

The Basics of Educational Podcasting: Enhancing the Student Learning Experience¹

Jamie S. Foster and Stephanie A. Havemann²

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. Here, 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 essential learning tool for students and educators alike.

What are podcasts?

Podcasts are digital audio files (e.g. MP3 files) that can be played on any portable media player or computer. 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, usage of the terms "podcast" and "podcasting" has embedded itself into the American

lexicon and can refer to the distribution of any downloadable digital audio file.

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 the students. Assuming one has access to a computer and the internet, podcasting can be implemented in the classroom for fewer than \$60.

Microphone

If a recording device is not integral to the computer, or if better recording quality than can be produced by the internal microphone is desired, a

1. This document is MB004, one of a series of the Microbiology and Cell Science Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Original publication date July 2008. Visit the EDIS Web Site at <http://edis.ifas.ufl.edu>.

2. Jamie S. Foster, Assistant Professor, Department of Microbiology and Cell Science; Stephanie A. Havemann, Post-doctoral Associate, Department of Microbiology and Cell Science, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL 32611.

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.creativetechnics.com/iq/what_is_a_good_microphone_for_podcasting_1.html.

Software

Although there are numerous professional podcasting software packages 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 operating systems. For Mac users another free podcasting program 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 iLife08 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 who are less constrained by cost, or who want to generate professional-level podcasts that include multi-person productions such as panel discussions or telephone interviews, more sophisticated equipment recording studio equipment may be needed. This equipment can include such items as condenser microphones, pop filters, UBS 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 such as student assignments, language labs, and distance learning lectures; however, for many educators, mobility is essential. For those educators interested in recording their 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 then be used directly, or edited with the podcasting software. The portable recorders can be coupled with hands-free headsets (e.g. Audio Tetchier PRO8HE) to make recording classroom lectures *in situ* an easy option.

The costs of these portable recording devices can range from \$200 - \$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 does 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 E-learning, Blackboard, or Angel. Students who have access to the class website can then download each lecture individually. Although less time consuming for the instructor, this approach 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 web site and downloading lectures as they are posted, a subscription to the podcasts can be established, thus enabling new lecture materials to be downloaded to the student's computer *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, with the large size of many podcasts (often over 10 Mb), server space can quickly become a limiting factor since few institutions can afford a dedicated podcasting server such as Apple's Podcast Producer for Mac OS X at <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 fewer than \$10 and many companies provide hosting plans for as low as \$5 per month for 10Gb of space (e.g., <http://www.godaddy.com>). For the beginning podcaster, using commercially available services may be a more economical option.

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://www.feedburner.com/fb/a/home>) 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. iTunes is a free program available to both Mac and PC users. Once a subscription has been established by the student, new podcasts will automatically download and play when the iTunes podcast window opens. To request that iTunes display the podcasts in their 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/store/podcaststechspecs.html>. In addition to iTunes, other directories are available to establish podcast subscriptions:

- Educational Podcast Network (<http://epnweb.org>)
- Podcast Alley (<http://www.podcastalley.com/>)
- Odeo (<http://odeo.com/>)
- Podcast Pickle (<http://www.podcastpickle.com/>)
- Podnova (<http://www.podnova.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 you to give the lecture and upload the file to the website. However, if the objective, for example, 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 is truly dependent on its creator and objective.

Benefits of podcasting in the classroom

For educators, podcasting offers 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 potentially hundreds of 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. Finally, assignments that require students to generate, edit, and publish their own podcasts reinforce critical communication skills such as writing text that will be orally presented online or in a classroom.

Podcasting in science education: a working example at the University of Florida

Podcasting was 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* was taught as a hybrid course, which combines both traditional in-person lectures and a distance-learning component. Distance learning lectures were given from the Kennedy Space Center using a Polycom video conferencing system (for course details see Foster and Drew, 2008).

Utilization of podcasting in *Astrobiology*

Instructor and guest lectures – Since podcasting was a new technology, only the *Astrobiology* distance learning (DL) lectures were converted into podcasts. DL lectures were digitized using a portable media recorder (Marantz PMD670) and hands-free headset (Audio Technia PRO8HE). All podcasts were then posted on the University of Florida E-learning online course management system along with the slides from each corresponding lecture. Students were responsible for downloading each lecture in order to gauge their interest and usage of the podcasts. In addition to lectures by the instructor, guest lectures were also recorded and posted as podcasts.

The assignments - All students were required to give a 10-minute oral presentation on an astrobiology topic of their choosing. Since podcasting was still an experimental tool in this course, students were given the option of an extra credit assignment to turn their oral presentations into podcasts. Almost all of the students (21 of 22 students) participated in the extra credit assignment. For those students interested in

learning how to produce a podcast a two-hour voluntary workshop was offered 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 the GarageBand software. The finalized student podcasts were then evaluated for quality and scientific content, and the top five were selected for publication on the website <http://www.jamiefosterscience.com/education/astroBioPodcasts.htm>. An example of a student project in GarageBand is depicted in Figure 1.

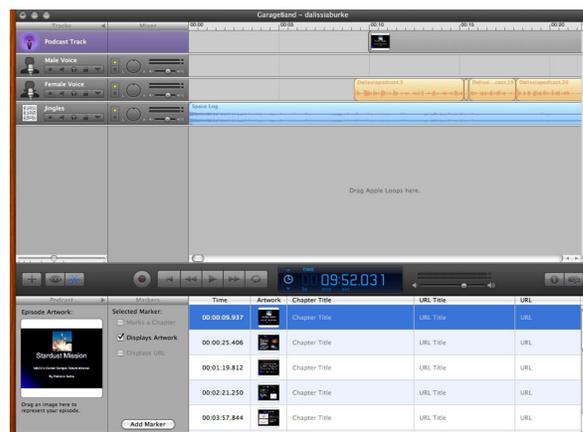


Figure 1. Screen shot of GarageBand, the podcasting production and editing software used to generate the student assignment entitled “Stardust Mission”.

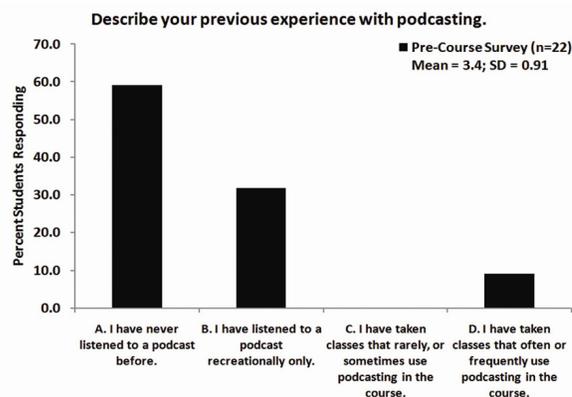


Figure 2. Students' previous experience levels with podcasting.

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. Of the 22 students who initiated the course, only 9% of the

students had previously used podcasting in a classroom setting. The majority of students (59%) had never listened to a podcast before this class, whereas 32% of the students had only used podcasting for recreational purposes (Figure 2). These results suggest that podcasting in the classroom is still a very novel tool and that student perceptions of this tool must be monitored.

Students' perceptions of podcasting before and after using the technology

In pre- and post-course surveys, students were also asked questions regarding their expectations of podcasting in the classroom. In the surveys, students were asked questions 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), and strongly disagree (1). The results of the survey indicated that from the beginning students ($n = 22$) expressed positive attitudes about podcasting (Figure 3). Exactly one-half (50%) of all the students agreed or strongly agreed that podcasting would benefit their learning experience in *Astrobiology*. The other half was either neutral about podcasting with 36% of the students neither agreeing nor disagreeing that podcasting would benefit the course, or they were pessimistic about podcasting with 14% of the students either disagreeing or strongly disagreeing that podcasting would benefit this course.

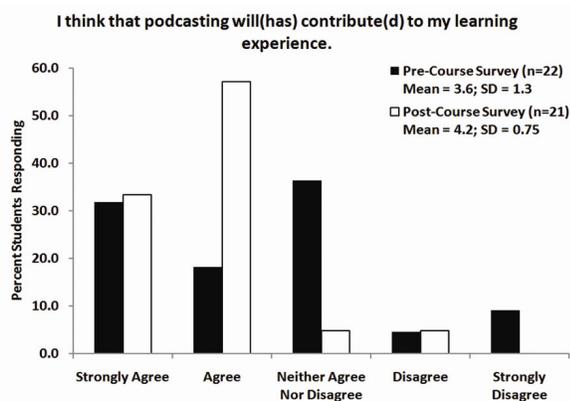


Figure 3. Students' perceptions of podcasting and their educational learning experience.

By the end of the course, however, there was a shift in the number of students who agreed or strongly agreed that podcasting enhanced their learning experience (Figure 3). The post-course survey ($n=21$; note one student did not complete the course) revealed that after the class, 90.4% of the students agreed or strongly agreed that podcasting enhanced the course; whereas, only one student disagreed (4.8%) and one neither agreed nor disagreed (4.8%). These results clearly show students' perceptions of podcasting in the classroom dramatically improved after using this technology in *Astrobiology*.

In the post-course survey, students were also questioned about: 1) how often they used the podcasting in *Astrobiology*; 2) the extent to which they thought podcasting should be used in future *Astrobiology* courses; and 3) whether podcasting should be used in more of their classes at the University of Florida (Figure 4). The vast majority of the students listened to at least one of the podcasts (95.2%); whereas, only one of the 21 students (4.8%) surveyed after the course did not listen to any of the podcasts (Figure 4A). Of those students who did listen to the podcasts, 47.6% of the students listened to all of the podcasts, 9.6% of students listened to most of the podcasts, and 38.1% listened to some of the podcasts. The students surveyed also thought that podcasting should be used more frequently in the *Astrobiology* course (Figure 4B). More than one-third of the students (38%), thought podcasting should be used to supplement all the lectures (both traditional in-person and DL lectures); whereas, 23.5% of the students thought that podcasting should only be used to supplement the distance learning lectures. Some students (28.6%) indicated that podcasting should replace the Polycom distance learning lectures entirely, while one student (4.8%) thought that podcasting should completely replace all the DL and in-person lectures. Only one student (4.8%) of the 21 that completed the course thought that podcasting should not be used in future *Astrobiology* courses.

Lastly, students were asked whether they thought podcasting should be used in more of their classes at the University of Florida (Figure 4C). The majority of students (80.8%) agreed (23.8%) or strongly agreed (57.1%) that podcasting should be used in

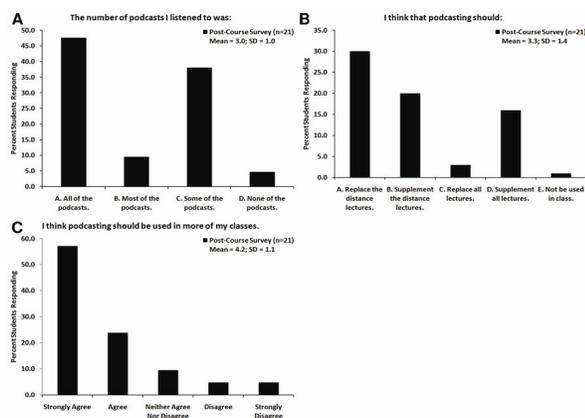


Figure 4. Post-survey responses of students usage patterns and opinions of podcasting.

more of their 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.

Conclusions

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, there are technological tools that greatly facilitate and enhance the learning processes. With over 38 million Americans listening to podcasts on a monthly basis (Diffusion Group, 2007), 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. Integration of podcasting into an educator's repertoire of teaching tools only requires a modest budget, software experimentation, and creativity. Podcasting, however, is not completely without its potential drawbacks. Because of a podcast's potential for such rapid and pervasive dissemination, maintaining student privacy may be difficult, so 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 perceive podcasting as an enhancement to their classroom experience. Although these results suggest that students are willing to individually download each podcast, automatic subscriptions may increase

the student usage by reducing the amount of time spent searching for and downloading the podcasts. Although podcasting was popular amongst most of the students, there was one student who opposed podcasting in the class. Because of the limitations of the survey, the reason for the student's opposition to podcasting was unclear. Perhaps by using more detailed course surveys it can be determined whether the opposition was due to lack of computer experience or a preference for in-person student/teacher interactions. One must also be reminded that, for most of the students, podcasting was a completely novel learning tool. Some students may simply need more time to adjust to new technologies.

Based on these results from the 2008 *Astrobiology* course, podcasting will be expanded to complement all future lectures. Additional attention will be given to making sure students feel comfortable accessing and playing the podcasts as well as increasing the number of assignments in which students have to prepare and produce their own podcasts. As podcasting becomes more familiar to students and educators alike, the use of in podcasting exercises is likely to expand, not only throughout the University of Florida, but also to other higher and secondary educational institutions throughout the state.

References

- Foster, J.S. and Drew, J.C., 2008. *Astrobiology undergraduate education: students' knowledge and perceptions of the field. Astrobiology*. In press.
- Likert, R. (1932) A technique for the measurement of attitudes. *Archives of Psychology* 140, 1-55.
- The diffusion group (2007). Marketing report: Podcast usage models and demand forecasts thru 2012. (<http://www.tdgresearch.com/>).