UF UNIVERSITY of FLORIDA
IFAS Extension

The Basics of Educational Podcasting: Enhancing the Student Learning Experience[1]

Jamie S. Foster, Jennifer Larmore, and Stephanie A. Havemann[2]

Overview

With millions of portable media players sold every year, podcasting has emerged as an accessible and affordable means of communicating ideas and knowledge to the world. In this article, we present a brief tutorial for educators interested in generating and publishing their own podcasts. We also discuss the role of podcasting in the classroom and present data to support the idea that podcasting is an effective learning tool for students.

What Are Podcasts?

A podcast is a digital audio recording, with or without images, which instructors can use to deliver content to students in an easy asynchronous fashion. Once generated, podcasts can be disseminated online through personal websites or podcast directories. **Podcasting**, the name for this process, is an amalgamation of "broadcasting" and the acronym "POD." POD stands for "Portable on Demand," and was first used to name Apple Computer's widely successful portable media player, the iPod®. Now, the terms "podcast" and "podcasting" are part of the American lexicon and refer to the distribution of any downloadable digital audio file that can be played on numerous devices such as computers, smartphones, iPads®, and other portable media devices.

Podcasting Made Easy

At its simplest, the creation of a podcast requires a microphone, software, and a computer. Often the microphone and recording software are bundled with the purchase of a new computer. However, if these items are not immediately available on the computer, there are a variety of options to begin podcasting.

At educational institutions, cost is often the limiting factor when developing novel technologies for the classroom. Podcasting, however, offers educators an affordable means to transfer their lectures and knowledge to students. Assuming an individual has access to a computer and the Internet, podcasting can be implemented in the classroom for less than $30. Here are the items you need to begin podcasting:

Microphone/Headset

If a recording device is not built into the computer, or if you want better recording quality than the internal microphone provides, a microphone can be purchased at a local retail store (e.g., Radio Shack or Target) or online (e.g., Amazon, http://www.amazon.com). The cost of a microphone ($7–$200+) often correlates with the sound quality. An example of a moderately priced yet quality microphone that directly plugs into the USB port of your computer is the Plantronics DSP-400 headset ($35). An acoustic comparison of this microphone with others is available at

http://www.creativetechs.com/iq/what_is_a_good_micro-phone_for_podcasting_1.html.

Software

Although numerous professional podcasting software packages are currently available ($100–$1000+), beginning podcasters may want to start with a freeware program. One of the most widely used free podcasting software programs is Audacity (http://audacity.sourceforge.net/), an open source sound recording and editing program with versions available for PC, Mac, and Linux. Another free podcasting program for Mac users is GarageBand, found within the iLife package that comes with all new Mac OS X computers. Although older versions of GarageBand do not have the podcasting function, upgrades to the new, podcasting-ready GarageBand 4.1 are available in the iLife package for $90 (educational discounts available; http://www.apple.com/ilife/garageband/). For specific instructions on using GarageBand, an online video tutorial is available from Apple at http://www.apple.com/ilife/garageband/.

For those less constrained by cost or those wanting to generate professional-level podcasts that include multi-person productions such as panel discussions or telephone interviews, more sophisticated recording studio equipment may be needed. This equipment can include items such as condenser microphones, pop filters, USB audio interfaces, and mixers. Several online resources exist for evaluating more advanced equipment, including two that discuss its use in the classroom (http://uvs.umn.edu/podcastequipment/; http://www.poducateme.com/).

Portable Podcasting

Podcasting at a stationary computer will work for most classroom applications, including student assignments, language labs, and distance-learning lectures; however, for many educators, mobility is essential. For educators interested in recording classroom lectures on the go, portable podcasting recorders offer flexibility as to where the recordings take place. By using small, solid-state recorders (e.g., Marantz PMD670), audio can be converted directly to MP3 files and transferred to a computer via a USB port. The MP3 files can be used directly or edited with the podcasting software. The portable recorders can be coupled with hands-free headsets (e.g., Audio Technica PRO8HE) to make it easy to record classroom lectures as they occur.

The costs of these portable recording devices can range from $100 to $1000. Although expensive, a portable podcasting system can be taken to different classrooms, field trips, professional meetings, guest lectures, or

interviews with experts in the field of study. Portable recording provides the educator with far more flexibility than a stationary system.

Publishing and Disseminating the Podcasts

Once the podcast has been recorded and edited, it is then ready for distribution. The simplest way for an educator to disseminate the podcasts is to upload them to an online course management website such as Sakai or Angel. Students who have access to the class website can then download each lecture individually. Although this approach is less time consuming for the instructor, it does not take advantage of the complete benefits of podcasting.

One significant advantage of podcasting is the ability to automatically distribute podcasts through online subscriptions. Instead of students going to a specific website and downloading lectures as they are posted, students can subscribe to the podcasts, which lets the student's computer download new lecture materials automatically.

For the publication and subscription process to begin, the podcast needs to be accessible on a server. Many academic institutions provide each faculty member with server space to maintain research and/or educational websites. However, many podcasts are large files (often over 50 MB), and server space can quickly become a limiting factor. Few institutions can afford a dedicated podcasting server such as Apple's Podcast Producer for Mac OS X (http://www.apple.com/server/macosx/features/podcasts.html). To overcome these space limitations, commercially available servers are readily available online. A dedicated domain name for the course or instructor can be purchased for less than $10. Many companies provide hosting plans for as low as $5 per month for 10 GB of space (e.g., http://www.godaddy.com). Using commercially available services may be a more economical option for the beginning podcaster.

Once the podcasts are posted on a dedicated website, the subscription process can be initiated. Establishing student subscriptions to the class lectures first requires a Really Simple Syndication (RSS) feed file to be generated. An RSS feed is a web publishing format that displays all the necessary information about the podcast, such as the title, file size, a brief description, and the author. The RSS feed file doesn't modify the podcast audio file; it is merely a text file that provides information for the podcast hosting site and, ultimately, the end user. To generate the RSS feed files, one can use the free program Feedburner (http://feedburner.google.com) with any operating system. This program will

create a URL that is then submitted to a directory portal such as iTunes where anyone can search for and subscribe to the podcast. Apple's iTunes is a free program available to both Mac and PC users (http://www.apple.com/itunes/download/). Once students subscribe to the podcast, new podcasts will automatically download and play when the iTunes podcast window opens. To request that iTunes display the podcasts in the directory, simply click the "Submit a Podcast" icon located in the "Learn More" section of the iTunes Podcast Store. More detailed instructions can be found at http://www.apple.com/itunes/podcasts/specs.html. In addition to iTunes, other directories are available to serve as repositories for educational podcasts including Multimedia Educational Resource for Learning and Online Teaching (MERLOT) (http://www.merlot.org); Podcast Alley (http://www.podcastalley.com/); and Podcast Pickle (http://www.podcastpickle.com/).

The Time Investment of Podcasting

As with any new technology, an educator must be mindful of the time and efforts he or she puts into its integration into the classroom. For podcasting, the time investment can be very low or high depending on the educator's time availability and the objective of the podcasts. If the objective is to quickly disseminate daily or weekly lectures, a minimalist podcast (i.e., without any visual or sound effects) can be generated in the time it takes to give the lecture and upload the file to the website. However, if the objective is to create a database of reusable lecture materials, then synchronizing the slides with the audio portion of the lecture and adding special effects (e.g., sound, video) may be required and will likely take at least as long as the lecture itself. The time investment of podcasting depends on the creator and the objective.

Benefits of Podcasting in the Classroom

Podcasting gives educators an opportunity to bridge the traditional classroom setting with progressive state-of-the-art technologies. There are several advantages of bringing podcasting into the classroom for lectures and student assignments. First, podcasting is an exciting and novel means for students to take a more active role in their own learning experience. As students realize their podcast assignments may be published online with hundreds of potential listeners through free podcast directories, their attention to the quality and detail of their assignments may improve. Second, podcasting is adaptable to the students'

learning needs. Students can access the material whenever and as often as they would like, thereby reinforcing critical concepts or details they may have missed in the original classroom lecture. Third, assignments that require students to generate, edit, and publish their own podcasts reinforce critical communication skills such as writing a script that will be presented online or in a classroom.

Podcasting in Science Education: A Working Example at the University of Florida

Podcasting was first introduced to the Department of Microbiology and Cell Science undergraduate Astrobiology course in the spring semester of 2008. Astrobiology is a multidisciplinary course that covers various aspects of microbiology, molecular biology, biochemistry, human physiology, geology, and physics in the space environment. Astrobiology is taught as a hybrid course, combining both traditional in-person lectures and an online distance-learning component.

Podcasting in Astrobiology
INSTRUCTOR AND GUEST LECTURES

Podcasts were generated for all class lectures whether they were in-person or distance-learning lectures. The podcasts were generated using GarageBand from Apple and included an audio lecture with synchronized slides. All podcasts were posted on the University of Florida Sakai online course management system along with an additional PDF of the slides from each corresponding lecture. Students were responsible for downloading each lecture in order to gauge their interest and use of the podcasts.

ASSIGNMENTS

In addition to the class lectures, students were required to give a 10-minute oral presentation on an astrobiology topic of their choosing. Students had the option to attend a one-hour voluntary workshop in which they were given free access to all the necessary equipment and software. In the workshop, students were taught to record, edit, and produce their own individual podcasts using GarageBand. The finalized student podcasts were then evaluated for quality and scientific content, and the top five were selected for publication on the websitehttp://www.jamiefosterscience.com/education/astroBioPodcasts.html. An example of a student project in GarageBand is depicted in Figure 1.

Students' Previous Experience with Podcasting

Prior to the start of the semester, students were given a pre-course survey in which they were asked about their experience levels with podcasting. In 2008, when podcasting was a relatively new educational tool, only 9% of the students (n = 22) had previously used podcasting in a classroom setting. The majority of students (59%) in 2008 had never listened to a podcast before the Astrobiology class, whereas 32% of the students had only used podcasting for recreational purposes (Figure 2). By 2012, however, students' prior experience with podcasting had shifted. Only 8% of the students (n = 25) had never listened to a podcast, with 64% indicating that they had some experience with podcasting in their classes, whereas 28% had only listened to podcasts recreationally. These results suggest that podcasting is an emerging educational tool in the modern classroom and that student perceptions and use of this tool must be monitored.

Students' Perceptions of Podcasting Before and After Using the Technology

Students also completed pre- and post-course surveys containing questions about their expectations of podcasting in the classroom. In the surveys, students were asked about podcasting and were requested to respond using a Likert scale with arbitrary values assigned to each level of agreement (Likert 1932). The Likert scale ranged from strongly agree (5), somewhat agree (4), neither agree nor disagree (3), somewhat disagree (2), to strongly disagree (1). The results of the survey indicated that students have continually (n = 22) expressed positive attitudes about podcasting (Figure 3). Exactly one-half (50%) of students in 2008 agreed or strongly agreed that podcasting would benefit their learning experience in Astrobiology, whereas in 2012 this number rose to 76%. In 2008, when podcasting was new, the other half of the class was either neutral about podcasting (36% neither agreed nor disagreed that podcasting would benefit the course), or they were pessimistic about podcasting (14% either disagreed or strongly disagreed that podcasting would benefit the course). By 2012, the students were less ambivalent, with only 16% of the students neutral on the subject and only 8% (n = 2) of students indicating that podcasting would not enhance their learning experience (Figure 3). These results suggest that students' perceptions of the value of podcasting in the classroom dramatically improved between the 2008 and 2012 Astrobiology courses.
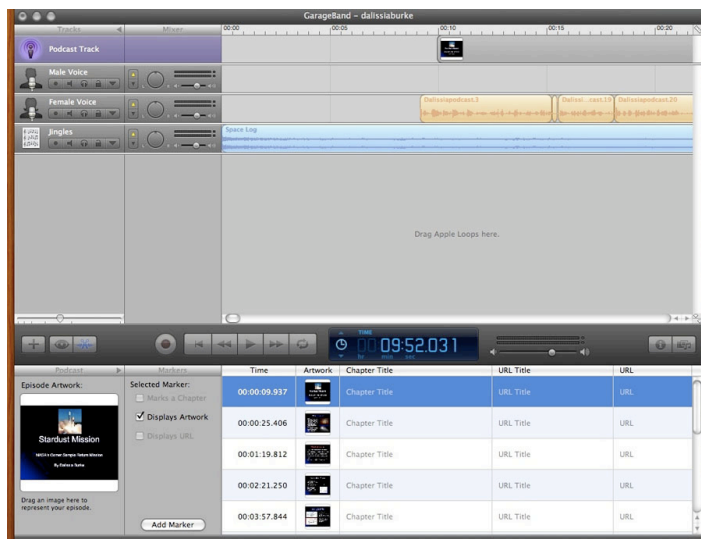

Figure 1. Screenshot of GarageBand, the podcasting production and editing software used to generate the student assignment entitled "Stardust Mission."
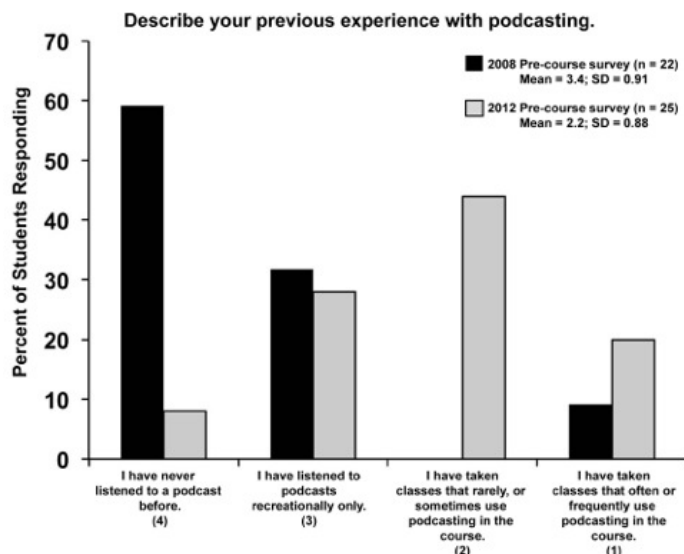

Figure 2. Students' previous experience levels with podcasting.

In the post-course survey, students were also questioned about 1) how often they used the podcasts from Astrobiology; and 2) whether podcasting should be used in more of their classes at the University of Florida (Figure 4). In both 2008 and 2012, the vast majority of the students listened to at least some of the podcasts (95.2%, 100%; respectively) (Figure 4A). Of those students who did listen to the podcasts in 2008, 47.6% of students listened to all of the available podcasts, 9.5% listened to most of the podcasts, and 38.1% listened to some of the podcasts. By 2012 the number of students listening to most or all of the podcasts rose to 92%, indicating students were using this learning tool at a higher rate than in previous years.

Lastly, students were asked whether they thought podcasting should be used in more classes at the University of

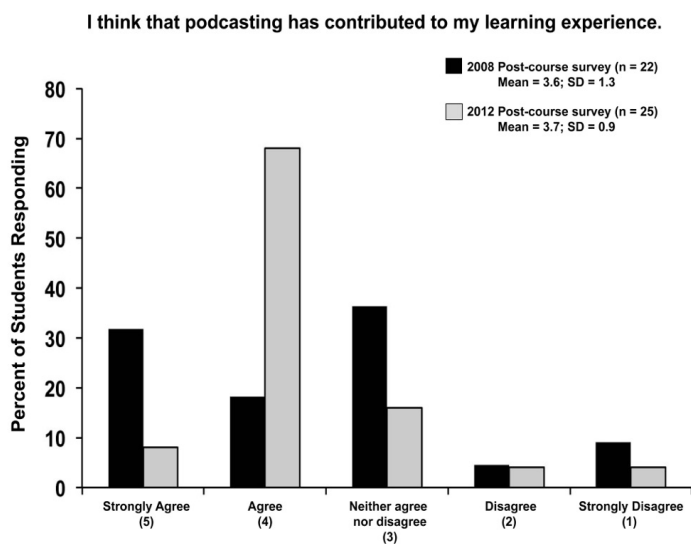**I think that podcasting has contributed to my learning experience.**

Figure 3. Students' perceptions of podcasting and their educational learning experience.

Florida and whether they thought podcasting should replace in-person lectures (Figure 4B). In 2008, the majority of students (80.9%) agreed (23.8%) or strongly agreed (57.1%) that podcasting should be used in more classes; whereas, two students disagreed (4.8%) or strongly disagreed (4.8%) that podcasting should be expanded to other classes, and two students (9.5%) remained neutral. By 2012 these numbers had slightly decreased with only 40% of students agreeing and 8% of students strongly agreeing that podcasting should be used in more UF classes. The number of neutral students (40%) indicated that although their use of podcasting increased and that podcasting helped their learning experience (Figure 4B), the students were still unsure whether the technology should be expanded to more classes. The students also indicated they

prefer that podcasting be a supplemental educational tool and not a replacement for in-person lectures. When asked whether they thought podcasting should replace in-person lectures, only 12% (n = 3) students agreed. One-third of the class (36%) thought that podcasting should be used only as a supplemental tool and that the lectures should be given in person (Figure 4B). The majority of students (52%), however, preferred the current hybrid course format, using a mix of in-person and podcasting lectures (Figure 4B).

Conclusion

The classroom is an evolving environment. Today's educators must continually adapt to changes in student learning needs and available technology. Although there is no substitute for personal interaction between the student and educator, new technological tools can facilitate and enhance the learning processes. With over 70 million Americans listening to podcasts (Arbitron 2010), podcasting is currently a popular technology. The low cost, ease of use, and effectiveness as a communication tool all validate the use of podcasting in the classroom. Educators can easily include podcasting in their repertoire of teaching tools because it only requires a modest budget, software experimentation, and creativity.

Podcasting is not completely without potential drawbacks. Because podcasts have the potential for such rapid and pervasive dissemination, maintaining student privacy may be difficult. Educators and schools will have to modify their podcasting strategies to best fit their specific situations. The results of these surveys provide evidence that students actively used this technology to facilitate their learning experience in Astrobiology and, more importantly, that they

A The number of podcasts I listened to was:

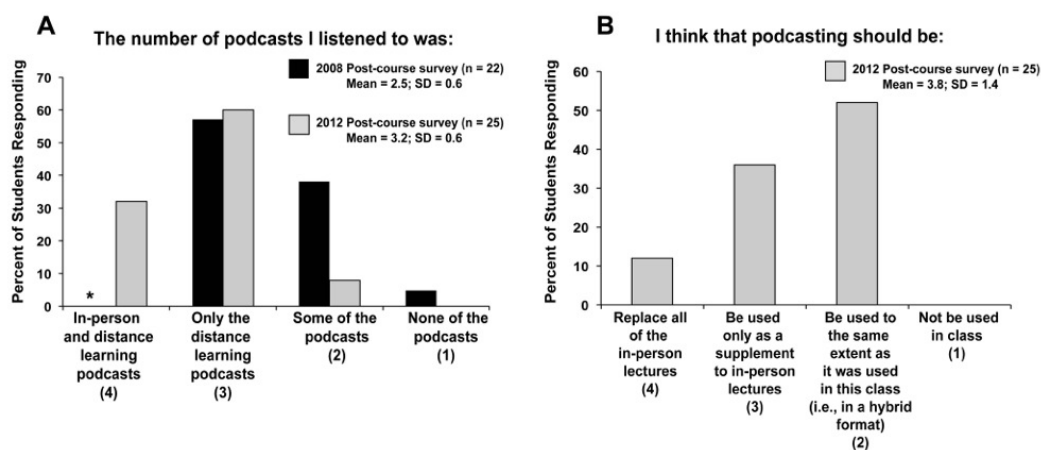**B** I think that podcasting should be:

Figure 4. Post-survey responses of students' use patterns and opinions of podcasting. Note that the asterisk indicates that podcasts of in-person lectures were not available to students in 2008, only the distance-learning lectures.

perceive podcasting as an enhancement to their classroom experience. Although podcasting was popular among most of the students, a few students opposed podcasting in the classroom in 2008 and 2012. Additional attention should be given to make sure these students feel comfortable accessing and playing the podcasts. As podcasting becomes more familiar to students and educators alike, the use of podcasting is likely to expand throughout the University of Florida and at other educational institutions throughout the world.

References

Arbitron. 2010. "The Infinite Dial: Digital Platforms and the Future of Radio, April 8, 2010." Accessed July 16, 2012. http://www.edisonresearch.com/home/archives/2010/04/the_infinite_dial_2010_digital_platforms_and_the_future_of_r.php.

Foster, J.S., and J.C. Drew. 2009. "Astrobiology Undergraduate Education: Students' Knowledge and Perceptions of the Field." *Astrobiology* 9:325-33.

Likert, R. 1932. "A Technique for the Measurement of Attitudes." *Archives of Psychology* 140: 1-55.