

## **Innovations in Podcasting and Screencasting Course Materials To Bring Mathematics to Life**

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### **Abstract**

Online and other forms of distance learning are a permanent fixture in the educational landscape. Mathematics taught in distance formats pose an even greater challenge to students and teachers alike. As mathematics is a skill subject, demonstration of concepts and processes is crucial, if not critical, to learning, particularly to visual and kinesthetic learners. Video podcasts and screencasts are the answer to distance students' need for demonstration and explanation of mathematical topics. In the current economic climate, however, expensive audio/video capture software and hardware, as well as a lack of technical media support, make it virtually impossible to create such course materials. Also, there is the question of ownership of intellectual property if created with institutional funds and/or resources. Free capture software and internet video hosting sites make it possible for an individual to create his or her own podcasts and screencasts for student use, retaining ownership of the created materials. Materials developed for online students can be made available to students in seated class. This benefits students who are unable to attend class, but can be made available to the entire class.

### **Workshop Summary**

The primary purposes of this workshop are to demonstrate the creation of podcasts and screencasts for classroom use and to present data demonstrating student success rates where podcasts and screencasts are used in traditional seated classrooms as well as the online teaching environment. Concentration will be on the use of freeware or other inexpensive software for the creation of podcasts and screencasts, as well as free video sharing websites to make them available to students. While in the workshop, participants will be invited to create a short podcast or screencast and post each to the internet.

The workshop involves the use of technology for innovative teaching practices and utilization of new paradigms in teaching and learning. Podcasts and screencasts can be used in both seated and online learning environments. Both instructors have extensive experience in teaching online with a variety of platforms as well as nearly 50 years of combined classroom teaching experience. It was found that the materials originally prepared for distance learning classes were beneficial for students in a seated class for the review of concepts, or for students who were unable to attend the original lecture.

### **History of Podcasts and Screencasts**

Podcasts are short digital media videos originally created for the small screen of the Apple iPod and available by download via web syndication. Despite the source of the name, it is not necessary to view podcasts from an iPod or other portable device. Podcasts can be viewed on any desktop or laptop computer that can display media files. As a result, the term "podcast" has been backronymed to mean, "Personal On Demand broadCAST." Podcasting came to the technological forefront somewhere around 2004, but the ability to distribute audio and video files has been around since the birth of the internet. In 2006, the Apple Trademark Department went on record stating that Apple does not object to third party usage of the term "podcast" and that Apple does not license the term "podcast." The following is a logo that indicates a podcast:



Screencasts are digital media recording that capture the output of a computer screen, with optional voice-over. Another name for a screencast is a "video screen capture." Just as a screenshot captures a still image of a computer screen, a screencast captures the screen and all the changes over time, much like a video or a movie. Screencasts were originally developed to teach users the features of new software. Since 2004, the screencast has gained

widespread use. Screencasts have a wide range of possibilities. For example, one could screencast a Power Point presentation, adding the voice over. This is particularly useful to individuals who do not desire to appear on camera.

### **How to Produce a Podcast/Screencast**

This presentation is merely an introduction to podcasting to encourage you to step out and do it yourself. You will also be given some free resources. Teaching mathematics online basically means that the students are essentially on their own. Even with excellent resources, including a readable text, written lecture notes, summaries, email after email, students still need more. But it is easy to feel like the online students do not receive the same quality of instruction that the students in seated classes receive. Online students needed face to face assistance, particularly for visual and auditory learners, just like a traditional seated class. This is where podcasts and screencasts have their **greatest value**.

A few things you need to remember when recording a video are:

- Keep each podcast 20 to 30 minutes, if possible. If it's a particularly long lecture, break it up into two parts. Just assume all your students have Attention Deficit Disorder (ADD).
- Remember that an ipod screen is small. So, if an individual is actually viewing the lecture on an ipod, the text must be as large and as readable as possible.
- Have the examples prepared ahead of time on overheads to use with a document camera, if available (show examples) to cut down on time. You can use multiple colors to emphasize points, but avoid red and green (there can be disability issues over color blindness).
- Rehearse the lecture or have a script prepared in order to avoid stammering and stuttering, using too many uh's, etc. It also helps to use the technology prior to recording so you are familiar with how everything works. If it makes recording any easier, recruit a few students to have in front of you and teach to them instead of the camera, particularly if you are a bit camera-shy.
- Don't wear white or red, checks or stripes. It makes the camera crazy.
- Be careful when including video clips or music on your podcast to avoid copyright infringement. Get permission prior to recording or use public domain materials.

A professionally produced podcast requires a studio, technicians, digital capturing devices, and expensive editing software.

There are several options for capturing the raw video.

Digital video camera. This requires a technician or additional person to operate the camera and make sure it is focused and positioned correctly. Later, the images must be edited on editing software.

Debut (<http://www.nchssoftware.com/capture/index.html>) open source freeware for Windows. It is a simple, easy to use video recorder program that lets you capture video files directly using a webcam (video camera) or capture device (from video). It can also record almost anything that can be played or displayed on the computer screen. The program automatically saves the video on your hard drive as avi, wmv or other file types.

CamStudio (<http://camstudio.org/>) open source freeware currently only available for Windows computers.

CamStudio is able to record all screen and audio activity on your computer and create industry-standard AVI video files and using its built-in SWF Producer can turn those AVIs into lean, mean, bandwidth-friendly Streaming Flash videos (SWFs).

Video Monkey (<http://videomonkey.org>) is open source software for Macintosh computers that can convert video to other formats. For example, if you have produced a screencast in AVI format and you want to distribute it using iTunes, you can use Video Monkey to convert the screencast. The developers of this software plan to support several different formats, but at this time only Macintosh formats are supported.

Next, if editing is necessary, there are several things to remember:

Once the podcasts are recorded, if you want them to be polished and maybe a bit flashy, then they can be edited.

This can be as simple or as elaborate as you can handle. You can add music to your podcast, however, be careful of copyright infringement. You must use public domain music or pay royalties.

One good source for free music is Freeplay Music ([www.freeplaymusic.com](http://www.freeplaymusic.com)). It's a good idea to write Freeplay and let them know what you want to do with the music. Make sure they know it won't be used for general public broadcast viewing, that it will be on a website for only your students to use. Their website says that if you are using Freeplay Music for educational, non-commercial use limited to student use on school grounds for in classroom projects - nonbroadcast, then you can use their recordings for free. For further information contact them at 212-974-0548 or email [Julie@freeplaymusic.com](mailto:Julie@freeplaymusic.com) or [Rox@freeplaymusic.com](mailto:Rox@freeplaymusic.com). When editing, you need a fairly powerful computer, one with at least a 500 gb hard drive. Most video is recorded in SD (Standard Definition). However, if you record in HD (high definition), remember, that HD video is 4x the size of the SD video.

Again, to do any fancy editing, you need to have video editing software in order to do any cutting, pasting or adding to your raw feed. It helps to be able to edit in order to take out any bloopers you recorded, thus eliminating the need to start over recording a particular lecture if you make a mistake. You also may need to compress the video before putting it out there for viewing. These skills are way beyond my expertise.

There is editing software for both Windows PC and Mac. Here are a few and what they cost.

#### **PC:**

1. Windows Movie Maker - Cost Free - Windows Movie Maker 2 is an XP-only download that gives you the tools to create, edit, and share home movies. Compile and edit a movie from video clips, add special effects, music, and narration.
2. Adobe Premier Pro CS4 - Cost \$349 USD - Edit files from the latest tapeless formats. Find sections of content quickly for editing. As an educator, you qualify for educational pricing.
3. Adobe Premier Elements - Cost \$139.99 USD - Adobe® Premiere® Elements makes it easy to create incredible movies with automated moviemaking options, add visuals and sound, and share your movies everywhere. With the additional Photoshop.com Plus membership, you can turn video clips into polished movies with special effects, back up on 20 GB of memory storage and access your video from virtually anywhere.

#### **Macintosh:**

1. iMovie - Cost \$79.00 USD - Comes with Apple's iLife when you purchase a new Macintosh computer - iMovie makes it quick and easy to browse your library and create new movies. And iMovie is built for sharing. You can easily publish videos them on a website, and create versions for iPod, iPhone, and Apple TV.
2. Final Cut Studio 2 - Cost \$1,299 USD - This is the industry standard, as many full length feature films currently in the theater were done completely on this software. This software is probably overkill.
3. Final Cut Express 4 - Cost \$199 USD - Import video and edit like a pro, add special effects, titles and music. This is a scaled down version of Final Cut Studio 2.

Once you finish any editing and enhancing, then there are several different video formats you can use.

Flash - this is a smaller file size, good for a slow computer connection.

Quicktime - This is a larger file format with higher quality resolution than flash.

iPod download - You can subscribe to a podcast feed that will allow you to download the videos to your iPod or other video player for viewing.

Once the podcast is finished, you must store it somewhere that gives students access, yet protects your intellectual property from those who would just take what you have done, perhaps selling it to others.

YouTube will only allow you to save 10 minutes of video. Also, on a site like YouTube, you have no control over who views it. Anyone can access it, and anyone can steal it. Google video is basically YouTube.

iTunes now has iTunes U for educational purposes. It is free (at the moment). You must sign a contract for storage space and they handle distribution. It takes the load off the home server and band width. Students must subscribe and have a user name and password to access your podcasts to protect the content.

Vimeo (<http://www.vimeo.com/>) is a site that allots you 500 mb per week of video. Podcasts are generally about 50 – 60 mb per video, so this site is perfect for this. It also allows you to mark your videos private and require a password to access them. This way your intellectual property and hard work is better protected from being stolen and used without your permission.

#### **Creating your Podcast**

We will create and upload a podcast at the conference with a laptop, webcam, CamStudio and Vimeo.

#### **Results**

When we did this we found that at least some of our students made very good use of the material. Some of them reported viewing the podcasts multiple times to help them with material that they were having difficulty with. Based on this experience, we have decided to expand this idea and develop podcasts and screencasts for more of our classes. Even though this is still at a beginning stage, we felt it was worth sharing with others.