience/episode2.mp3</link>
      <author>Professor James Stephenson</author>
      <enclosure url="http://www.cmu.edu/~historyofscience/episode2.mp3" length="14300000" type="audio/mpeg"/>
      <description>This episode highlights the most significant scientific discoveries of the Middle Ages, in the Islamic world and in Renaissance Europe.</description>
      <pubDate>Sun, 17 Jun 2007</pubDate>
    </item>
  </channel>
</rss>
```

1 The `<channel>` describes attributes of the whole podcast series.

The *channel title* identifies the whole podcast series, like the title of a radio or TV show.

The *channel description* allows the podcast creator to briefly describe the podcast series and its purpose.

The *channel publication date* is typically the same as the publication date of the most recent episode.

2 The `<item>` describes attributes of each individual podcast episode.

The *item title* identifies each individual episode.

The *item enclosure* tells the podcast aggregator where to download the audio or video file for each episode.

The *item description* allows the podcast creator to briefly describe each individual episode.

The *item publication date* is the date the episode was published.

Podcast Aggregators

Podcast aggregators are the software used to subscribe to and play back podcasts. Aggregators check podcast feeds at predetermined intervals, and automatically download new episodes. Most can be set to automatically synchronize with portable audio/video devices, so you always have the most recent episodes on hand.

Doppler <http://www.dopplerradio.net/>

iTunes <http://www.apple.com/itunes/>

Juice <http://juicereceiver.sourceforge.net/>

Podcast Directories

Podcast directories compile and categorize podcasts alphabetically or by topic. Use the directories listed below to discover relevant third-party podcasts, or publicize your own podcast by submitting your link and description.

Digg <http://www.digg.com/podcasts>

iTunes Music Store <http://www.apple.com/itunes/store/podcasts.html>

Odeo <http://www.odeo.com/>

Podcast.net <http://www.podcast.net/>

Yahoo! Podcasts <http://podcasts.yahoo.com/>

Other Resources

A quick internet search for “how to podcast” will turn up hundreds, if not thousands, of useful resources. Here are a few of our favorite. If you need help or want to learn more, please do not hesitate to contact the Office of Technology for Education at ote@andrew.cmu.edu, or 412-268-5503.

Make Your First Podcast

<http://www.podcastingnews.com/articles/How-to-Podcast.html>

Understanding RSS Feeds

http://www.podcastingnews.com/articles/Understanding_RSS_Feeds.html

Audacity (Free audio recording and editing software)

<http://audacity.sourceforge.net/>

Copyright/Legal Information

http://wiki.creativecommons.org/Welcome_To_The_Podcasting_Legal_Guide