



Explorations in course-casting: podcasts in higher education

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Abstract

Purpose – To explore the benefits, challenges, and impact of podcasting in higher education and also to provide educators with anecdotal and practical advice and information on how to create and distribute podcasts.

Design/methodology/approach – In support of a traditional college course, a biology professor implemented podcasts to explore the value of coursecasting and its role in student learning. Direct observation, attendance counts, and server statistics supplement a survey that was distributed to 246 students involved in the project. Five survey questions focused on whether the podcasts affected the students' attendance of class, students' preferences for listening to and processing of lecture material, and students' perceptions of the academic impact associated with the podcast availability.

Findings – Taken together, the responses to the main questions from the survey and the student self-reported comments strongly suggest that having podcast lectures available to students does not lead to large declines in class attendance. For the specific courses that were examined by this survey, students overwhelmingly preferred the actual lectures to the recorded podcasts. In addition, the large majority of students were using the podcasts to increase their understanding of material covered in specific lectures. All of these findings seem to indicate that students perceive the podcasts as really useful additional resources available to help them succeed in their courses rather than as a substitute for more traditional methods of learning.

Practical implications – In addition to research-based findings on the podcasts' positive impact on the teaching and learning process, this paper provides practical, "how-to" information on the creation of podcasts.

Originality/value – This study describes experiences and presents original research relating to the podcasting of college biology lectures. Research and observations respond to the question of whether podcasts detract from the educational process. For the prospective podcaster, this paper also shares specific methods, strategies, and how-to information involved in the creation of an academic podcast.

Keywords Management techniques, Teaching methods, Educational institutions, Students

Paper type Case study

Introduction

According to a Student Monitor research study that was described by Cable News Network, iPods are currently "the most in thing among undergraduate college students" (Cable News Network, 2006). The survey, which is now in its 18th year, revealed that 73 percent of respondents from 100 US colleges placed iPods in first place on the What is "In" list, ahead of both beer and Facebook.com, a social networking site. As educators investigate ways to deliver lecture notes and other educational materials, the growing acceptance of the iPod across college campuses emphasizes the practicality of course-casting as a way to supplement and enhance the education of college undergraduates.

Professors at The College of St. Scholastica and other colleges and universities have been recording lectures and making them available to students for many years. What



is novel with podcasting is the way that – a simple change in file format and delivery method – can meet students’ mobile and lifestyle needs by transporting a professor’s teachings away from the confinements of the lecture hall or computer/audio carrel and into any environment of the listener’s choosing.

Background

In Spring 2005, members of the staff and faculty at The College of St. Scholastica resolved to develop course casts for students. At that time, faculty and information technologies (IT) staffs were aware that many students did not yet have an iPod or other MP3 player. Such hardware allows students to avail themselves of mobile advantages of the portable MP3 audio format. While to achieve ubiquitous portability would mandate the distribution of an army of iPods or other MP3 players to students, the availability of free podcatching software made it evident that our college could both afford and support the distribution of podcasts to virtually every student. To receive a podcast, the user needs:

- An internet accessible computer with speakers or headphones;
- Free podcatching software, such as iTunes or Juice (both are free); and
- A web browser.

Research by our college’s academic technology staff showed that creating podcasts was relatively easy and inexpensive. Podcasts can be hosted in conjunction with a web log (“blog”) or they can be created and maintained on a web server requiring minimal resources of:

- computer;
- audio editing software;
- microphone (or, if recording lectures live, a recording device such as the Edirol mobile recording unit used by Dr Cizadlo);
- plain text editing software (such as Notepad or Textpad); and
- storage space on the web server.

In Figures 1, 2 and 3, podcast subscriptions and needed resources are described.

Podcasting:

- Automatically distributes audio content to a subscriber.
- To subscribe, a user locates and enters the address of the XML/RSS file of the desired podcast into special podcatching software. (iTunes offers an even easier interface in which the user can simply click on a SUBSCRIBE button for any podcast registered in the iTunes Music Store).
- The podcatching software is set to scan for updates to the XML/RSS file on a periodic basis. When a new item has been added to the code, the podcatcher downloads it.
- When the user’s iPod is connected, the new material is synched automatically.
- Although podcasts are composed of MP3 files, it is the automatic distribution method combined with the potential for portability that makes podcasts what they are.

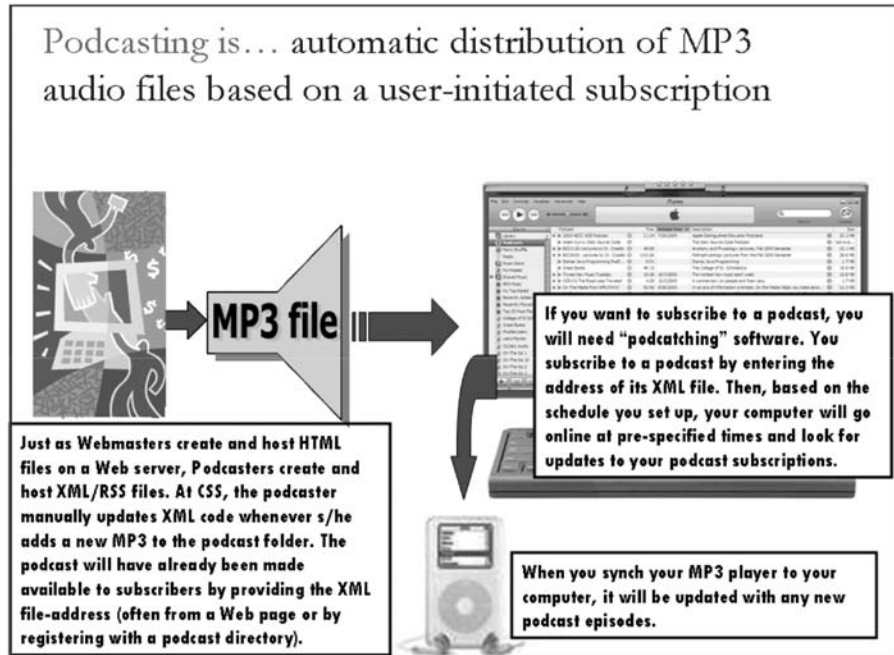


Figure 1.
Podcasting logistics –
subscribing to a podcast

In the beginning: building a framework to support podcasting


Based on the discovery that podcasting is a highly accessible and easy-to-implement technology, staff from the academic technologies department approached Dr Gerald Cizadlo to see if he would be interested in podcasting or course-casting his lectures for the 2005-2006 academic year.

Dr Cizadlo, who was already in the practice of providing lecture audio to students, agreed to participate in this early experiment with podcasting. Throughout the summer of 2005, technology staff experimented with a demonstration podcast that involved the chapter-by-chapter reading of books in the public domain. The MP3 files for this experimental *Great Books* podcast were generated using the freely available Audacity software (See Appendix 1 for technical notes on recording the MP3s), the podcast folder was set up within the Academic Technology web area (See Appendix 2 for technical notes on setting up a podcast), and the XML code was written using simple directions provided by computer information systems faculty member, Diana Johnson, using a plain text editor (See Appendix 3 for instructions for writing the podcast XML file). Initially, the podcatching software we used to receive and test this pilot podcast was Juice (formerly known as "iPodder") which, like iTunes, is freely available on the internet.

Although our beginning usage of XML/RSS was not based on the iTunes version of podcast code, this would change by the end of the Fall 2005 semester.

Project goals and logistics

As the time to begin podcasting some actual lectures drew nearer, initial goals in this endeavor were to:

 Resources: What you'll need to start 

1. **Hardware for recording** (computer + microphone or digital recording device)
2. **Quiet place to record**
3. **Software for recording MP3:** Audacity is free: <http://audacity.sourceforge.net/>
4. **Plain text editor for creating XML file** (e.g., Notepad, Textpad)
5. **Website/server space where you can host podcast**
6. **Podcatching Software:**
 - iTunes: www.apple.com/itunes
 - iPodder: <http://ipodder.sourceforge.net/download/index.php>
 - See Wikipedia for others
7. **Folder on Web server where you'll host XML file and MP3s**
8. **MP3 Player** is desirable but not necessary.



Figure 2.
Podcasting logistics –
what you'll need to get
started

- provide biology students with accurate and complete study materials; and
- experiment with a new technology that seemed in tune with students' lifestyles and interests.

Beginning with the upcoming semester, Dr Cizadlo would record his biology lectures in MP3 format. Staff from the information technologies (IT) department would write the initial XML file that would be associated with the podcast, and Dr Cizadlo would then update that XML file with a new "item tag" and description each time he created a new lecture file/MP3. With this plan in place, the IT staff made preparations for the podcasting of two biology courses.

Preparations included arranging for web space with the College's networking and web services managers, experimentation on how to generate and optimize MP3 files, the creation of the initial XML code file, and making minor edits to Dr Cizadlo's web site to provide a link to the XML file address that students and other site visitors would need in order to subscribe to the podcast.

Once it was clear that the college would be providing podcasts to a target group of over 250 students, campus computer technicians upgraded all lab computers to include Juice and iTunes software, which are both brands of podcast receiving or podcatching software that can be downloaded for free off the internet. These software programs support the utilization of podcasts on a personal computer, and their availability in campus labs paved the way for universal access to podcasts or coursecasts as a backup for any students who did not own an iPod or other brand of MP3 player.

XML Instructions

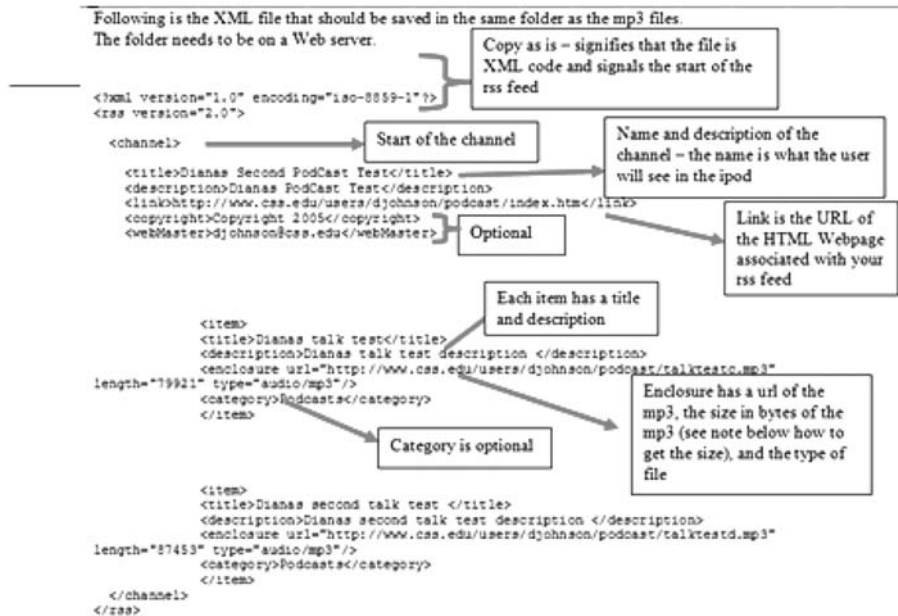


Figure 3.
Podcasting logistics –
simplified XML
instructions

Notes: The XML file that points to the new audio file is written using a plain text editor like Notepad or Textpad. The file is stored in the same Web folder as the MP3 files and is updated to reflect each new MP3 as it is added. Instructions and examples of XML code used to distribute podcasts can be found at various sites throughout the Web, including Apple iTunes and the Harvard.edu site. The simplified instructions shown here were created by Diana Johnson of the College of St. Scholastica

By the first day of the Fall 2005 semester, Dr Cizadlo and the IT staff were ready to launch the College's first expedition into the realm of course-casting, a form of podcasting in which an entire series of lectures is made available via podcasting.

The podcasts begin

As with other independently delivered podcasts that we had studied during our research phase, we edited the biology course web pages to include links to the XML address or URL that student-subscribers could use to obtain the podcasts. Additionally, Dr Cizadlo linked the web page containing his lecture audio from within his WebCT site, which he uses to provide information about course schedules and student grades as well as a place to distribute interactive, but ungraded "self-tests", syllabi, and other course-related material.

On the first day of class, Dr Cizadlo announced the new podcast option for reviewing course lectures or catching up on a missed lecture. The students were positive and, despite the fact that the lectures were recorded live during class, this did not seem to inhibit their willingness to ask questions and participate during class.

The “viral” nature of podcasting

In our initial coursecasts of Fall 2005 we used a simplified and generic form of XML code (Appendix 3) and focused our efforts at providing the podcasts to students at the college. However, with a small amount of time and experience, we began to appreciate what has been referred to as the viral nature of podcasts, in which knowledge and use of the new podcasts spread rapidly and uncontrollably from one listener to the other. The distribution of the podcasts extended beyond the parameters of campus or students. Soon, Dr Cizadlo started receiving e-mail messages from out-of-state and non-US listeners. As one listener stated in an e-mail message, “I have directed friends (and yes, even my current Human Physiology Professor) to the podcasts” (personal communication, March 2, 2006).

Server statistics also verified the rapid growth in visits from podcast subscribers. In Figure 4 below, a graph from a Web Trends report illustrates data from Table I. Taken together, the figures describe the increasing trend in visits, including statistics and a summary of activity.

In addition to the above server data and the receipt of e-mail messages from an extended universe of listeners, we also discovered that the anatomy and physiology podcasts had been registered on the Podcast.net directory. As the semester progressed, and more notes were received by Dr Cizadlo, our perspective changed and we took specific steps to address needs of what had become a worldwide audience of listeners. Today, our XML code is iTunes compliant and all three of Dr Cizadlo’s podcasts include an introductory announcement and a logo bearing The College of St. Scholastica crest. Based on a report from students, the IT Department discovered that Dr Cizadlo’s podcasts were included on the Top 100 List of Education Podcasts on iTunes. One of the podcasts, *Biology 2120: Anatomy & Physiology*, has been an iTunes Featured Podcast, and is often listed among the top 25 most popular educational podcasts on iTunes. “Strange” is the adjective used by Dr Cizadlo to describe the unforeseen success of his podcasts. But with a medium like podcasting, even audiences

Web Trends: Page Statistics at the College of St. Scholastica
Visits 09/08/2005 – 11/03/2005

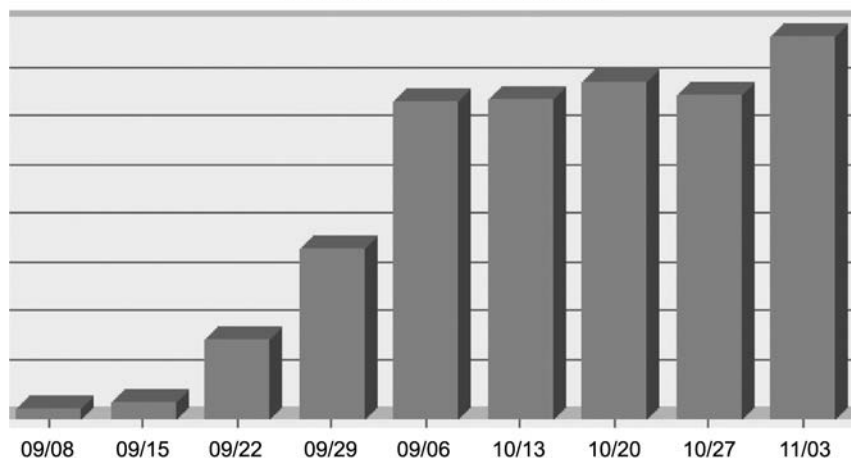


Figure 4.
Server statistics for the
anatomy and physiology
podcast

Table I.
Server statistics/activity
summary for anatomy
and physiology podcast

Summary of activity for report period	
Average number of visits per day on weekdays	68
Average number of hits per day on weekdays	104
Average number of visits per weekend	130
Average number of hits per weekend	200
Most active day of the week	Thursday
Least active day of the week	Saturday
Most active date	November 3 2005
Number of hits on most active date	243
Least active date	September 10 2005
Number of hits on least active date	2
Most active hour of the day	22:00-22:59
Least active hour of the day	05:00-05:59

with narrow or specific areas of interest can find resources that meet their needs and interests.

One listener, provides the following podcast review in the Podcast area of the iTunes Music Store:

“Continual updates yet another reason. . .

Just when I was getting settled into this podcast (I’ve been listening since lecture 1) and as if the quality of the content wasn’t enough, Dr Cizadlo’s efforts to incorporate all the features of a great podcast shine through. The episode descriptions, the St. Scholastica logo, and classical music use at the beginning of each episode add to the academic experience of his podcast. He is considerate of his diverse audience while at the same time staying committed to his students’ needs first. This is a first rate physiology podcast and I wish I had as tech savvy a professor when I was an undergrad!”

Review of the literature

Context, task, and learner are all factors in the selection and effectiveness of a specific medium (Salomon, 1979). Robert Kozma builds upon this concept with his call to explore how different media might interact with and influence various processes of learning (Kozma, 1994).

The vast and diverse population across the internet supports the “narrowcasting” of specific information, including podcast programs, to people with specific needs and interests. Podcasting also has the ability to transcend constraints of time and scheduling by offering what has been often referred to as “radio on demand”. This could be one explanation for the medium’s enormous popularity and applicability in the face of even the most esoteric of topics. According to recent Bridge Ratings research, podcasts are “catching on with iPod users” (Bridge Ratings, 2005a, p. 1). This growth is expected to ultimately reach a critical mass in 2010, when a conservative estimate of podcast audience growth is expected to reach or exceed 45 million users (Bridge Ratings, 2005b).

In the realm of education, podcasting has become increasingly popular. Dave Jobbings, the founder of a quality-controlled directory of educational podcasts for educators, schools, and colleges states:

There is no doubt that the medium of podcasting has so much to offer for transforming learning styles and generating motivation amongst students and adults of all ages. This is partly why I created a podcast directory specifically for educators and for learners at home, school, college or elsewhere. I am not surprised by the kind of responses that Dr Cizadlo and other educational podcasters have been receiving. It is good to hear these positive and worldwide responses (personal communication, February 20, 2006).

The Horizon Report, a collaborative effort of EDUCAUSE and The New Media Consortium lists personal broadcasting, including podcasting, as among the top two technologies that are being implemented in higher education today. The 2006 report reports a “Time-to-Adoption Horizon” for this technology of one year or less.

According to *The Horizon Report*, personal broadcasting is “at the leading edge of a wave that will last for the next several years. . . From podcasting to video blogging (vlogging), personal broadcasting is an increasingly popular trend that is already impacting campuses and museum audiences” (*Horizon Report*, 2006). This trend also includes image-enhanced podcasts and video podcasts (vodcasts), which are viewable on a PC using podcast receivers like iTunes or Juice and are also fully portable using the Video iPod.

Robert Kravik’s chapter in *Educating the Net Generation* (Kravik, 1995) suggests that ubiquity is a key factor in the degree of student appreciation and use of technology. In response to a survey that queried college students on the advantages of technology, the most frequently cited benefit was convenience (Kravik, 1995). As a portable, on-demand medium, it seems likely that the convenience factor of podcasting will continue to have an appeal for this generation of students.

Podcasting’s impact on education is already being felt and heard. The existence of Apple’s iTunes University, the efforts of Purdue University to podcast over 90 courses (Read, 2005a, p. A32), and the expansion of the lexicon to include hitherto unheard of words – such as course-casting – are symptomatic of the popularity and potential of educational podcasts (Apple, 2006).

Predictably, the success of these podcasts has also opened the door to some questions and controversy. Referring to podcasting, an article in *The Chronicle of Higher Education* states that:

[...] many professors remain wary of the technology. . . [saying] . . . that it will lead to empty classrooms or serve as a crutch for late-sleeping students, and some worry about course-casting’s intellectual-property implications (Read, 2005b, p. A39).

A newspaper article entitled, “The iPod took my seat”, described a situation in which the availability of podcasts was blamed for a dramatic decline in student attendance. According to the article, there were times when only 20 students (out of an enrollment of 200) showed up for class, a situation that the instructor referred to as “demoralizing” (Silverstein, 2006, p. 4).

However, research studies explore motivational issues that relate to student absenteeism. According to a 2004 article in the *College Student Journal*, survey data indicated that:

[...] the most common situation in which students are motivated to attend class is if they consider the instructor and/or the material interesting. Of the 144 students who responded to the survey, 84.7 percent indicated such interest was a reason they would attend class. Only 66.7 percent indicated they would be compelled to attend a class

because credit was given for attendance, suggesting that instructors should try to make their courses as interesting as possible if they wish to improve attendance rates (Gump, 2004, p. 157).

Before iPods, and before the dawn of podcasting in 2004, college professors provided (and continue to provide) students with various other forms of online resources including audio and notes. Similar to the debate surrounding podcasts, these supplements were said to have a potentially counterproductive effect of decreasing student attendance. In his research on note use and how the provision of online notes impacts student attendance concludes that:

[...] it is important to recognize that missing classes can occur for many reasons, and instructor resistance to providing notes would not be justified as a response to all of these reasons (Grabe, 2005, p. 420).

In support of the benefits provided by complete notes Grabe also asserts that:

[...] in at least some of these circumstances [...surrounding absenteeism...], class attendance probably had little to do with the availability of notes and access to notes would clearly be to the benefit of the student. If the connection between online notes and class attendance is a significant issue causing instructors to deny access to notes they could easily make available, further investigations attempting to associate note access with specific reasons for not attending class and with course performance should be considered (Grabe, 2005, p. 420).

According to an article in *The Chronicle of Higher Education* (Read, 2005b), one college instructor addressed concerns about absenteeism by writing something on the board and saying (for all the audio-podcast listeners to hear) that the item he was writing would be on the next test. Not only is it likely that students can get around this strategy, but one might also assume that it could build resentment among that same group of students.

Student usage of podcast lectures

As in the case of the professor who made his complete notes available online, findings from a survey of students at The College of St. Scholastica indicate that the biology podcasts are used for a similar purpose – to improve student understanding of the material (Grabe, 2005).

Based on observations, random attendance counts, and results from a survey that was administered to 246 of Dr Gerald Cizadlo's biology students, the availability of podcasts promotes understanding of the content, but does not encourage students to skip class. This is also the general observation of an article entitled, "Technology's impact on CSS attendance," which was written by a staff writer for St. Scholastica's student newspaper. The article explored the issue of how podcast audio and other online content has affected student attendance at The College of St. Scholastica. The writer concludes that "despite reports that technology at school aids in student absenteeism, the College has not experienced the same trend" (Hoover, 2006, p. 5).

Survey results

In order to address whether the availability of podcasts had an effect on students' class attendance and effort in the course, a survey was presented to students in two biology courses. Of the 246 students who were notified and asked to participate in the survey,

166 responded, for a response rate of 67 percent. This was an impressive response rate considering that students were given five to seven days to complete the survey through WebCT.

The five main questions included on the survey focused on whether the podcasts affected the students' attendance of class, students' preferences for listening to and processing of lecture material, and students' perceptions of the academic impact associated with the podcast availability. The specific questions that were asked included the following:

- Has the availability of podcast/audio caused you to attend class less frequently?
- Please select the statement that best describes your preference as it relates to this course: (I prefer listening to the actual lecture/I prefer listening to the podcast or another recorded version of the lecture).
- Have you used the podcast/audio to improve your understanding of the material covered in a given lecture?
- Has the availability of podcasts/audio helped you do better in the course?
- If a lecture is missed, how does the availability of podcasts compare to using notes borrowed from a fellow student?
- If there's anything you'd like to add, please share your comments here.

Results for the first survey question are provided in Table II. The responses indicate that approximately 95 percent of the students did not attend class less often as a result of having the podcasts available. Although this attendance was self-reported, it seems to suggest that students do not use the podcasts as a way to avoid attending class. Furthermore, actual attendance counts in the larger Biology course on two different days showed the attendance rates to be 74 percent one day and 79 percent on the other day. While we do not have a baseline for comparison with typical attendance rates prior to the podcasts, the instructor's impression is that the implementation of podcasts and lecture audio has not caused a decline in the percentage of students attending the lectures. Further, these rates do not reflect the large decrease in attendance noted in the newspaper article cited previously, "The iPod took my seat."

The results for the second survey question are displayed in Table III. The responses for this question support those from the first question in that only 6 percent of the students indicated that they preferred the podcast or recorded version of the lecture to the actual lecture.

The third survey question and associated responses are presented in Table IV. Approximately 70 percent of the students report that they have used the podcasts to improve their understanding of lecture material. This suggests high utilization of the

	Responses	Frequency	Percent	Valid percent	Cumulative percent
Valid	Yes	8	4.8	4.9	4.9
	No	156	94.0	95.1	100.0
	Total	164	98.8	100.0	
Missing	System	2	1.2		
	Total	166	100.0		

Table II.
Has the availability of
podcast/audio caused you
to attend class less
frequently?

recorded lectures to help with the processing of the material covered during the class periods.

The responses to the fourth survey question, which are provided in Table V, also indicate that the majority of students believe that having the podcasts available has helped them to improve in the course. However, almost 35 percent were unsure as to whether the podcasts had helped them to do better in the course. It may be that this group of students had limited exposure to the recorded lectures or that they could not pinpoint a specific positive result associated with having the recorded lectures available to them.

Responses to the fifth survey question are provided in Table VI. The results from this question strongly suggest that students, as a group, see much greater value in having the podcasts available rather than having only the opportunity to borrow notes from another student when they have missed a lecture. In fact, approximately 75 percent of responding students indicated that the availability of the podcast lectures was more helpful or much more helpful than borrowing notes from a fellow student, while less than 2 percent reported the podcasts as less helpful than notes from another student.

A brief examination of the responses to the open-ended comments section of the survey supported many of the findings from the more quantitative questions. The comments of those few students who indicated that they did attend class less frequently

Table III.
Please select the statement that best describes your preference as it relates to this course

	Responses	Frequency	Percent	Valid percent	Cumulative percent
Valid	Prefer actual lecture	154	92.8	93.9	93.9
	Prefer podcast or recorded version	10	6.0	6.1	100.0
	Total	164	98.8	100.0	
Missing	System	2	1.2		
Total		166	100.0		

Table IV.
Have you used the podcast/audio to improve your understanding of the material covered in a given lecture?

	Responses	Frequency	Percent	Valid percent	Cumulative percent
Valid	Yes	116	69.9	70.7	70.7
	No	48	28.9	29.3	100.0
	Total	164	98.8	100.0	
Missing	System	2	1.2		
Total		166	100.0		

Table V.
Has the availability of podcasts/audio helped you do better in the course?

	Responses	Frequency	Percent	Valid percent	Cumulative percent
Valid	Yes	85	51.2	51.8	51.8
	No	22	13.3	13.4	65.2
	Unsure	57	34.3	34.8	100.0
	Total	164	98.8	100.0	
Missing	System	2	1.2		
Total		166	100.0		

as a result of the availability of the recorded lectures, some of them made comments that indicated they not only used the technology as a first introduction to missed lectures but also to review confusing or difficult material. These comments further support the responses to the question asking whether or not students had used the podcasts to improve the understanding of specific lecture material. Furthermore, of the 72 written comments, 34 of them indicated that students used the podcasts to review confusing or complex information from specific lectures or in studying for exams.

Another finding that was supported by the written comments was that students do tend to prefer the actual lecture over the podcast/recorded lecture. Several students (12) specifically indicated that they found the actual lectures informative and enjoyable. Yet, the majority of the students could also see the benefit to having the podcasts available for reviewing material as a study tool or for when having to miss class. In addition, as noted by the comments from at least two students, the podcasts do not include any pictures of what is being discussed during the class period, which makes it more desirable for students to attend the actual lecture.

One other interesting finding from the written comments focused on the benefit of having the podcasts available in addition to notes from other students when it is necessary to miss class for some reason. These students (8), indicated that both the written notes and the recorded lectures would be really useful for helping them to understand class material they had missed. However, there were also students who indicated that if they had to be absent from a class they would rely on the recorded lectures to provide the information they had missed.

Overwhelmingly, the 72 comments from students contained mostly positive reactions and appreciation for the availability of the podcast lectures. In fact, only four of the comments addressed a negative issue or the need for some type of change to the current practice of offering the recorded audio lectures through WebCT. The large number of appreciative comments serves to validate the overall positive results of the rest of the survey. This is especially relevant since the prompt for written comments was deliberately vague and non-directive. Students could have chosen to point out the negative aspects of the podcast lectures, but instead, chose to clarify their already positive responses to the other questions on the survey.

Discussion

Taken together, the responses to the main questions from the survey and the student self-reported comments strongly suggest that having podcast lectures available to

	Responses	Frequency	Percent	Valid percent	Cumulative percent
Valid	Much more helpful	81	48.8	49.7	49.7
	More helpful	42	25.3	25.8	75.5
	Neutral	25	15.1	15.3	90.8
	Less helpful	2	1.2	1.2	92.0
	Not applicable	13	7.8	8.0	100.0
	Total	163	98.2	100.0	
Missing	System	3	1.8		
Total		166	100.0		

Table VI.
If a lecture is missed, how does the availability of podcasts compare with using notes borrowed from a fellow student?

students does not lead to large declines in class attendance. For the specific courses that were examined by this survey, students overwhelmingly tended to prefer the actual lectures to the recorded podcasts. In addition, the large majority of students were using the podcasts to increase their understanding of material covered in specific lectures. All of these findings seem to indicate that students perceive the podcasts as really useful additional resources available to help them succeed in their courses rather than as a substitute for more traditional methods of learning.

Conclusion

Overall, our experience with podcasting has been more exciting and more enriching than we ever imagined it would be. While it was not difficult to begin producing the podcasts, the dearth of resources on how to get started with academic podcasts and need to forge a new set of plans and procedures at our institution made the project just enough of a challenge.

We also found that our original intentions in creating the podcasts shifted from wanting simply to support students from The College of St. Scholastica to wanting to support an avid and worldwide audience of people who were eager for the information these podcasts provide. In keeping with the idea of the internet as an interactive and global community, the listeners have similarly enriched our own work and experience at the College. Listeners have sent Dr Cizadlo ideas and information, and one scientist from another university even e-mailed a video of a cardiac muscle cell in the hope that this lab experiment might become a useful illustration of a point made in one of Dr Cizadlo's lectures about oscillating muscle cells. Many others have simply written to express their appreciation for the podcasts.

With this project, we have expanded our approach from an institution-centered effort designed to support a specific number of undergraduate biology students to one that also acknowledges the podcasts' broader value in providing materials that benefits an international audience of students, professionals, and others with an interest in medical and scientific information. At this College, where our mission is to prepare leaders who will "touch the world," we are pleased to associate the name and logo of St. Scholastica with the provision of these free and highly-regarded series of lectures.

Academically, for our own students, we have found that the podcasts have enhanced learning, but have not detracted from class attendance. Students use the podcasts to improve their understanding of the material, and the podcasts represent a valuable and reliable alternative to borrowing the class notes of other students.

Although this discussion has centered on the use of podcasts to disseminate class lectures, various faculty members at this campus and others are using podcasts for other purposes. One computer information systems (CIS) instructor uses them to highlight important concepts and material covered during class and in assignments. Another instructor who particularly values the fact that podcasting offers an opportunity for students to produce work for an authentic audience, allowed her students to create audio guides to describe various works of art located throughout our historic campus. Podcasting also represents an effective way to share and distribute poems and short stories that were written by the students at our college and published in the campus literary magazine, *Out of Words*. These are just a few applications of podcasting, and we look forward to exploring more.

As the founder of the podcast directory for educators, schools, and colleges points out: “The potential uses are limited only by the imagination, time and resources that are available, and the relevance of the activity” (Jobbings, 2005).

Throughout this project, podcasting has been an exciting journey, and one which we will continue eagerly.

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Appendix 1. Technical notes recording your MP3s

Create audio files in MP3 format

Podcasts involve the syndicated distribution of a series of MP3 files. Because MP3 files take up a fairly large amount of space, you will need to arrange for the web and network resources needed to support an ongoing podcast project. The MP3 files that were used in the anatomy and physiology lectures averaged 30 MB each for a 55 minute lecture. Naturally shorter lectures or audio files will be considerably smaller. Hint: Create an MP3 file that reflects the average quality and length of your planned podcast program. Then, right click on the file icon to determine its size. You will then be able to use this information to estimate the space you will need on the web server.

There are several ways to record your MP3

You can record your podcast using a microphone and audio editing software that has been installed on your computer. During our summer trial, we used Audacity because it was free and works very well. We currently use Sony's Sound Forge Audio Studio 8, and have been pleased with our results.

For recording lectures live, Dr Cizadlo uses a portable and high-quality, Edirol recording device. Before updating the XML code to reference the new MP3 file, each MP3 is edited to include a standard musical introduction to the lecture episode. Against a backdrop of classical music, a student's voice is heard to announce: "This lecture by Dr C is coming to you from The College of St. Scholastica in Duluth, Minnesota".

MP3 files associated with your podcast should all go in the same podcast folder

The MP3 files for a specific podcast are all stored in the same web folder. In addition to MP3s, the folder also includes the XML/RSS file that serves to "direct" that podcast.

The XML file is used to "flag" the addition of new MP3s

Whenever a new MP3 is added to the web folder, the podcaster needs to edit the XML code/file to reflect the new MP3/content. The information about the new MP3 file is included in an enclosure or "item tag".

Add new XML "item tags" to reflect the addition of new MP3/audio files

Many aspects of the item tag stay the same from one week to the next, so it is an easy matter to copy the entire item tag from the previous audio/episode and update it to reflect the current MP3/audio. However, once copied, the podcaster needs to update the tag to include new information such as: a new date and time, a new description, a new file name to specify the name of the new MP3 file (e.g. the file of an anatomy and physiology lecture that took place on May 8, 2006 might be called AP050806.mp3), and the exact size in bytes of the new file. One can obtain a file size of an MP3 by right-clicking on the file and then selecting properties.

Appendix 2. Technical notes setting up your podcast

Set up your web/podcast folder

The XML code file needs to go in the same web folder as the MP3s that are associated with your podcast. This XML file gets updated whenever there is a new podcast episode, and the new "item

tag” that you include in the update is basically a reflection or description of the content or properties of the new MP3 file (Appendix 2, Figure A1).

An XML file “directs” your podcast

It is imperative that you use a plain text editor (e.g. Textpad or Notepad) to write your XML code. Directions on how to write the code may be obtained from the simplified instructions provided in Appendix 3 of this paper. However, if you plan to register your podcast with iTunes, you may want to visit the iTunes web site where you can obtain instructions for writing a special form of XML code. Using this iTunes code format will allow your podcast to comply with categories, keywords, and other features supported by iTunes. If you care to promote your podcast, you can further enhance your podcast’s curb appeal in the iTunes Directory by including a graphic image for display. Details and how-to information is available from the iTune’s Technical Specifications web site: www.apple.com/itunes/podcasts/techspecs.html

Link the XML file from your web site

Remember that the MP3s and other elements of your podcast must be stored and maintained in a web folder. Type the plain text XML code file using the simplified instructions provided in Appendix 3. (or use instructions from the iTunes site). You will save your XML code file with the extension of.xml. (For example, the XML file for Dr Cizadlo’s Anatomy & Physiology podcast is entitled, “AnatPhys.xml” and the full URL is: <http://faculty.css.edu/gcizadlo/podcast/AP/AnatPhys.xml>.)

You will add the link from your web site in the same manner in which you might link an ordinary HTML file.

You can link to the XML using a plain text link: “Anatomy Podcast XML”. However, to make it even more evident that a podcast is available, you can use an XML graphic to link to the XML code file. You can find standardized XML/RSS graphics at various sites on the internet.



Figure A1.

Consider this...

Before you register your podcast with one or more of the podcast directories on the web, it's a good idea to test your podcast to ensure that it is working properly. Set up:

- Your web/podcast folder with MP3s and a single XML file that references the MP3s comprising the podcast; and
- Your web page link to your podcast XML file.

Once you've linked your XML file/site, you can test your podcast by copying the full URL of your podcast XML file and pasting it into your podcast receiving software. (In iTunes you can manually subscribe in this way by clicking on Advanced >> Subscribe to Podcast and pasting the URL into the designated area).

Appendix 3. Technical notes – XML/RSS Instructions by Diana Johnson

Channel - This is what you see in the iPod as a subscription feed name

Item - Items go inside the channel.

An Item describes an mp3 sound file.

This is what you see as the episode name.

Following is the XML file that should be saved in the same folder as the mp3 files.

The folder needs to be on a Web server

```
<?xml version="1.0" encoding="iso-8859-1"?>  
<rss version="2.0">
```

```
<channel>
```

```
<title>Dianas Second PodCast Test</title>  
<description>Dianas PodCast Test</description>  
<link>http://www.css.edu/users/djohnson/podcast/index.htm</link>  
<copyright>Copyright 2005</copyright>  
<webMaster>djohnson@css.edu</webMaster>
```

Copy as is – signifies that the file is XML code and signals the start of the rss feed

Start of the channel

Name and description of the channel – the name is what the user will see in the iPod

Optional

Link is the URL of the HTML Webpage associated with your rss feed

```
<item>  
<title>Dianas talk test</title>  
<description>Dianas talk test description </description>  
<enclosure url="http://www.css.edu/users/djohnson/podcast/talktestc.mp3"  
length="79921" type="audio/mp3"/>  
<category>Podcasts</category>  
</item>
```

Each item has a title and description

Category is optional

Enclosure has a url of the mp3, the size in bytes of the mp3 (see note below how to get the size), and the type of file

```
<item>  
<title>Dianas second talk test </title>  
<description>Dianas second talk test description </description>  
<enclosure url="http://www.css.edu/users/djohnson/podcast/talktestd.mp3"  
length="87453" type="audio/mp3"/>  
<category>Podcasts</category>  
</item>
```

```
</channel>
```

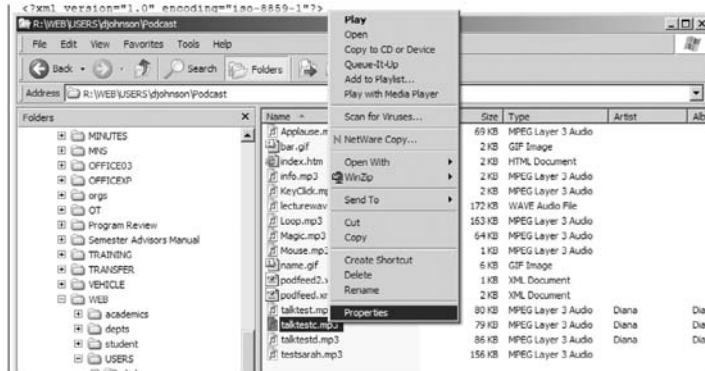
```
</rss>
```

Figure A2.

To get the file size of the MP3

Go to Windows Explorer

Right click on the file and click on properties



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Copy the file size (when you paste the file size into your XML make sure and delete the comma)

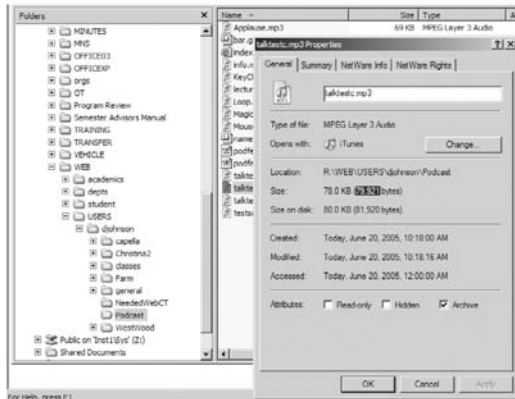


Figure A3.

Suggestion

When you add an MP3... just copy the code for an item and change the name of the MP3 and the file size.

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