MP3 AND PODCASTING TECHNOLOGY FOR EDUCATORS

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Abstract: Portable MP3 players, podcasting, and RSS (Really Simple Syndication) have become key technologies in the creation, distribution, and accessibility of media over the Internet. These technologies offer educators several key opportunities to enhance learning in and out of the classroom. A problem-based course in Information Sciences and Technology (IST) has been developed at Penn State Abington to explore the use of portable MP3 players, podcasting and related technologies. The problem-based learning (PBL) approach allows for the introduction of computer engineering and IT concepts as well as exposure to social and ethical issues (e.g. copyright, digital rights management), all in the context of the podcasting technology theme. Students are exploring existing podcast content and are also creating podcasts in a variety of areas using low-cost software and hardware tools. The tools, experiences, and preliminary outcomes of this course development will be of value to educators who are interested in applying podcast technology to enhance learning in many areas of education.

Keywords: MP3 player, podcasting, RSS, problem-based learning (PBL), iPod

1. Introduction

MP3, podcasting, and RSS (Really Simple Syndication) have become key technologies in the creation and distribution of media over the Internet. A growing number of college students have access to portable MP3 players and have expertise in the process of downloading music and media for mostly entertainment purposes. Student experience with podcasts, vodcasts (video podcasting), and RSS aggregators is limited, but growing. Overall, there is a great deal of interest, curiosity, and excitement surrounding the use of these relatively new technologies by the student population.

The term “podcast” was named “Word of the Year” in 2005 by the New American Oxford Dictionary and is defined as "a digital recording of a radio broadcast or similar program, made available on the internet for downloading to a personal audio player"[1]. Podcasts (also known as “audio blogs”) are generally digital audio recordings that are stored in MP3 compressed format and typically consist of a series of episodes which are added on a regular basis, perhaps once a day, or once a week, or other time period. Each of the episode recordings can be typically in the 2 minute to 30 minute or more duration in length. The key to the success of the podcast technology is the ability to “subscribe” to a podcast series or program. Each podcast program available for subscription has an associated RSS feed text file (in a special XML format) which provides content and episode information. Special software clients, called RSS feed aggregators, or “podcatchers”, will periodically read these RSS feeds to determine if additional episodes are available, and then automatically download any new episodes of the podcast program to your desktop computer and/or portable MP3 player. The RSS feed mechanism for podcasts is very similar to the RSS feed process for blog syndication.

Many free podcast RSS aggregators are available for a variety of platforms such as Juice[2] and jPodder[3]. Music management clients such as Apple iTunes [4] software can also be used to locate, subscribe, manage, and listen to podcasts. There are websites

that serve as podcast repositories and offer search facilities to locate and examine user ratings for podcasts of interest. Websites such www.podcast.net and www.podcastalley.com are useful podcast directory sites for podcast searching. Apple iTunes also provides a podcast directory and search feature as well as subscription and playing capabilities. At this time, the vast majority of podcasts are free and available to the public.

There are a number of useful resources available on the web and in print that describe podcast technology in more detail. I have found the books by Cochrane[5], Geoghegan[6], and Farkas [7] to be very useful. The IEEE Education Society has also published a very informative web-based presentation series by Prof. Burks Oakley on the topics of blogs, RSS, podcasts, and wikis [8].

Several universities have recently established educational initiatives using MP3 player technology and podcasting. In 2004, Duke University provided each incoming freshman (over 1500 students) with an Apple iPod player with a microphone accessory. In addition to recording lectures and field notes, Duke has supported innovative teaching and learning projects which leverage the iPod device. Over 42 courses at Duke integrate student use of the iPod in spring of 2006. An evaluation of the freshman iPod pilot program and current initiatives can be found on the Duke Digital Initiative website [9]. Stanford University is currently offering audio content through a special academic arrangement with Apple iTunes software. Lectures, interviews, sports and special event content are all available to the public through "Stanford on iTunes" web page [10].

MP3 and podcast technologies provide opportunities for educators to enhance the content and delivery of curriculum. There are two key areas of opportunity for educators: one opportunity is to incorporate MP3 and podcasting technologies into coursework to provide a context in which to teach technical topics such as analog-to-digital conversion, file compression, networking, copyrighting, ethics, digital rights management (DRM), RSS, etc. – that is, leveraging the rich technology and social implications of podcasting. The other opportunity is to use the MP3 player and podcasting tools to create, distribute, and deliver podcasts based on existing curriculum and new content in a compelling manner to achieve an improved, mobile learning environment. These two approaches are not mutually exclusive. The course enhancement project described in this paper combines elements of both approaches.

The following sections of this paper include an overview of the enhanced course and podcast projects, podcast myths and misconceptions, podcast software tools, key lessons learned, and a summary and conclusion.

2. Course Objectives and Student Podcast Projects

Information Sciences and Technology (IST) 110 Information, People, and Technology is a required first-year introductory course for IST majors and also serves as an elective for the general student population. The objectives of the course are to expose students to the multi-faceted nature of modern computer information systems and their impact on organizations and society, and to expose students to educational and career opportunities in IT-related fields. Active and collaborative learning, teamwork, and communication skills are expected components of the course. During the spring of 2006, a section of IST 110 was delivered in a problem-based format based on podcast technology. The course

challenge presented to the students was to explore and develop podcast content and technology and to deliver recommendations and podcast prototypes on the effective use of podcasting for the Penn State Abington campus in the areas of marketing, recruitment, student life, and education support. This project theme was integrated throughout the entire course and the podcast theme provided the context for the treatment of all other topics.

There was no required textbook, but each student was required to purchase (if necessary) an inexpensive portable MP3 player that would be used in the course. Roughly half (9) of the 19 students enrolled in the class already owned MP3 players. The most common MP3 player owned by students (7 out of the 9 students) was the Apple iPod series player. The remainder of the students purchased MP3 players that ranged from low cost (less than $100) players to higher end ($300+) MP3 players.

Core course topics include analog-to-digital conversion, CD-ROM and DVD digital storage technology; MP3 file and compression techniques; peer-to-peer file sharing; blogs; podcasting; RSS; MP3 player operation; copyright and IP issues; digital rights management (DRM); home computing; networking and Wi-Fi; database; HCI issues; Internet and web technologies; societal impact of technology. One group project required a team of students to develop a 5-10 minute video on MP3 player technology. The second team project was to develop a podcast theme assuming a college student audience. Student podcast themes proposed for this course project included:

- Movie reviews
- Book reviews
- Local Restaurant Reviews
- Personal Computer Security and Protection Tips
- Open Source Software and Freeware Reviews
- Student Government, Clubs, and Campus Activities Update
- French Language Tutorial
- Student Career and Co-op Opportunities
- Tips for Using iTunes Software
- Review of MP3 Players with interviews
- Review and Promotion of Student Rock Band
- College Football Talk Show

At the time of this writing, the individual student podcast themes and content outlines have been finalized and approved by the instructor. Students have also successfully recorded, edited, produced, and submitted the introduction portion of the podcast program in MP3 format. The second stage will be to complete the podcast production, deliver podcasts, and review complete podcast programs – each of which will consist of three episodes. Each of the three episodes is 5 minutes to 15 minutes in duration. The evaluation of these student-authored podcast programs will serve a foundation to deliver a podcast solution for the campus.

3. Podcasting Myths and Misconceptions

Here is a list of four common myths or misconceptions encountered during the coursework experiences with podcasting technology.

- "It is necessary to use an iPod portable player to access podcasts." This is not true. Any MP3 player will be able to store and play podcasts.
- "It is necessary to use an MP3 player to access and play podcasts." This is not true. While it is true that any MP3 player can access podcasts, it is possible, and in some cases desirable, to listen to podcasts directly from a desktop or laptop computer.
- "It is necessary to 'subscribe' to a podcast in order to access and listen to the podcast." This is not true. Podcasts episodes are currently stored as simple MP3 files and these MP3 files can be directly downloaded and played on any computer or MP3 player. The value of subscription through RSS is that new podcast episodes will be automatically downloaded to your computer. For example, if you intend to listen to a podcast which is updated with a new episode every week, then it makes sense to subscribe to this podcast, but it is not required.
- "Only Apple iPod players will work with Apple iTunes software for podcasting". This is not true (for the most part). Apple iPods will automatically synchronize (transfer downloaded podcasts) with iTunes software and this is convenient and advantageous. However, if you subscribe, download, and manage podcasts with iTunes, it will be possible to manually copy the downloaded podcast files to any MP3 player. This is due to the fact that podcast files are stored as common MP3-formatted files. It is not as convenient or as seamless as with an iPod device, but it works. Of course, there are also other podcast management tools besides Apple iTunes.

4. Resources and Software Tools

This section will briefly introduce the two key software packages that have been utilized in this course to support podcast projects. The first package to be discussed is the Audacity sound editing software package, and the second package to be described will be the Apple iTunes software with special emphasis on the podcast capabilities.

4.1 Audacity Sound Recording and Editing software

Audacity [11] software is a free, open source, sound recording and editing package that is available for Windows, Mac, and Linux platforms. The software supports multitrack, stereo recording and editing. Students have generally found the interface to be very intuitive and friendly. Many editing operations on a sound file in Audacity are similar to the highlight, copy, cut and paste operations found in other software packages. Audacity captures audio from a variety of sources on your computer including a built-in microphone (not recommended because of low quality) and external microphones. The software is capable of high bit rate recordings. The multitrack features allow the user to add soundtracks or background music to your recordings. Features such as fade-in, fade-out, amplify, noise removal, and normalize are available operations. This package allows the user to easily delete unwanted artifacts in the recordings (such as "ums" or coughs), or remove periods of undesired silence or noise. The output can be exported as an MP3 file if you download the LAME MP3 encoder file which is available from the same download web site. It was convenient to use a software package in the course that students were able to download and install on personal and home computers. The students were permitted to borrow external microphones to complete sound recording

projects off campus. A screenshot of Audacity software, displaying stereo waveforms, is shown in figure 1.

4.2 Apple iTunes Music and Podcast Management Software

Apple iTunes [4] software is a very popular music store, media player, and media management software tool. This software package synchronizes music and media files directly with the iPod player. In the latest versions, iTunes incorporated direct podcast support. Users can browse and search from a large directory of podcasts, subscribe to podcasts, and play podcast files directly from the desktop. Podcast selections are free to download and transfer to an iPod or manually copy to any other MP3 player. The iTunes software acts as a podcast aggregator, so this software will automatically manage podcast episode updates. One clear advantage of using this tool as a podcast manager is that many students already access this tool for other media, and are comfortable with the interface. The other advantage is that iTunes combines a complete podcast directory along with the aggregator and subscription mechanism. iTunes software is free and is available for the Mac and Windows platforms, and is a very useful tool for any podcasting project.

Figure 2 shows a screenshot of iTunes with a sample list of subscribed podcast programs. As shown, iTunes will store, organize and display the episodes associated with each subscribed podcast program. The user has control over the number of previous episodes stored, and how often iTunes should check the RSS feeds to discover and download any new episodes that are available.

5. Key Lessons Learned

Although preliminary, the use of the podcasting theme in the IST course has been successful. Students have been able to explore MP3 player technology, successfully access and evaluate existing podcasts, and more importantly, the students have created simple podcast recordings, and have developed podcast themes on a wide range of topics. Based on these accomplishments, here is a list of select lessons learned and instructor observations and recommendations from the course:

- The required purchase of a MP3 player was well-received by students. Some students elected to purchase high-end MP3 players such as the video iPods, and others chose to purchase less expensive ($30 to $100) players, some of which possessed useful features such as voice recorders and FM tuners. Although the inexpensive, non-Apple players did not synchronize with iTunes directly, they satisfied the requirement for the course. The use of low-cost MP3 players allows educators to explore MP3 and podcast technology without the need for external grants or funding to purchase high end units. This approach also reduces costs for students. Also, the added benefit of a variety of MP3 players allowed students the opportunity to compare and contrast MP3 player features.
- The low-cost microphones available to the students in our course were of satisfactory quality, but future courses of this nature would benefit from higher-end microphones. It is recommended that educators test and evaluate microphone quality prior to podcast activities. Generally, any built-in microphones on computers generate too much noise to be useful. Higher quality USB headset and

microphones in the $50 to $100 range would generally be recommended, and should be available to students to use during the projects.

- There was a need for mobile digital voice recording (DVR) devices for field work and interviews in venues where a laptop or desktop recording setup would not be feasible. Most of the MP3 players did not have built-in voice recording features. Some MP3 players have optional accessories to provide voice recording. One recommendation is to provide a few high quality digital recording devices for students to use in projects. These high-end DVR units will have ports for external microphones if needed.
- The use of iTunes and Audacity software is highly recommended. Both software packages are freeware, and run on the Windows, Mac, or Unix platforms. This flexibility allows students to install these packages on personal computers at home or other locations. Based on my experiences in this course, I would recommend the iTunes and Audacity software be installed on several campus computer labs, since I found students were in need of on-campus access to these tools for project work.

5. Summary and Conclusions

Podcasting technology is an important and useful Internet technology that is well suited for curriculum integration and enhancement, such as the project-based course outlined in this paper. The podcasting theme provides an opportunity to teach a variety of concepts in engineering and information technology in a context-based approach. The availability of low-cost software and hardware tools makes it practical for both students and instructors to design, create, and distribute podcast media. In this way, the students can be both consumers and producers/creators of podcast-based content. RSS feed aggregators and music management tools allow students and faculty to download, organize, manage, and subscribe to existing podcasts that have been developed internally or are distributed through other colleges and organizations. The widespread use of portable MP3 players has increased the opportunity to access podcasts and audio media in a variety of non-traditional venues, such as in the car or in the gym. This capability creates a mobile learning opportunity for students.

The integration of podcast technology theme in the Penn State Abington introductory IST course has been successful at this preliminary stage. Students from a wide range of majors and technical backgrounds have been introduced to a variety of engineering and IST concepts in the context of creating podcast solutions. These students have successfully created and evaluated podcast media using the tools described above. Final student recommendations for effective use of podcast technology at the campus level will be developed and presented later in the course. These results will be analyzed and presented in a future work.

While podcast and related technologies provide the tools and mechanisms to create, distribute, download, and listen to audio media, it must be emphasized that the starting point for any successful podcast is meaningful and compelling content. The identification of the target audience is a key step in this process. Podcasting is a highly successful Internet technology, but podcasting is not the solution to every content delivery problem.

It is hoped that the classroom experiences with podcasting described in this paper will provide educators with a starting point to further explore the use of this exciting technology in other instructional and curriculum applications.

6. References

[1] Oxford University Press: http://www.us.oup.com/us/brochure/NOAD_podcast/?view=usa
[2] Juice Podcast Software: http://juicereceiver.sourceforge.net/index.php
[3] jPodder Podcast Software: http://www.jpodder.com/
[4] Apple iTunes Software: http://www.apple.com/itunes/
[5] Cochrane, Todd, *Podcasting: The Do-It-Yourself Guide*, Wiley Publishing, 2005.
[6] Geoghegan, M., Klass, D., *Podcast Solutions: The Complete Guide to Podcasting*, Springer-Verlag, 2005.
[7] Farkas, Bart, *Secrets of Podcasting*, Peachpit Publishing, 2006.
[8] Oakley, Burks, 2006 IEEE Education Society's Distinguished Lecture Series: Wikis, Blogs, RSS and Podcasts, http://ewh.ieee.org/soc/es/DLP/Oakley.html
[9] Duke University Digital Initiative: http://www.duke.edu/ddi/
[10] Stanford on iTunes: http://itunes.stanford.edu/
[11] Audacity: http://audacity.sourceforge.net/

7. Figures

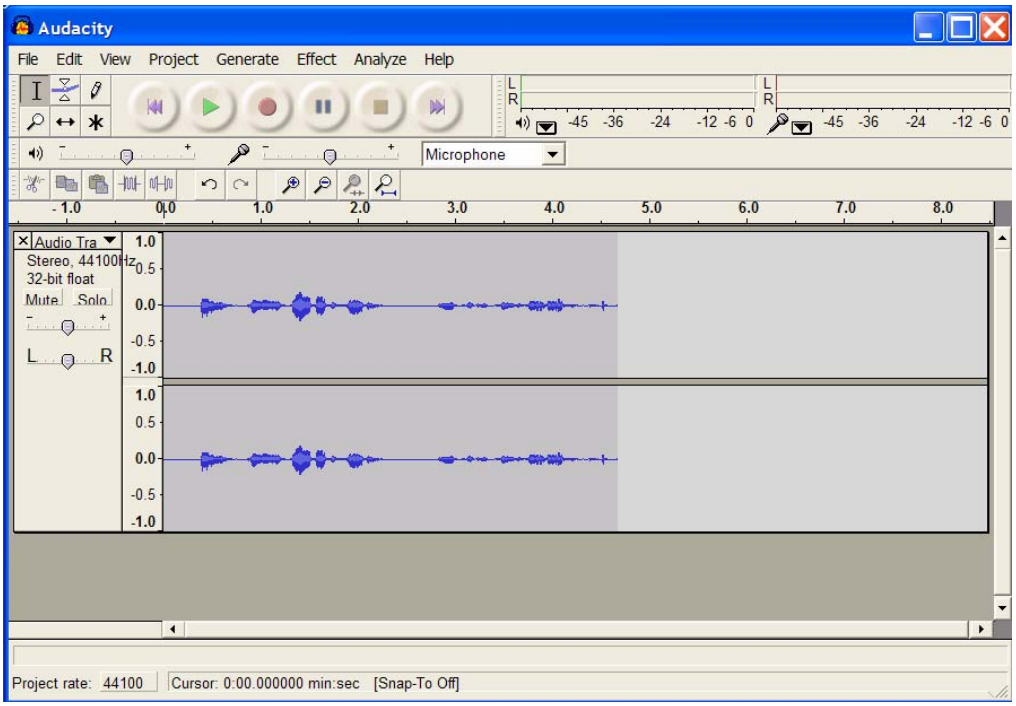

Figure 1: Audacity Sound Recording and Editing Software screenshot

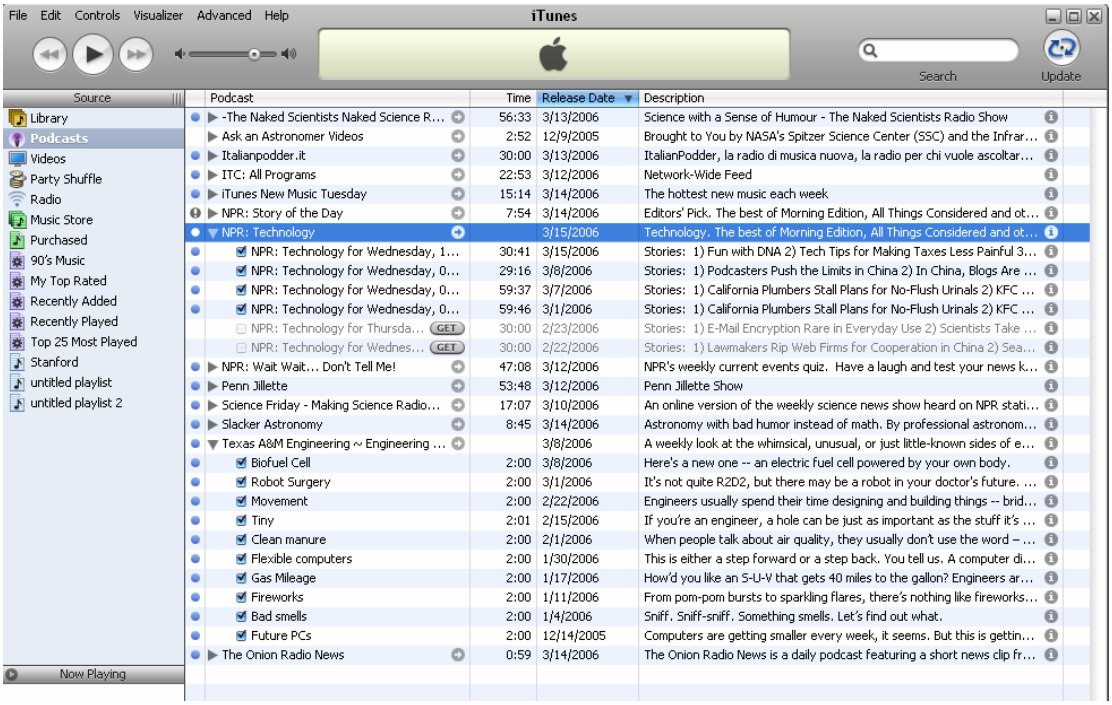

Figure 2: Apple iTunes Music Software with Podcast Support