Creating Enhanced Podcast Virtual Lectures
Using Enhanced Podcasts and PowerPoint to Deliver Online Modular Lectures

Michael A. Russell
AC 2568, (503) 491-7348
mike.russell@mhcc.edu

Abstract:

This report discusses the phenomenon of podcasting in considerable detail. Podcasting requires simple equipment and procedures to enact, and this report attempts to lower the learning barrier to new faculty interested in podcasting to their individual audiences.

The podcasting process is explained, and the three main steps in podcasting (production, publishing and promoting) are discussed. A quick discussion on the four types of podcasting medium is provided, namely "traditional" audio-only podcasting, enhanced podcasting, vodcasting and screencasting. Cross-platform (i.e. Macintosh and Windows) options are provided whenever possible.

Examples and instructions on creating the various podcasting types are provided. Comments on how I personally use podcasting in the classroom are provided in order to give potential ideas to interested podcasters. Finally, a comprehensive list of references is also provided for readers to gather additional information about the procedures and discussions presented in this report.

This document and all supplementary materials may be viewed on the World Wide Web:
http://www.gst-d2L.com/TLC

Contents:

If I can answer any additional questions you might have, please contact me. Thank you for your time,

Michael A. Russell, Ph.D.
Professor of Chemistry, Mt. Hood Community College, Gresham, Oregon 97030 USA

I. <u>An Introduction to Podcasting</u>

Podcasting is a method to get your message across to an audience over the Internet. Podcasting incorporates several tools (such as RSS, XML, FTP, etc.), and podcasting itself can incorporate different mediums (vodcasting, screencasting, enhanced podcasting, etc.) but it is all about getting your ideas across to the people. The term "podcast" is quite new, being added to the Oxford Dictionary as an "official word" in their lexicon in October of 2005. Podcasting has taken the Internet by storm, and one cannot attend any sort of multimedia or technology conference without someone mentioning podcasting in some context.

> *Podcasting:* distributing a multimedia file (usually audio MP3 files) over the Internet for people to download and listen to at their leisure.

The podcasting phenomenon was fueled by the advent of the Apple iPod, and many podcasts have been listened to through the ear buds of an iPod... but the technology is actually quite versatile, and one need not own an iPod (or even use or like the Apple Macintosh!) to listen to and create podcasts.

> *Important!* You do not need an iPod to use or create a podcast!

Please note that the podcasting phenomenon is exploding in creative, educational, business and government circles even as I write this paper (May 2006), and many of the subjects written about in this report may be obsolete by time you read this. Podcasting is a constantly changing technology with new possibilities appearing daily. So before going into the current state of podcasting, it will be instructive to take a step backwards and discus the history of podcasting. A brief history of podcasting will also allow for the introduction of many of the terms and methodologies used in creating and distributing the podcasts to the people.

A Brief History of Podcasting

The first (rudimentary) podcast experience began in 2001 through the powerful collaboration of Adam Curry (one of the original MTV VJs) and Dave Winer (the creator of the RSS technology.) RSS (which usually stands for Really Simple Syndication) is a technology used to quickly update the content of a website. RSS technology uses XML (eXtensible Markup Language, a computer language used by many websites) to produce changes quickly and relatively easily with no coding involved (most of the time.) For example, the RSS protocol allows bloggers (the online "diaries for everyone to read" phenomenon) to upload the changes and additions to their blogs easily without knowing complex Web language (and most of the time without knowing about FTP (File Transfer Protocol) terminology either.

> *RSS:* Really Simple Syndication, a protocol used by bloggers and podcasters to update their content automatically on the Internet

> *XML:* The eXtensible Markup Language; a computer language (actually a protocol) used by advanced websites and the RSS protocol

> *Blog:* Essentially an "online diary" which can be kept (and updated) by anyone with a connection to the Internet for free. Blogs can usually be ready by anyone who is aware of the blog address.

> *HTML:* The HyperText Markup Language, a computer language used by the majority of websites on the Internet to display images, text, etc.

> *FTP:* File Transfer Protocol, a system whereby files are transferred from your computer to a computer connected to the Internet (i.e. a server.) FTP is usually used to transfer MP3 podcast files from your computer to a server.

Back to the podcasting: the first 2001 "podcast" used the RSS technology to upload huge audio files to the

web, making them accessible to anyone with an Internet connection. However, the files were large (they used a memory-intensive WAV (WAVe Audio, developed by Microsoft) format and difficult to "advertise" to people who might be interested in Adam Curry's pontifications. The common Internet download speed in 2001 was still closer to 56K, which is too slow for adequate podcast download performance.

However, what was novel about their approach is that they got away from the "streaming" Internet radio protocols which were "all the rage" at the time and proposed a one-time downloadable file which users could listen to at their leisure. Adam Curry called this "The Last Yard", a treatise that basically foreshadowed the advent of distributable "on-demand" media.

Adam Curry took these ideas and, along with some help from Dave Winer and the online programming community, created the first podcasts. The MP3 audio format was selected as the podcast medium of choice due to the small file sizes and relatively good audio quality. A community of podcasters was born (through his ipodder.org website.)

> *MP3:* Officially known as MPEG-1 Audio Layer 3, this is a common digital audio format used for podcasts. MP3 files are smaller than the original uncompressed audio files at the loss of some audio quality.

Apple Computer added a directory of podcasts to the iTunes Music Store in early 2005, and this allowed all iPod and iTunes users to access podcasts directly without visiting external websites and/or RSS feeds. iTunes and iPods account for more than 70% of the digital music market currently, and when podcasts entered their realm, the interest in podcasts spiked considerably amongst the Internet community.

Podcasting on the Mt. Hood Community College Campus

Here at Mt. Hood Community College I started the first podcast / vodcast series for my Chemistry 221 - Chemistry 223 series in October of 2005. The Integrated Media Department's ART 279 class (heralded by the wonderful creative team of Jack Schommer, Chris Maier and JD Kiggins) followed with an enhanced podcast shortly afterwards, and at the time of this writing there are several podcasters on our campus.

> *Chemistry with Dr. Michael Russell at Mt. Hood Community College: (iTunes required)*
> http://phobos.apple.com/WebObjects/MZStore.woa/wa/viewPodcast?id=81721896

> *MHCC ART279:* http://www.mhccim.com/classes/art279/

In May of 2006 Mt. Hood Community College was accepted into the iTunesU program with the generous assistance of Michael Callaghan and myself (acting on behalf of the Teaching and Learning Cooperative.) iTunesU is essentially "donated server space" by Apple Computer in Cupertino, California, for podcasts, vodcasts, screencasts, etc. made by the educational community at MHCC. All of these original creations will be accessible through a modified version of the iTunes interface that will be open to all members of the MHCC community (and hopefully the public as well.)

For an example of the capabilities of iTunesU, please see the URL for the Berkeley College iTunesU site given below. iTunesU at Mt. hood Community College, an exciting development in the world of localized podcasting, will begin in earnest during the fall of 2006.

> *iTunesU Program:* http://www.apple.com/education/solutions/itunes_u/

> *Berkeley's iTunesU Program:* http://itunes.berkeley.edu/ (This is an excellent example of what Mt. Hood Community College's iTunesU website could look like one day)

Types of Podcasting

Classically, a podcast has consisted of an audio-only file in the MP3 format. Indeed, when most people hear

the term "podcast", they think exclusively of audio files.

Think again!

Podcasting has enveloped a host of other distribution mediums in addition to the "audio only" version. Approximately 20% of the population has been estimated to learn through audio methods only, and addressing additional learning modalities must be incorporated not just for the sake of education but also for effective marketing. The audience must understand (and be able to learn from) the messages and news you wish to get across! Hence, the desire for additional distributable mediums for podcasting remains a critical source of "fuel" for the exploding podcast phenomenon.

And what a host of modalities have emerged and are emerging! Audio files with pictures ("enhanced podcasts"), video files ("vodcasts" or vlogs), converted PowerPoint-like lectures ("screencasts" or coursecasts), and even PDF (the Portable Document Format championed by Adobe) files are supported. Each of these mediums is discussed in greater detail below.

For the sake of this paper, a *classical podcast* consists of an audio-only file which is usually encoded in the MP3 format. MP3 podcasts are compatible with all hand-held consumer audio listening devices from the Apple iPod to the iRiver Clix and the XM Radio-compatible Pioneer Inno.

> *Classical Podcast:* An audio only file in MP3 format playable on almost all portable music players and in iTunes.

Enhanced podcasts are traditional audio files "enhanced" with still images (usually no larger than 300 x 300 pixels in .jpg or .png format) that highlight the subject being discussed in the audio file. Enhanced podcasts utilize a different audio format (the MPEG-4 Audio codec, a derivative of the specifications used in the creation of DVDs) to create "chapters" on the audio file, and as the listener progresses through the recording, subsequent chapters bring up different pictures. Enhanced podcasts can also utilize URL Hyperlinks to send the listener to their browser to view an accompanying website or article. The ART 279 podcast at Mt. Hood Community College exemplifies the ideal enhanced podcast. Enhanced podcasts are, to the best of my knowledge, only viewable on the iTunes platform (and 5th generation iPods with a color display.)

> *Enhanced Podcast:* An audio file utilizing chapter markers to display still images at select locations within the podcast. iTunes is required for enhanced podcasts.

Vodcasts (which are also known as "video blogs" or "vlogs", etc.) are video files compressed for easy distribution over moderately fast Internet connections (DSL, Cable modem, T1, etc.) Video formats range wildly depending on the platform and application, but vodcasts usually incorporate the MPEG-4 Video codec (again derived from the DVD standard.) Vodcasts can be as high (or low) quality as the creator wishes, but to make an Internet compatible file accessible for downloading, care must be taken to ensure a small file size and moderately high quality. Vodcasts in the MPEG-4 Video codec are only viewable on the iTunes platform (and 5th generation iPods with a color display), although in theory one could make a vodcast in Windows Media Video (WMV) format and distribute the podcast away from iTunes using Blogger or a related promotional website.

> *Vodcast:* A video file which incorporates both moving pictures and audio to express ideas. iTunes is required for vodcasts if using the MPEG-4 Video codec.

Screencasts (which are also known as "coursecasts", etc.) are video files created from PowerPoint lectures and distributed using an RSS-type system. Screencasts are the newest version of the podcasting genre to make its appearance, but the medium deserves attention, especially in education. Students can download and view entire lectures (with audio annotations from the instructor) in the comfort of their home.

Creating a screencast can be quite fun, although specific directions require very platform based (i.e. Windows or Mac) codec-intensive (i.e. MOV (QuickTime), WMV (Windows), MP4 (either), SWF (either)) procedures. I will explain the methodology used to create my screencasts in the next section, but this field

will undoubtedly see incredible growth as the techniques catch the podcasting community's attention.

Of special note to Windows users is a program called Camtasia which is used by many screencast creators on the Web. Macintosh users should check out Snapz Pro for their screencast work.

Viewing screencasts can be troublesome or easy depending on the methodology used to create the screencast. I attempt to make my screencasts compatible with the MPEG-4 Video codec (.m4v) to ensure they work on both iTunes and iPods, but screencasts can be made for a variety of platforms and programs. Know your audience before you start experimenting with screencasts! If unsure, make everything compatible with iTunes.

> *Screencast:* A video file that recreates a PowerPoint lecture using the PowerPoint slides and/or audio narration. A sort of virtual lecture, screencasts come in a variety of codecs making the requirements for viewing unpredictable.

Of special note to screencast creators: a previous Teaching and Learning Cooperative Innovation Grant authored by me ("PowerPoint to Flash Conversion Techniques") may be of use (viewable at http://gst-d2l.com/TLC). Flash movies converted into Shockwave files can be used as a screencast medium and distributed using an RSS feed. Indeed, Google video services (http://video.google.com/) allow viewers the cross-platform choices of both iPod compatible MP4 files and Flash videos.

Also of special notice is the ability to include Portable Data Format (PDF) files in your podcasts. PDF files can be created using Adobe Acrobat, PrimoPDF (a free Windows PDF creation program), or natively for free from with Macintosh OS X. The PDF files can be added to your podcast list and viewable from within iTunes, but they will not be viewable from an iPod.

> *PDF:* Portable Document Format, a technology developed by Adobe in their Adobe Acrobat program used to present documents in the same fashion with the same fonts and formats regardless of the computer platform or viewing software.

There are many possibilities when it comes to podcasting: video, audio, PDF files, etc. But creating the content is only one part of the podcasting process; one needs to distribute and advertise the podcast episodes to the Internet. The next section will discuss these options in more detail.

How to Create and Distribute a Podcast

To create a podcast, one must perform the following three steps:

- *Create the podcast* - The first step is to create the audio (or video) file which will be used in the podcast itself
- *Publish the podcast* - The created audio (or video) file must be placed on a server connected to the Internet so others may download your podcast
- *Promote the podcast* - Once the podcast is available for download on the Internet, you must advertise the podcast to interested members of your community

The first step, *creating the podcast*, will be addressed in detail in the next section of this report. You will need some kind of audio (and/or video) recording gear (i.e. a microphone and a computer.) During this step you'll convert the file into a podcast-friendly format (such as MP3). Typically this stage takes the longest of the three steps, for planning and editing of your recording can take considerable time... if you wish to record quality podcasts!

The second step, *publish the podcast*, will not take much time once everything is set up correctly. You will need some kind of server space to upload your podcasts, making them accessible to denizens of the Internet. If you have access to server space through a website, you are ready to roll. If you do not have access to server space, consider using the following free podcasting server options:

- OurMedia - http://www.ourmedia.org/
- Blogger - http://www.blogger.com/
- Feedburner - http://www.feedburner.com

All three of these sites allow you to store your podcast files on their server space for free. If your podcast becomes hugely popular, they may charge you for the increased bandwidth usage, etc. but for most of us in academia, this option is fine.

In addition, starting in the fall of 2006, Mt. Hood Community College individuals will be able to store their podcast files for free within the iTunesU server space.

Regardless of which option you use, the podcast file will have to be uploaded to the server, probably using FTP. FTP (File Transfer Protocol) allows you to publish your files to the server relatively easy. You will need a **FTP Address**, a **FTP username,** a **FTP password** and a **Home Directory** to use FTP, all of which can be provided by your server manager. Three common FTP programs are:

- SmartFTP - Windows only, free, http://www.download.com/SmartFTP/3000-2160-10028635.html?part=dl-SmartFTP&subj=dl&tag=button
- Fetch - Macintosh only, free for academia, http://fetchsoftworks.com/
- Transmit - Macintosh only, http://www.panic.com/transmit/

The final step of the podcasting process, *promoting your podcast*, is important because it allows you to notify your audience that a new podcast has been generated. Promotion of podcasts usually revolves around the RSS protocol (with its XML interior), and although the XML in the RSS file can be somewhat intimidating, many programs are available now that perform this step automatically.

In a nutshell, the promotion is essentially a blog-like entry which can be updated quickly as appropriate. If you are familiar with posting new blog entries, then this process will be very familiar to you.

If you have not experienced the blog uploading process before, then I suggest that you look closely into the Macintosh programs **iWeb** or **Podcast Maker** or the Windows program "**The Podcast RSS Buddy**."

- iWeb (Macintosh only): http://www.apple.com/ilife/iweb/
- Podcast Maker (Macintosh only): http://www.potionfactory.com/podcastmaker/
- The Podcast RSS Buddy (Windows only): http://www.tolley.info/rssbuddy/

If you wish to write your own RSS file, I recommend the tutorial here: http://radio.about.com/od/podcastin1/a/aa030805a_3.htm

If you write your own RSS file, you can validate it (make sure it is free of formatting errors) for free here (http://rss.scripting.com/) or here (http://validator.w3.org/).

When you start podcasting, try to remember that the steps which are most difficult to begin with at first (publishing and promoting) will soon become relatively easy once the basic setup has been determined. So if RSS and/or XML and/or FTP seem daunting, chin up! It will become much easier given time, I promise!!!

Compatibility with iPods and Other MP3 Players

Since approximately 70% of the digital music market involves the iTunes interface, it is helpful to think about your audience and the type of portable music player they will use to listen to your podcasts.

As stated previously, the MP3 format is accepted by all portable digital music players on all computers. All

other music and video formats need to be tried on a case-by-case basis to adequately determine the compatibility with the iPod. Officially iPods support MP3, M4A and M4V files only (video files can use the H264 codec as well, but they must have a certain width and height ratio, etc.)

If your audio file can play in iTunes, conversion of a non-MP3 audio file into the MP3 format is easy. In iTunes, select "Advanced - Convert to MP3." If the MP3 option is not listed, you can change the conversion format under "Preferences - Advanced - Importing." MP3 files will play fine in iPods.

Video files can also be converted to a playable iPod format with assistance from one of several free programs. Converting a video file to an iPod video file can be tricky, but these programs convert most playable formats into an iPod compatible format.

For the Macintosh, I recommend **Podner** (http://www.splasm.com/products/productpodner.html) or **iSquint** (http://www.isquint.org/) (along with **HandBrake Lite (**http://www.isquint.org/handbrakelite/**)** which is made from the same code, essentially.)

For Windows, **Free iPod Video Converter** (http://www.ipod-video-converter.org/) is a noteworthy converter to iPod compatible video.

- Podner: http://www.splasm.com/products/productpodner.html
- iSquint: http://www.isquint.org/
- HandBrake Lite: http://www.isquint.org/handbrakelite/
- Free iPod Video Converter: http://www.ipod-video-converter.org/

Other audio and/or digital players might provide valuable perks such as XM / Sirius satellite radio compatibility, playable protected WMA audio files, and other such goodies, but standardization of the players is still quite far off... so *caveat emptor*!

Versions of PowerPoint and Flash Utilized in This Report

All the software used in this report had been updated to the highest current level (iTunes 6, QuickTime 7, etc.)

Now On to the Good Stuff!

We've now discussed the background information necessary to this report on podcasting; now we can move on to the actual creation of the various enhanced podcast formats! So read on, and get ready for the fun part of the podcast process!

II. **Creating Enhanced Podcasts**

This portion of the "Creating Enhanced Podcast Virtual Lectures" will be split into five sections. Each section will focus on one aspect of creating a particular type of podcast. The sections are:

- *Section One: Technology* - The kinds and types of technology used to create the podcasts referenced in this report.
- *Section Two: Creating an Audio Podcast with Audacity* - If creating an audio-only podcast is your goal, the cross-platform and free Audacity program can be your ticket to your creations.
- *Section Three: Creating an Enhanced Podcast* - If creating an audio podcast with pictures and/or hyperlinks to web pages is your goal, then this section will provide hints and techniques on completing this task. *A warning to Windows users:* As of May of 2006, I have found no satisfactory method to complete this section on a Windows machine.
- *Section Four: Creating a Vodcast* - If you wish to incorporate video into your podcast, this section is for you. There are a multitude of paths to create vodcasts, so I will focus on the methods most appropriate to this paper.
- *Section Five: Creating a Screencast or Coursecast* - If creating videos from PowerPoint lectures with narration is your goal, then Section Five is for you. I will discuss Snapz Pro (Macintosh) and Camtasia (Windows) as viable alternatives.

I will include directions on how to create the completed podcast type using my own hardware and software (with the exception of Section One.) Examples of these files can be found in the following section and on the website: ***http://gst-d2L.com/TLC***

Enough talk! Let's get down to business...

Section One: Technology Used in Podcasting

When I wrote the proposal for this grant, I had intended to use enhanced podcasts exclusively. I would use a series of static "PowerPoint slides" augmented with audio narration. Over the course of this grant, my goals changed to a combination of podcast styles to effectively get my classroom experience to my students.

For this grant, all of my podcasts have been composed on a Macintosh PowerBook G4 running System 10.4.x (Tiger). The PowerBook has a built in microphone which was used at first, however its quality did not meet my expectations and was later dropped. With a wealth of USB2 and FireWire ports, the PowerBook (and its newest incarnation, the MacBook Pro) is an outstanding workhorse for all forms of podcasting (as well as for other applications!)

- MacBook Pro: http://www.apple.com/macbookpro/

Most of my audio recordings were composed on a M-Audio MicroTrack. This iPod sized digital recorder takes audio from a variety of inputs (standard stereo, XLR with or without phantom power, etc.) and digitizes it onto a Flash Memory Card. The MicroTrack comes with a decent stereo microphone which is small and efficient, and this was used for the basis of many of my recordings. Data files created on the MicroTrack are easily transferred to the computer using a USB2 interface. Remember to order a flash memory card (at least 1 GB) when you purchase the MicroTrack!

- M-Audio Microtrack: http://www.m-audio.com/products/en_us/MicroTrack2496-main.html

The MicroTrack requires some sort of protection (it is delicate!), and I found the perfect solution in a Marware SportSuit Convertible armband. Designed for 3rd generation iPods, it fits snuggly around the MicroTrack and allows most normal operations to be done without removing the armband.

- Marware SportSuit Convertible: http://www.marware.com/cgi-bin/WebObjects/Marware.woa/3/wa/selectedCategory?catalogCatID=164&wosid=hNZtM7ZlOtAnfQot1EFMIw

I attempted to connect a cheap set of wireless microphones to my MicroTrack for improved recording, but the quality suffers greatly. A decent wireless microphone system costs $1000 plus, and my $200 system did not perform adequately. I also tried using a "room microphone" to record information from the entire class area, but again the quality paled and the performance was poor for my lecture style.

Useful in creating vodcasts, Apple Computer's iSight portable camera helped considerably. I could carry it with me in my computer case and make vodcasts "on demand" without having the added bulk of a normal DV camcorder. In addition, it uses a FireWire interface, and the fast transfer rate created wonderful vodcasts with excellent audio. Indeed, the audio was so clear in my opinion that I wound up using the iSight camera to make audio-only recordings in QuickTime Pro! (Note that iSight cameras are built in to the new MacBook and MacBook Pro computers from Apple.)

- iSight Camera: http://www.apple.com/isight/

Finally, I needed an iPod with video capabilities in order to see which items worked (and did not work) in the portal realm. I chose a black video iPod which has behaved wonderfully. I strongly recommend the optional A/V kit to view your videos on a large screen.

- iPod with video: http://www.apple.com/ipod/ipod.html

Note that you do not have to own this hardware to create podcasts; alternatives (some cheaper, some more expensive, some on other platforms) will suffice. The goal is to familiarize you with the equipment used in this report only, and many additional combinations exist which will prove very useful to the podcaster.

Section Two: Creating an Audio Podcast with Audacity

In this section I will detail the steps used to create a "traditional" MP3 audio-only podcast using Audacity. Audacity is a free, cross-platform audio editing program much beloved by the podcasting community. You will need the free LAME MP3 encoder to encode the final audio file into a format that portable digital music players can utilize (namely MP3 files.)

To begin, make sure you have the most current version of Audacity downloaded and installed on your machine. Next, install the LAME MP3 plug-in so Audacity can create MP3 files. Both applications are free and compatible with both Windows and Macintosh computers.

- Audacity: http://audacity.sourceforge.net
- LAME MP3 Plug-in: http://audacity.sourceforge.net/help/faq?s=install&item=lame-mp3

Open the Audacity program. You will need some sort of microphone connected to your computer. In my case, my PowerBook has a built-in microphone which I can access in System Preferences (Apple Menu - System Preferences - Sound - Input). On Windows, a similar control pane exists (Start - Control Panel - Sounds and Audio Devices).

Test your microphone in Audacity: in the Audacity program, push the button with a red circle in it (this is the record button.) You should see a red line or lines appear in the upper middle part of the screen: this is the audio input level. If you do not see any red lines, then re-check your sound input levels. Press the spacebar to stop the recording.

While recording your test audio, you should see the waveform generated by your voice while recording. This is a cool feature of Audacity; you can see what your voice 'looks like" and you can use this information

to edit it later.

Once you're done recording, use the cassette-like controls in the top left corner of the screen to play the sound back, stop it, rewind, etc. just like on a cassette. Ideally you would like your audio to be relatively strong in intensity (so people can hear you!) but not too strong (so that the sound becomes distorted and unlistenable); use the audio input control slider to augment or diminish your sound volume as appropriate.

To get rid of the "test audio track" (or tracks!), press the small box with an X in it next to "Audio Track" - this will delete the sound file from your project.

Once you are familiar with the normal operations of Audacity, record your first podcast. I would recommend making the first podcast short and sweet. Keep your voice as clear as possible (do not muffle your mouth, use sound effects, etc.) If you do not like the recording, delete it and start again. Podcasting is very easy... however, a "Good Podcast" can take hours or even days to complete!

Once you have a recording that you would like to use as a podcast, we'll use the LAME MP3 recorder to convert the Audacity audio file into something useable by iTunes, iPods, etc., namely an MP3 file. In Audacity, select "File - Export as MP3" Select a file name and location, then select "Save." Another box appears: "Edit the ID3 Tags for the MP3 file." Select "ID3v2" (which is used by more MP3 players than the old ID3v1 version despite what LAME tells you), and feel free to complete as many of the entries as possible. This allows the listeners to know what they are listening to, and I highly recommend filling out all the fields to the best of your abilities. Press "Save" and voila! You have just created your first audio-only MP3 file!

Problems with the MP3 step? If you were unable to complete the last paragraph's instructions, this probably means that you were unsuccessful in the installation of the LAME MP3 converter. Please refer to the instructions again and see if everything was followed to the letter. You only need install the LAME MP3 converter once, then you're ready to start converting files to podcastable MP3s!

Note that Audacity has a wealth of features not covered in this brief overview. In Audacity, check out the "Effects" menu. All of these effects are available for you to use on your audio file. You can remove noise (useful!), reverse your audio (maybe your Podcast has Satanic messages if you play it backwards? a la Led Zeppelin or Bing Crosby's "White Christmas"?), and more. You can make yourself sound like you are in a stadium and much more... Audacity is an amazingly sophisticated and useful piece of software for being free and cross platform! Explore and enjoy!

Here are some other useful websites on making the most of Audacity for podcasting: (all sites accessed May of 2006)

- http://www.macworld.com/2005/04/secrets/junecreate/index.php
- http://www.macworld.com/2005/04/secrets/junecreateside/index.php
- http://www.zefhemel.com/archives/2004/10/11/how-to-create-your-own-podcasting-show
- http://www.jakeludington.com/podcasting/20050222_recording_a_podcast.html
- http://www.windowsdevcenter.com/pub/a/windows/2005/04/05/create_podcasts_with_pc.html

OK, so now you can make the podcast audio file. Remember that your next steps should be publishing the podcast and promoting the podcast (explained in Section I, above) but the hard (and fun!) part is over.

But believe me, podcasting is about more than just audio files... which leads us to our next section on creating enhanced podcasts.

Section Three: Creating an Enhanced Podcast

Podcasts are wonderful, but they are like radio: wonderful for audio learners, but the rest of us prefer

something a little more visual.

The Enhanced Podcast is actually a "traditional" podcast (audio file) with "chapter markers" thrown in at specific points to alert the listener's attention to a new screen, a hyperlink, a specific picture, etc. Enhanced podcasts do not incorporate video, but they do allow for the insertion of still images into a podcast to augment the listener's attention.

Windows users: iTunes allows for a great platform in order to view enhanced podcasts. However, I have yet to find a satisfactory system for creating enhanced podcasts on Windows. One possibility is listed below, but it involves Windows scripting and other tools which seem daunting. I would not worry about this, however: I have found enhanced podcasting to be fun for specific types of applications, but not very useful in my own world view (see below.)

- A Windows method to create enhanced podcasts: (accessed May 2006):
  http://www.jakeludington.com/project_studio/20051004_windows_media_enhanced_podcast.html

The enhanced podcast system originated on the Macintosh, and so plenty of programs exist for creating enhanced podcasts. In my opinion, the ultimate program for creating enhanced podcasts is GarageBand, a part of the Macintosh iLife suite.

- GarageBand: http://www.apple.com/ilife/garageband/

To create an enhanced podcast in GarageBand, open GarageBand and select "New Podcast Episode." Give the file a name and location, then press Save.

Notice the "tracks" present in the upper left corner: "Podcast Track", "Male Voice", "Female Voice", "Jingles" and "Radio Sounds." The first step will be to create or import your audio file into the "Male" or "Female" voice track (as appropriate - GarageBand will enhanced the sound quality of the podcast track to match the sex of the podcaster... it works wonderfully for both males and females during my informal tests.) If recording, select the track you want (Male Voice or Female Voice), then press the "red circle in a circle" button in the middle left hand of the screen (the "record button".) If your audio is configured correctly, the waveform should begin to appear for your voice; if it doesn't, see the notes in the "Audacity" trial earlier. Press the "record button" again to halt the recording, and feel free to audition, edit, re-record, etc. the audio file until you get it right.

Alternatively, you can import a data file directly into the "Male Voice" or "Female Voice" by dragging the file from the desktop into the corresponding track... this is the method I use when recording from my M-Audio MicroTrack recorder.

At this point you could select "Share - Send Podcast to iTunes" and GarageBand would send your file to iTunes as a "traditional" podcast episode. However, we want to enhance the podcast with pictures and/or hyperlinks... we will use the "Podcast Track" to accomplish this feat.

Move the pointer in GarageBand to the place where you want the first still picture to appear in your enhanced podcast. Making sure the "Podcast Track" is selected, press "Add Marker" in the lower left portion of the screen. This creates a chapter marker telling GarageBand that something will be happening at this point in time within the podcast.

Once a marker has been made, I recommend adding a descriptive title to the chapter (such as "Start" or "How to Solve for x" or "Ending Discussion", etc.) You can add the title to the right of the "Add Marker" button; a box says "Chapter Title" and you can enter your chapter title here.

Adding a hyperlink (i.e. a clickable Web address which, if selected by the listener, will send them to a website if they have an Internet connection) is relatively straightforward. To the right of the "Chapter Title" column, you can enter "URL Title" (i.e. "Google Website") and "URL" (i.e. "http://www.google.com"). The URL will now appear at the bottom of this chapter when viewed by audience, and if they click it, their

default browser opens to the selected page.

Adding a picture is not difficult either. To the right of the "Chapter Title" is an "Artwork" column with a "Drag Artwork Here" icon. You can drag your pictures from the desktop or from GarageBand's built in pictures browser to use that image at the chapter. Pictures should ideally be no more than 300 x 300 pixels, but GarageBand will convert your files for you... sometimes the results are nice, sometimes they are not so nice. If picture quality is an issue, a quick stop at PhotoShop beforehand will alleviate any conversion problems.

You have just added a Web address and a picture to one chapter maker in your podcast file. You can now repeat this process for any remaining chapters you would like to add to your enhanced podcast. In the example I created for this grant, you can see how I have approximately twenty chapter markers in my enhanced podcast.

An enhanced podcast can also have "Episode Artwork" which is a picture for the entire podcast, not just an individual chapter. Think of the Episode Artwork as being a "teaser" picture when new movies come out: the artwork tries to get you interested in the episode without actually watching it. You can drag an "episode artwork" file to the bottom left screen of GarageBand (where it says "Drag Episode Artwork here" if the Podcast Track is selected) to take advantage of this option.

When your enhanced podcast is complete, select "Share - Send Podcast to iTunes" to make GarageBand convert the file into an acceptable viewing format. Congratulations! You have just made your first Enhanced Podcast!

GarageBand offers a wealth of additional possibilities when creating an enhanced podcast. Podcasters can add jingles (little ringing noises, useful when a new chapter starts) or sound effects (in the Radio Sounds track) if desired; GarageBand's built in sound library contains an impressive array of suitable sounds, or you can add sounds discovered through the Web or through your own creations.

When I started podcasting, I thought that the enhanced podcast would be the final type of podcast, superior to all the other forms, and the original goal of this grant was to create nothing but enhanced podcasts for my chemistry lecture series. However, I have become disenchanted with enhanced podcasts except under very specific conditions.

Why? Well, enhanced podcasts are larger in size than their traditional podcast equivalents, so download times can be quite larger. And although it's nice to add URLs and pictures to your podcasts, they pale significantly when compared to their vodcast and screencast cousins, at least in my opinion. So there are limitations of the medium... also, the lack of Windows options makes this podcast option philosophically not as attractive as the other cross-platform options.

That being said, enhanced podcasts do have a function. The ART 279 class here at Mt. Hood Community College made wonderful use of enhanced podcasts to deliver a bi-weekly (or so) radio broadcast with pictures, hyperlinks, etc. which was wonderful to behold. If your podcast will incorporate a "radio broadcast"-like appeal, I would recommend the enhanced podcast medium, definitely.

But for my type of class, I have found the "traditional" podcasts, vodcasts and screencasts to be more helpful. So let us change gears again and talk about the third type of podcast style, the vodcast.

Section Four: Creating a Vodcast

Officially I started off as a "vodcaster" which means that I used short video segments to get my messages across instead of just audio. Vodcasting has excelled in countries like the Netherlands which boasts an average download speed time of greater than 1 Mbit/second for its citizens.

There are advantages and disadvantages in vodcasting. Advantages should be obvious: your audience can see you (assuming you want to be seen!), then can hear and see what kind of a person you are, and you can

give examples in "real time" much better with both video and audio than you can with just video.

Disadvantages must be considered when vodcasting as well. First, the file size of vodcasts is usually much greater than in podcasts. Video occupies a lot of memory, and the size per Megabyte is quite high (vodcasts take up roughly 3 MB per minute of vodcast while a traditional podcast takes up approximately 0.5 MB per minute of podcast time... these numbers are suspect to compression settings, codecs used, etc. but they do represent the size differential of vodcasting versus podcasting.)

Another disadvantage of vodcasting is platform dependency. Making a video has become much easier over time (thanks to the DV Revolution - see a previous TLC grant ("Joining the DV Revolution" - http://gst-d2l.com/TLC/) for more information on video construction), but the results can be very platform specific. Windows WMV files may or may not run on a Mac, and Macintosh MOV files may or may not run on a Windows machine. So cross-platform considerations *must* be taken into account when vodcasting unless you know your entire audience will be using one platform and one video codec.

Another disadvantage of vodcasts is the time commitment required to create a vodcast. Video requires adequate lighting, good sound quality, and other such factors be considered before you start recording, while audio recordings require only a quiet room.. Be prepared to spend a little extra time when creating your vodcasts in relation to the time spent recording podcasts.

Even with all these disadvantages, I have found suitable solutions which make vodcasting appealing to all audiences. In my vodcast world, I use my iSight camera (referenced in Section One of this section) and QuickTime Pro to record my vodcast. It can be simple or complex, but I do try to keep the time duration as small as possible due to the size of the resulting vodcast file.

One can edit video files in a suitable program (for the Mac, iMovie (part of the iLife suite) and Final Cut Pro are the dominant choices; on Windows, Pinnacle's Studio is a popular choice. However, most of the time I find the vodcast is either fine or so bad that I start again without editing; these are options up to each vodcaster.

- QuickTime Pro: http://www.apple.com/quicktime
- iMovie: http://www.apple.com/ilife/imovie/
- Final Cut Pro: http://www.apple.com/finalcutstudio/finalcutpro/
- Pinnacle Studio: http://www.pinnaclesys.com/PublicSite/us/Home/

Next, the resulting video file should be converted into an iTunes / iPod friendly video format. Everyone with a Windows or Macintosh computer can view videos formatted for iTunes (and the iPod), so your audience will not be hindered by a platform-specific codec. As mentioned before, Podner, iSquint, HandBrake Lite and the Free iPod Video Converter are the best-known options as of this writing.

- Podner (Mac): http://www.splasm.com/products/productpodner.html
- iSquint (Mac): http://www.isquint.org/
- HandBrake Lite (Mac): http://www.isquint.org/handbrakelite/
- Free iPod Video Converter (Windows): http://www.ipod-video-converter.org/

Note that other vodcast solutions exist which do not require an iSight or QuickTime. Creating a video file is always the first step, then one should convert the video file into an iTunes / iPod compatible format to get the best audience. There are a host of DV cameras and Web Cam options available to the vodcaster... even a cell phone video camera will work if it is done correctly!

Here are the steps I used to make a vodcast:

Connect the iSight camera to the Firewire port. Open QuickTime Pro (not just QuickTime!) and select "File - New Movie Recording" Position the camera and lighting to an optimum configuration, then press the "record" button (red circle in another circle). Give yourself some space before speaking; you can edit this

portion out later if you have to, but sometimes it is nice to have the file start with a little empty space. Push the record button again to stop recording.

You can preview the movie to see if it is to your liking. If so, select "File - Save" to save your movie; enter a name for your file and a destination, then press "Save".

Now drag the completed file into Podner or iSquint in order to compress the movie for iTunes. I use Podner mostly, and I generally accept all the default settings. When Podner is done, it rings and places the file in iTunes for me, saving a step.

Congratulations! You have now made your first (of many?) vodcasts, and this vodcast can now be published and promoted like a normal podcast file. Notice how *vodcasting can be easy* but you have to make it that way. Remember your audience and their download restrictions, and try to keep the resulting file as inclusive as possible.

Vodcasts are wonderful if you wish to get personal information across to your students or audience; for example, my Web based students loved my vodcasts because it gives them "face time" with them, at least virtually. However, what if you do not wish to be seen on the screen? Or maybe you are intimidated by video cameras? There is still one more podcast solution available to you which I find very helpful for both my Web-based students and my "traditional" students; welcome to the world of screencasting!

Section Five: Creating a Screencast or Coursecast

Screencasting (also known as coursecasting) is a special type of vodcasting which utilizes PowerPoint-like files and audio narration to get a lecture idea across to the audience. Think of screencasting as a "portable Tegrity" solution here on our campus, but unlike my own personal experiences with Tegrity in the past, your audience should have minimal cross-platform or viewing dilemmas.

Screencasting stemmed from the desire to translate a "live" PowerPoint lecture into a format suitable for Web-based delivery. I have always wished that my Web-based students could have the experience of a "traditional" lecture (if they desired to, that is!), and screencasting allows this to happen.

In Screencasting, a "screen recording" of PowerPoint or a PowerPoint-like program (such as Keynote) is created simultaneously with audio narration provided by the recorder. The computer has two tasks to accomplish simultaneously: it needs to record what is happening on the screen along with the "voice over" narration occurring with the presenter. In my world, I use the program Snapz Pro to record my PowerPoint lectures while I talk about what is happening on my computer screen into a recorder.

This field is growing rapidly, but the two dominant programs in the field are the (above-mentioned) Snapz Pro for the Macintosh and Camtasia for Windows. Snapz Pro is more than a simple screencast recorder, but it performs the process beautifully in a tight (and inexpensive) package. You will need the full version of Snapz Pro to record screencasts. Camtasia is a more robust program which converts PowerPoint files (with the accompanying narration) into a Flash / Shockwave .swf file. Both Snapz Pro and Camtasia create cross-platform files viewable by any computer, although the Camtasia-created Shockwave files are not viewable in iTunes to the best of my knowledge.

- Snapz Pro (Macintosh): http://www.ambrosiasw.com/
- Camtasia Studio (Windows): http://www.techsmith.com/

Other programs exist for converting PowerPoint files into Flash / Shockwave files, but these appear to be the dominant players in the field at the time of this writing (May 2006.) For more examples of conversion options, see the grant "PowerPoint to Flash Conversion Techniques" (http://gst-d2l.com/TLC/).

To prepare a screencast, I first create a copy of my PowerPoint file and edit out all unnecessary data. I add "thrills and chills" to my "normal" lecture which do not translate well into screencasts, so I remove them.

Also, because a screencast is a video file, I try to only include relevant information in the screencasts, and anything somewhat irrelevant is omitted. Finally, I try to prepare for my screencast be selecting about six slides for the screencast. More slides makes a larger file for download, but fewer slides makes it uninteresting to the viewer.

Next I open up Snapz Pro and begin recording. Select "Snapz Pro - Movie" and select the viewing area to be recorded. Also make sure you record narration (if you plan on talking along with the PowerPoint slides), and if you have any audio within your PowerPoint files (from movies, etc.) then make sure that computer audio is recorded as well. Save the file with the default settings and voila! You have created your first screencast!

Once your screencast file has been created, you can use the above-mentioned Podner, iSquint or Free iPod Video Converter programs to convert the data file into an iTunes / iPod compatible format.

I recommend using a modular approach to coursecasting; namely, use multiple small files instead of one large (and massive) file. Smaller modular files will be easier to download by your audience, and it keeps the "music video" feel of your work present in the presentation. People enjoy small bits of information over large, boring presentations.

I have been told that the creation of a Camtasia screencast is similar to Snapz Pro although I have not attempted it myself. Also note that Snapz Pro can take a screen capture of more than just PowerPoint slides... anything you can do on your computer, Snapz Pro can capture it in a video file. People on the Mac side use Snapz Pro for training purposes, demonstrating a design or website, etc.

I find screencasts to be an exciting opportunity for instructors unparallel in previous years, and I plan on creating many more screencasts for my students in the future.

III. Utilizing Podcasts in the Classroom

It is important to discuss the utilization of the various podcast types in my own classroom in order to see the type of applications podcasts can address. Below you can see how I use the different podcast styles in my classes in the hope that you will become inspired to try them on your own audiences!

In my world, I primarily teach a majors level chemistry yearlong sequence (CH 221, CH 222 and CH 223.) My CH 221 and CH 222 classes are offered in both a "traditional" form (i.e. lectures three days a week with a four hour lab each week) and a "Web based" form (lectures are all virtual, but they still attend a four hour lab each week) while my CH 223 class is offered as a "traditional" class exclusively. My students' needs force me to consider both virtual and "traditional" modes of interaction, but I have found that many of the "traditional" students have benefited greatly from my "non-traditional" web-based methodologies.

Each of my CH 221, CH 222 and CH 223 classes is divided into six "study modules" which I call "Chapter Guides." Each guide represents about a week or so of learning material; midterm exams, class presentations, etc. do not count as study modules.

I use the Macintosh program Podcast Maker (http://www.potionfactory.com/podcastmaker/) to publish *and* produce my various podcasts, vodcasts and screencasts. Podcast Maker has saved me countless hours of editing XML RSS feeds, and it does it in a smooth, efficient manner which I find second to none. Podcast Maker allows one to upload the podcasts to one server while maintaining your RSS feed on a second server.

"Traditional" Audio-only Podcasts

I use traditional audio-only podcasts for two purposes.

First, I provide a brief audio introduction to each of the Chapter Guides (i.e. study modules) for my class. I find the audio-only introduction makes the students aware of what is important in each Chapter Guide, and they get to hear my voice, know that I am out there for them. I try to make these files as small as possible so download will be easy; I also make these files MP3 in order to get the widest audience possible.

I label most of my podcasts sequentially, usually in the format "ChXX.mp3" so I can quickly determine which Chapter Guide each of these podcasts belong to.

- *Example of a Chapter Guide Introduction:* http://mhchem.org/221/media/Ch01b.mp3

Secondly, I am able to use my MicroTrack recorder to record each of my "traditional" lectures. I then take these digital files, place them in GarageBand or Audacity for "fine tuning" and editing, and then export them to iTunes or a related program in the MP3 format. Students who miss my lectures may download these files and listen in on what we talked about in class, how far we got in the material, listen for important announcements, etc. The quality is not as great as the Chapter Guide Introductions, above (they are recorded live, after all, and they include my coughing, class questions, etc.) but they have proved to be very useful to my students.

I also label these podcasts in a sequential manner in order to identify the date and chapter they belong to. The following file is designated "Ch18P2050506.mp3" which means, in my world, that it comes from "Chapter 18 Part II" in our textbook and it was recorded on May 5, 2006.

- *Example of a Lecture Recording:* http://mhchem.org/221/media/Ch18P2050506.mp3

Enhanced Podcasts

As stated earlier, my initially high expectations for enhanced podcasts did not pan out as expected, and I have not found an extensive use for enhanced podcasts in my class. Here is an example of an enhanced podcast I created for this grant:

- *Example of an Enhanced Podcast:* http://mhchem.org/221/media/Ch12E020606.m4a

That being said, I **do** see a use for enhanced podcasts in academia. At Mt. Hood Community College, the ART 279 class instructors created a (roughly) bi-weekly radio address to their students. The address focus was on how the class was doing, what had just happened, and what will be happening shortly. The enhanced podcast format was *perfect* for this medium: students can listen along to the podcast, seeing the images change as the material changed, and they can click on the images to access URLs from the Internet (if they're connected to the Internet, of course!)

- *Example of an ART 279 Enhanced Podcast:* http://mhchem.org/221/media/ART 279 Weekly Podcast No. 7.m4a

Vodcasts

In a manner similar to the traditional podcasts, above, I find vodcasts wonderful for getting information across to students whether they are in the classroom or not. I utilize vodcasts for "weekly" (i.e. for every Chapter Guide) summaries of what is happening in the next week. This gives the students more exposure to me, and it lets them know what is important and not as important during each week. Most of my vodcasts are not "fancy", but they do get my "essence" across to the viewing student.

Vodcasts also receive a common naming system for quick identification. The following vodcast is labeled "223E2.m4v" which means it comes from my CH 223 class and it discusses Exam 2 in the class.

- *Example of a Vodcast:* http://mhchem.org/221/media/223E2.m4v

Screencasts

While vodcasts and podcasts provide weekly reminders of what is happening and what will be occurring, I hope to use screencasts in a completely different methodology. I plan on creating a host of screencasts for each of our textbook's chapters, offering my students an option for a "quick review" on a troublesome concept.

I do not use a camera for my screencasts. Indeed, I use my PowerPoint slides and an audio recorder from within the Snapz Pro platform to record my narration and slides into a single movie file. I then take the completed file and convert it using Podner (or sometimes iSquint) in order to make it iTunes (and iPod) compatible.

Screencasts get a common naming scheme applied to the file name for quick identity. The following file is "Ch16ValueOfK.mp4" which means it comes from "Chapter 16" of our textbook and it covers the "Value of the Equilibrium constant K" from that chapter.

- *Example of a Screencast:* http://mhchem.org/221/media/Ch16ValueOfK.mp4

IV. <u>Final Thoughts</u>

We are in a gifted age.

The age of podcasting (and vodcasting and screencasting and blogs and...) has given the computer user a true chance to be heard, not just in text or still graphics but also in real audio frequencies, with videos, animations, and more. From instructors in the classroom to pen pals writing across a distance, podcasting technology has minimized the miles separating individuals and allowed for learning opportunities not approachable just a few short years ago.

The future iTunesU implementation at Mt. Hood Community College will benefit our institution greatly. Apple's generous server storage space and fast bandwidth alleviates financial strain on our institution and provides a common gateway into all of the podcasting content available on our campus. There are maybe five podcasters on our campus currently; I hope this number to have increased by at least 500% by September 2007.

If I had to predict future trends in podcasting, I would argue for an increased presence of user-selected interactivity options, specifically through VR (QuickTime, Java, etc.) and/or Flash / Director. QuickTime VR (and the related Java-based VR technologies) could impact podcasting through a series of linked "interaction areas" which would make these podcasts truly "enhanced." Another future area for podcast development would be the implementation of Flash or Director technology into the podcast realm for increased user interactivity (hyperlinked jump spots, links from one podcast to another, etc.)

Podcasting could also benefit from new compression technologies for delivering content to the user. MP3, MP4, and the related codecs work adequately, but perhaps new codecs with smaller file sizes and higher quality could be developed for future podcasting operations.

The future of podcasting is still ripe with possibilities...

Regardless of your level of podcasting knowledge, please know that I will assist you to create your own personalized podcasts, vodcasts and screencasts to the best of my abilities... all you have to do is ask! Good luck in your podcasting, and I look forward to hearing and viewing your creations in the future!

V. Acknowledgements

This Teaching and Learning Cooperative Innovation Grant is dedicated to my late father, Dr. Ronald Russell, who passed away on February 19, 2006, after a thirteen month battle with a glioblastoma brain tumor. *You are missed every day!*

I would like to thank several people for their assistance on this project:

- **Jill Russell** - my wife, favorite colleague and patient friend while I explore the nuances of podcasting, vodcasting and screencasting
- My son **Grayson** for keeping me company while writing this report
- **Dr. Ron & Bev Russell** - my parents for their enthusiasm for all my varied technological endeavors
- **Gordon & Jean Russell** - my grandparents for purchasing my first college computer
- My colleagues **Jack Schommer, JD Kiggins**, **Chris Maier, Paul Morris, Michael Callaghan,** and **Wally Shriner** for the many enlightening discussions, support and inspiration
- **Dr. Jim Arnold** - my very supportive Dean on this project
- The entire **TLC Team** - Sharon, Sally and all those who helped support this project

I would also like to thank you, the reader, for taking the time to read this report. Thanks!

All of the materials in this report can be found on the Web at **http://www.gst-d2L.com/TLC**

Feel free to contact me if you have any questions. Peace, and I look forward to viewing and hearing your podcasts, vodcasts and screencasts!

VI. Resources For Additional Information

Printed Material on Podcasting:

- Geoghegan, Michael and Klass, Dan "Podcast Solutions: The Complete Guide to Podcasting," Friends of Ed, 2005.
- Micell, Dawn "Podcasting for Dummies," For Dummies, 2003.
- McElhearn, Kirk, Giles, Richard and Herrington, Jack "Podcasting Pocket Guide", O' Reilly, 2006.
- Colombo, George and Franklin, Curtis "Absolute Beginner's Guide to Podcasting", Que, 2005.
- Herrington, Jack "Podcasting Hacks: Tips and Tools for Blogging Out Loud", O' Reilly, 2005.
- Felix, Lionel and Stolarz, Damien "Hands-On Guide to Video Blogging and Podcasting: Emerging Media Tools for Business Communication", Focal Press, 2006.
- Cochrane, Todd "Podcasting: Do It Yourself Guide", Wiley, 2005.
- Blaisdell, Mikael "Is It iTime Yet?" *Campus Technology* **2006**, *19*, 38-50.

Podcasting Articles and Websites: (all sites accessed May 2006)

- http://www.podsafeaudio.com/ - "PodSafe Audio - Podsafe Music under the Creative Commons license for Podcasting", a source of royalty-free music to use in your podcasts and vodcasts
- http://www.macnewsworld.com/story/lUEHtSGnIKDXwC/Professor-Uses-Hollywood-Techniques-to-Spice-Up-Podcasts.xhtml - "Professor Uses Hollywood Techniques to Spice Up Podcasts"
- http://www.macnewsworld.com/story/hEHI9vjP9mYh43/Podcast-Tours-Hold-the-Cheese-Please.xhtml - "Podcast Tours: Hold the Cheese, Please"
- http://www.macnewsworld.com/story/dUNaTd9xLQfxAn/Educators-Give-iPod-High-Marks.xhtml - "Educators Give iPod High Marks"
- http://www.macnewsworld.com/story/6QKPrb70lWP5nw/Professors-Getting-Wise-to-the-Power-of-Podcasting.xhtml - "Professors Getting Wise to the Power of Podcasting"
- http://www.macnewsworld.com/story/huiDgkkdsuAPzw/Startup-Banks-on-Big-Money-in-Podcasting.xhtml - "Startup Banks on Big Money in Podcasting"
- http://www.macnewsworld.com/story/49302.html - "Pope Benedict Gives iPod His Blessing"
- http://www.macnewsworld.com/story/49304.html - "Podcast Marketing Do's and Don'ts"
- http://www.macnewsworld.com/story/49376.html - "iPods Let Students Crack Books on the Go"
- http://www.macnewsworld.com/story/Ee8KvV0tglfFfA/Dont-Get-Stuck-in-the-Pre-Podcasting-Dark-Ages.xhtml - "Don't Get Stuck in the Pre-Podcasting Dark Ages"
- http://www.macnewsworld.com/story/n2PYlEi3Gmwe9z/Podcasts-Give-Students-More-Teacher-Time.xhtml - "Podcasts Give Students More 'Teacher Time'"
- http://www.macnewsworld.com/story/lUEHtSGnIKDXwC/Professor-Uses-Hollywood-Techniques-to-Spice-Up-Podcasts.xhtml - "Professor Uses Hollywood Techniques to Spice Up Podcasts'"
- http://www.ipodder.org/history - "iPodder.org : History"
- http://www.webmonkey.com/webmonkey/05/52/index4a.html - "All the World's A Podcast"
- http://radio.about.com/od/podcastin1/a/aa030805a.htm - "How to Create Your Own Podcast - a Step-by-Step Tutorial on Podcasting"
- http://www.podcastblaster.com/history-of-podcasting.html - "History of Podcasting - PodcastBlaster.com"
- http://www.how-to-podcast-tutorial.com/ - "How to Podcast"
- http://en.wikipedia.org/wiki/Podcasting - "Podcasting - Wikipedia, the free encyclopedia"

Podcasting Software and Hosting Sites: (all sites accessed May 2006)

- iTunes and QuickTime (Mac/Windows, free): http://www.apple.com/itunes/
- Audacity (Mac/Windows, free): http://audacity.sourceforge.net/
- LAME MP3 Encoder (Mac/Windows, free): http://audacity.sourceforge.net/help/faq?s=install&item=lame-mp3
- GarageBand (Mac, part of iLife suite): http://www.apple.com/ilife/garageband/
- iWeb (Mac, part of the iLife suite): http://www.apple.com/ilife/iweb/
- LogicPro (Mac): http://www.apple.com/logicpro/
- Logic Express (Mac): http://www.apple.com/logicexpress/
- Podcast Maker (Mac): http://www.potionfactory.com/podcastmaker/
- The Podcast RSS Buddy (Windows): http://www.tolley.info/rssbuddy/
- IndiePodder (Podcast Directory, free): http://www.ipodder.org/
- Podcast.com (Podcast Directory, free): http://podcast.com/home.php
- Podcast.net (Podcast Directory, free): http://www.podcast.net/
- Podcast Alley (Podcast Directory, free): http://www.podcastalley.com/
- Musicmatch Jukebox Plus 10 (Windows, free): http://www.musicmatch.com/download/plus/jukebox_ext_intro.htm?os=pc&mode=input&BTD=1&DID=999991574&OEM=CJJ&AID=5676440&PID=1766091
- RSSRadio (Podcast client for Windows, shareware): http://www.dorada.co.uk/
- Blogger (free Blogging service and Podcast storage server space): http://www.blogger.com/
- FeedBurner (free Podcast storage server space and more): http://www.feedburner.com
- OurMedia (free Podcast storage server space and more): http://www.ourmedia.org/
- Camtasia Studio (Windows screencast solution): http://www.techsmith.com/
- Snapz Pro (Macintosh screencast solution): http://www.ambrosiasw.com/
- SmartFTP - (Windows only FTP client, free): http://www.download.com/SmartFTP/3000-2160-10028635.html?part=dl-SmartFTP&subj=dl&tag=button
- Fetch (Macintosh only FTP client, free for academia): http://fetchsoftworks.com/
- Transmit (Macintosh only FTP client): http://www.panic.com/transmit/
- Podner (Macintosh iPod video conversion tool): http://www.splasm.com/products/productpodner.html
- iSquint (Macintosh iPod video conversion tool): http://www.isquint.org/
- HandBrake Lite (Macintosh iPod video conversion tool): http://www.isquint.org/handbrakelite/
- Free iPod Video Converter (Windows iPod video conversion tool): http://www.ipod-video-converter.org/
- iMovie (Macintosh vodcast editor): http://www.apple.com/ilife/imovie/
- Final Cut Pro (Macintosh vodcast editor): http://www.apple.com/finalcutstudio/finalcutpro/
- Pinnacle Studio (Windows vodcast editor): http://www.pinnaclesys.com/PublicSite/us/Home/
- PrimoPDF (free Windows PDF creation utility): http://www.primopdf.com/
- Adobe Acrobat (cross-platform high quality PDF creation utility): http://www.adobe.com/products/acrobat/