WINDOWS MEDIA ENCODER TO ENHANCE MATHEMATICS TEACHING AND LEARNING: THIS MAY BE THE MISSING LINK

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Introduction and Overview

Windows Media Encoder is a powerful tool for teachers (or anyone producing content) who wishes to capture audio and video content from a computer screen, or screens, for later playback using *Windows Media Player*. *Windows Media Encoder* is a free download from Microsoft.com (once installed it may be found in Start|Programs|Windows Media). For playback, *Windows Media Player* is pre-installed with windows (or a free download). These 30-second to 5-minute videos can be used in face-to-face classes, web-enhanced courses, or online courses, or on Internet sites, to demonstrate a variety of computer programs, Internet applets, and mathematical concepts.

Windows Media Encoder may be the "missing link" for the *easy-once-you-know-how syndrome* with computers. The easy-once-you-know-how syndrome describes the common situation in which students, or other users of technology, have a hard time getting started with a new piece of software, new web site, or new user interface (but once acclimated, have little difficulty). For example, short, how-to videos may "grease the wheels" to make navigation in online courses easier. In the K-16 mathematics classroom or computer lab, the videos can make online learning activities more accessible for teaching and learning. This paper is designed to be a practical guide for users who wish to make videos. I will discuss some possible uses of *Windows Media Encoder* videos, features of the software, advantages of screen capture videos, and a few video production tips. In the appendix, I'll list the step-by-step details of using *Windows Media Encoder*. It is quite easy to use.

Why use it?

For those of us who use technology in teaching, *Media Encoder* videos can be used to do a number of things we've wanted to do to facilitate utilization of technology and learning. These videos can be used to:

- Demonstrate a piece of software when the software is not present.
- Demonstrate a web site, even when the Internet is not available (or temporarily down).
- Have students view a demonstration *off-site*. That is, without the software or an expert present.

- Have students view a demonstration asynchronously.
- Show students how something is *supposed* to look. Often with computers, the end user (in an online course, for example) may not know how the application is supposed to work (to submit an online assignment, for example), because they have never seen it (and it is difficult to envision from a written explanation). This situation is further complicated if the end user's computer is not functioning properly (due to the lack of a plug-in or pop-up blocker or java blocker, for example). The video shows the student how the process *should* look on their computer.
- Demonstrate, for a novice, how an Internet applet is used (and during the video, important mathematics can be "smuggled in"). In this way, teachers and students can come to learn how to use valuable, interactive learning applets, because they have seen them in action (with audio explanation).

To expand a bit on the last item, the 2004 Department of Education report entitled *Toward a New Golden Age in American Education: How the Internet, the Law, and Today's Students are Revolutionizing Expectations* says "Teachers have more resources available through technology than ever before, but some have not received sufficient training in the effective use of technology to enhance learning. Teachers need access to research, examples and innovations as well as staff development to learn best practices." *Media Encoder* videos are a potential "missing link" to help teachers see examples of innovative uses of technology, which they, in turn, can use to help their students learn.

What it Does and Examples of How it Might be Used

Windows Media Encoder will capture anything and everything on the computer screen (including mouse movements). It can be used with any software. It is excellent for use with dynamic software and applets, because *a picture speaks a thousand words, but an animation speaks a thousand pictures*. The videos show the user how the computer screen is supposed to look at a particular point. Videos can have an audio explanation of the process and underlying concepts (therefore, a microphone is recommended). During playback (with *Media Player*) the video can be paused and/or replayed as many times as desired.

A few examples of videos I have created (and which are available on the Internet—URL below):

- Video of an Internet Applet: *Function Flyer* – This is a great applet for investigating functions. From Shodor Interactivate. File size: 1.19 MB. Length: 2:24.
- Video of a piece of software. Graphing with the TI-84 Calculator - Quick introduction to graphing on the graphics calculator. This is a video of TI-Smartview program (calculator emulator). Therefore, the video is actually demonstrating the graphics calculator. File size: 717 KB. Length: 1:01.

- Video of a process on the Internet: How to Submit an Assignment in Western Online - For online students. This shows how to submit an assignment in an online course (using WebCT Vista). File size: 1.99 MB. Length: 2:36.
- Video of an Internet learning game: *Find Digit Game* - Interactive game from the Cyberchase games from PBS. File size: 4.08 MB. Length: 2:19.
- Video of a piece of software: "Exponential Function Value Half-way Through" - This is a video of a *Geometer's Sketchpad* sketch which demonstrates a characterization of the geometric mean using exponential functions. File size: 1.62 MB. Length: 2:34.

Advantages of Screen Capture Videos Over a Live Demonstration

At times, a recorded video may actually be better than a live demonstration. (Often, videos should be kept short, or viewer's interest may be lost.) Reasons why a carefully recorded demonstration video may be desirable over a live demonstration include:

- All the points one planned to cover are included (or you re-record the demonstration).
- The computer and Internet *are working* during the recording and one needn't worry about the Internet going down (or being slow) during the presentation.
- Mistakes are avoided (or you re-record the demonstration).
- It can be paused as needed.
- The video can be replayed, as needed, and it can be reused, on demand, at a later date.

Video Production Tips

While I'm not an ITT expert, I have found the following pedagogical, technological, and practical tips useful when planning videos:

- Determine your goal (and your audience).
- Always try to "smuggle in" some mathematics (specify the key concepts that will be illuminated by using the applet or application).
- Use mathematical language and terminology. (For example, "click on the vertex of the right angle" is better than "click on the point.")
- Keep it short (do a little, and do it well).
- Allot little or no time for things that are obvious.
- Make a plan (on paper) of the
  o key points you want to make,
  o outline of the video (even if it is only 60 seconds).
- Plan that it might require several "takes" to get it right. Doing several takes is easy with *Microsoft Media Encoder*.
- Test your audio (the microphone) ahead of time. (That is, is it going to be loud enough on playback?)

URL's for Sample Videos and Downloads

My web page on *Windows Media Encoder* can be found at
http://www.wiu.edu/users/mfjro1/wiu/tea/encoder/encoderfront.htm.
The page has sample videos, links to the *Microsoft* download pages, the how to make
videos document, and a video of how to use the *Media Encoder* to make a video.

Conclusion

I have found *Windows Media Encoder* to be an easy-to-use tool for capturing audio and
video content from a computer screen for use in teacher workshops and classes, whether
they are face-to-face, web-enhanced, or online. In the appendix below, step-by-step
instructions for using *Windows Media Encoder* to make videos are provided.

Reference

U.S. Department of Education. (2004). *Toward a New Golden Age in American
    Education: How the Internet, the Law, and Today's Students are Revolutionizing
    Expectations*. (National Education Technology Plan 2004). Washington, DC.
    U.S. Department of Education.

Appendix - How to Use Windows Media Encoder to Make a Videos

You start a new *session*. Double-click Capture Screen. The New Session Wizard is
easy to use and has the following 5 screens (dialog boxes):
  ➢ Select "Specific Window"; "Region of the screen"; or "Entire screen." Also,
    check the box if you plan to have audio (use a microphone). (If you pick
    "Entire screen," then the next dialog box is skipped.)
  ➢ Here you select the window you'll record or the region of the screen you'll
    record. The "Flash border during capture" checkbox will do just that (that is,
    the flashing border is a reminder that you *are* recording).
  ➢ Here you set the output file (location and filename). Note the output filename
    is ---**.wmv** which stands for windows media video. When the end user opens
    this file it will automatically (keep your fingers crossed) run in *Windows
    Media Player*.
  ➢ Set the quality of the recording (Low, Medium, or High), which will effect the
    file size.
  ➢ Display Information. These are the *properties* of the file, such as title and
    description. These can be viewed later by the end user by right-clicking the
    file and choosing properties (in Windows Explorer or My Computer, for
    example).
Now you are recording (technically, you are "encoding")!

To *pause* the recording, click the Windows Media Encoder button at the bottom of the screen. After which:

- You can record more (this appends to your video because you paused) by clicking **Start Recording**. (Nice feature.)
- You can click **Stop**, to stop the recording. When you stop the recording the Encoding Results box is displayed, at which point you can click **Play Output File**, which is a nice way to check to see if the video turned out to your liking. The output file is automatically saved (which is also a nice feature). Click **Close** in the Encoding Results box.

*If you are **not** satisfied with your video it is very easy to re-record right over the previous file.* To re-record, click Start Encoding (all of the settings for the "session" are maintained). You will be given a dialog box to verify that you want to overwrite the existing file. Proceed as above.

A note about "sessions": A *session* stores all the answers to the five screens listed above (filename, quality of recording, title, description, etc.). Often you want to reuse this information (or modify it slightly). Therefore, often you should *save the session*. Session files are ---**.wme** files, which stands for windows media encoder. Under the file menu, New, Open, Save, and Save-As all refer to session files (.wme files). To modify a session, open the existing session, then click New Session. The defaults will be the values from the previous session. Change those you wish to change and then use Save or Save-As.