Techniques for Creating Video Content for Radiology Education[1]

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TEACHING POINTS

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Video podcasts, or vodcasts, are an innovative tool for teaching and learning that allow the efficient distribution of tutorials, lectures, and other educational content. Certain types of content lend themselves to presentation in a video format. For example, vodcasts are well suited to teaching radiologic procedures. Vodcasts might also be quite useful in demonstrating the use of an audience response system and how one system differs from another, providing background content before an active-learning session, comparing magnetic resonance imaging pulse sequences, and teaching valuable interpersonal skills such as how to deliver bad news to a patient or how to maintain professionalism in the work environment. The authors present a step-by-step text-and-video tutorial on how to create, edit, and export vodcasts using a variety of software tools, describing both the "how" and the "why" of creating vodcasts. Interested readers are encouraged to examine both the print and online versions of this article to gain a more comprehensive knowledge of the ideas presented by the authors. *Online supplemental material is available for this article.*

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Introduction

Vodcasts, or video podcasts, are an innovative tool for teaching and learning, both in the classroom and on an individual basis. Once created, vodcasts can easily be shared and disseminated via the Internet. Although an audio podcast creates a smaller file and is easier to upload and download (1), a vodcast with its visual component provides distinct advantages, particularly in the setting of procedure-based tutorials, providing the viewer with a kind of "hands-on" experience. A few situations in which vodcasts might be helpful include *(a)* creating a tutorial on how to use software or picture archiving and communication system (PACS) features, *(b)* demonstrating a correlation between radiologic and surgical findings, *(c)* comparing magnetic resonance (MR) imaging pulse sequences in cardiac imaging, and *(d)* demonstrating an interventional procedure such as an arthrogram.

In this article, we provide a step-by-step tutorial on how to create, edit, and export vodcasts using a variety of software tools on both Macintosh (Apple, Cupertino, Calif) and Windows (Microsoft, Redmond, Wash) operating systems. We discuss use of Screenflow (Telestream, Nevada City, Calif) and iMovie (Apple) (Macintosh-based software), as well as Camtasia (Techsmith, Okemos, Mich) and PowerPoint (Microsoft) (Windows- and Macintosh-based software).

Teaching Point

In deciding which software to focus on, consideration was given to both Macintosh and Windows personal computer (PC) platforms. Other factors such as overall popularity, ease of use, scope of features, and the authors' personal experiences were also taken into account. As of this writing, trial versions for each of the aforementioned software programs exist, and the authors encourage readers to try several of these versions and choose one or two of them based on personal preference.

Materials and Methods

Screenflow
Screenflow (Telestream) is a video creation and editing tool available for download on Macintosh operating systems. A free 30-day trial is available at *http://www.telestream.net/screenflow/*. Alternatively, the software can be purchased at the same website for $99. This powerful tool creates, edits, and exports screencasts, which are digital video recordings of the computer screen, usually accompanied by audio narration.

A video has been created using Screenflow itself to illustrate how this is done in real time (Movie 1). Alternatively, the online version of this article contains text that outlines the steps in creating a screencast using Screenflow.

iMovie
All Apple iOS computers now come with iMovie software already installed. iMovie allows the user to create, edit, and export movies from video clips and/or still images. Audio components in the form of voiceovers/narration, music, or uploaded audio clips can also be added. Movie 2 demonstrates the most commonly used tools and settings for creating a video. The online version of this article also contains text that outlines these same steps.

PowerPoint
PowerPoint software is available on both Macintosh and Windows PC operating systems. Although PowerPoint is more commonly used for presentations in which the presenter uses slides as an adjunct to speaking, more current (2011) Windows PC versions allow the slide show itself to be formatted with sound and exported as an independent movie, allowing the presentation to function independently of the presenter and facilitating widespread distribution.

Adding Audio Clips
The first step is to create a PowerPoint presentation. Individual audio clips can be added to each slide by clicking on the Insert tab along the toolbar at the top of the desktop. Choosing "Audio" from the drop-down menu, followed by "Record

Audio," will cause a box to appear in the center of the screen that allows the user to begin recording by clicking on the Record button. Once recording is complete, clicking on the Save tab will end the recording. A "speaker" icon, representing the audio recording, will then appear on the underlying PowerPoint slide. The icon can be moved around and placed anywhere on the slide. These steps can be repeated for multiple slides (Fig 1).

At this point, audio will play for each slide *if* the user clicks on the speaker icon on the slide during the slide show. However, applying certain settings to the audio recordings allows the viewer to be more "hands off." Clicking on the speaker icon on any one slide will cause the Format Audio tab to appear at the top of the PowerPoint window. Clicking on this tab makes the Audio Options tab available. The user should then click on the "Start" drop-down menu and choose "Automatically." These steps can be repeated for every slide that contains audio. Slides with audio will now advance automatically after each audio clip is complete.

The slides *without* audio require different settings to ensure a set amount of time for display, as well as automatic advancement. To format the settings on these slides, the user clicks on the Transitions tab at the top of the PowerPoint window. To the far right, an Advance Slide tab will appear. Beneath this tab, an On Mouse Click tab can be seen. This box should not be checked. To change the amount of time each slide will be displayed, the user checks the After tab and types in the number of seconds desired for each slide. Clicking on the adjacent All Slides tab will assign the same length of display time for all unnarrated slides.

A second way to add audio to a PowerPoint presentation is by clicking on the Slide Show tab at the top of the PowerPoint window. A Record Slide Show tab will appear. Clicking on this tab will change the slide show into a presentation state and will begin the recording of audio. Although this offers a seemingly attractive alternative to the slide-by-slide method, it requires that the audio for the presentation be recorded in its entirety in one sitting. Consequently, inserting audio clips for each slide as outlined earlier is the recommended method.

Exporting As a Movie
The 2011 Windows PC version of PowerPoint software allows the narrated slide show to be exported in its entirety as a movie that includes both visual and audio components and can be played without PowerPoint. The 2011 Macintosh version of this software allows the slide show to be exported as a movie but has the well-documented shortcoming of excluding the audio in its final version.
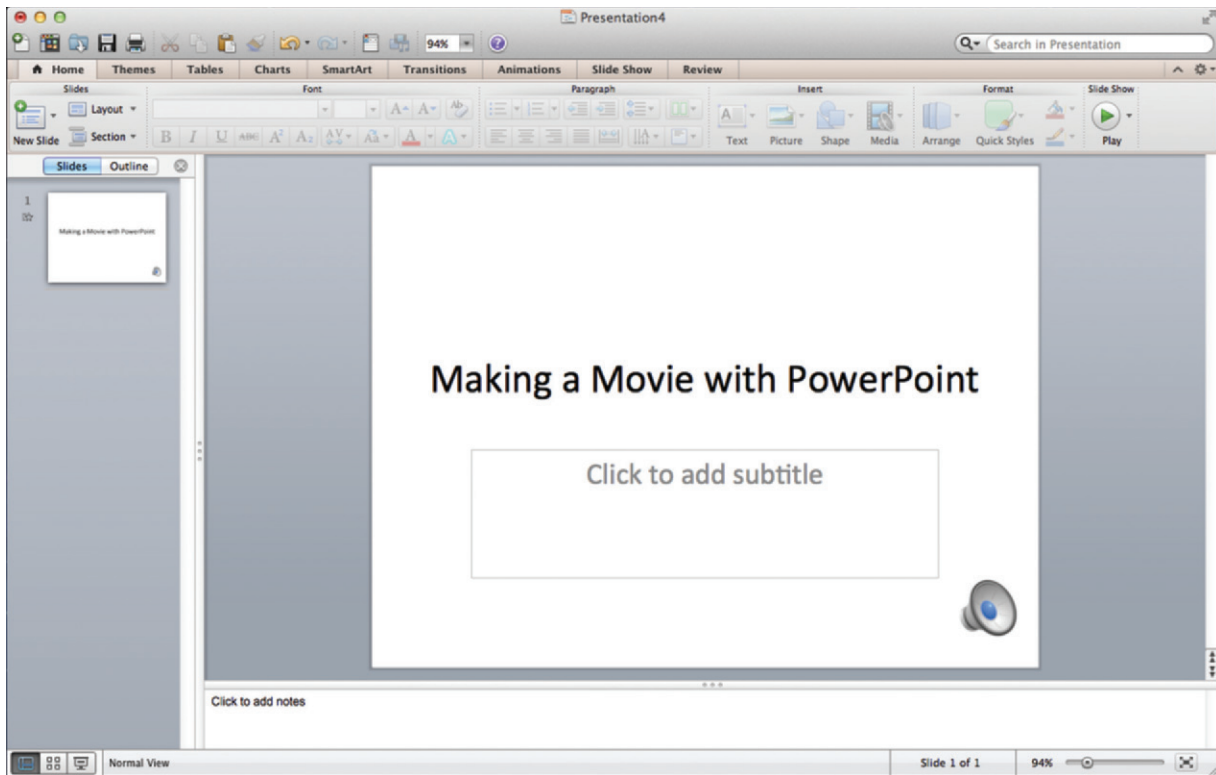
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Figure 1.   Screen shot shows a PowerPoint slide after an audio clip has been added. Note the speaker icon in the lower right corner of the slide.

Camtasia Studio

Camtasia is a video creation-editing program that is available for either Windows PC or Macintosh. A free 30-day trial is available for download at *http://www.techsmith.com/download/camtasia/*, after which the program will need activation. The requisite software can be purchased for $179 (for academic use). Camtasia is a well-designed, easy-to-use program that offers a wide range of capabilities. It can import all common audio, video, and image formats for use in video creation, and can also capture screen videos with audio for importing.

> **Teaching Point**   In creating a vodcast, it is useful to practice or script the audio that is to be included, so as to limit mistakes and subsequent editing requirements.

A vodcast created with Camtasia also describes its basic functionality (Movie 3). This description is based on the Windows PC version of the program; the Macintosh version is similar.

Making a Video

Camtasia allows the importation of video from any source (eg, digital camera, phone, or built-in webcam), as well as the direct creation of video in the form of camera or screen recordings. To use the screen record function, the user clicks on the Record the Screen button at the top left of the window. This will minimize the main program and bring up a small window at the bottom left of the screen with a button to start recording. It also provides the option of recording a predefined portion of the screen or the entire screen (Fig 2). The user then talks into the computer's microphone to record the audio portion. The video can be stopped at any time by pressing the F10 button on the keyboard or clicking on the Stop button.

Once a screen capture has been recorded, the video portion and audio tracks will be placed into the "clip bin" and timeline. These tracks can be edited separately. Multiple screen recordings can be created and edited to create a final video, along with any other video, audio, or images.

Editing a Video

Once installed and opened, the main Camtasia screen shows three main partitions: the clip bin, the timeline, and the preview window (Fig 3). The clip bin contains all video, audio, image, and screen captures that can be added into the timeline. Files can be dragged and dropped from the computer's file system or desktop into this area, and screen-captured video is automatically placed there.

These files can then be dragged into the timeline at the bottom, which provides a running view of which media are at which point in the project. The project can contain multiple tracks, which are layered, with higher-numbered video tracks

Figure 2. Toolbar for screen capture used by Camtasia. Note the basic recording options that are available.
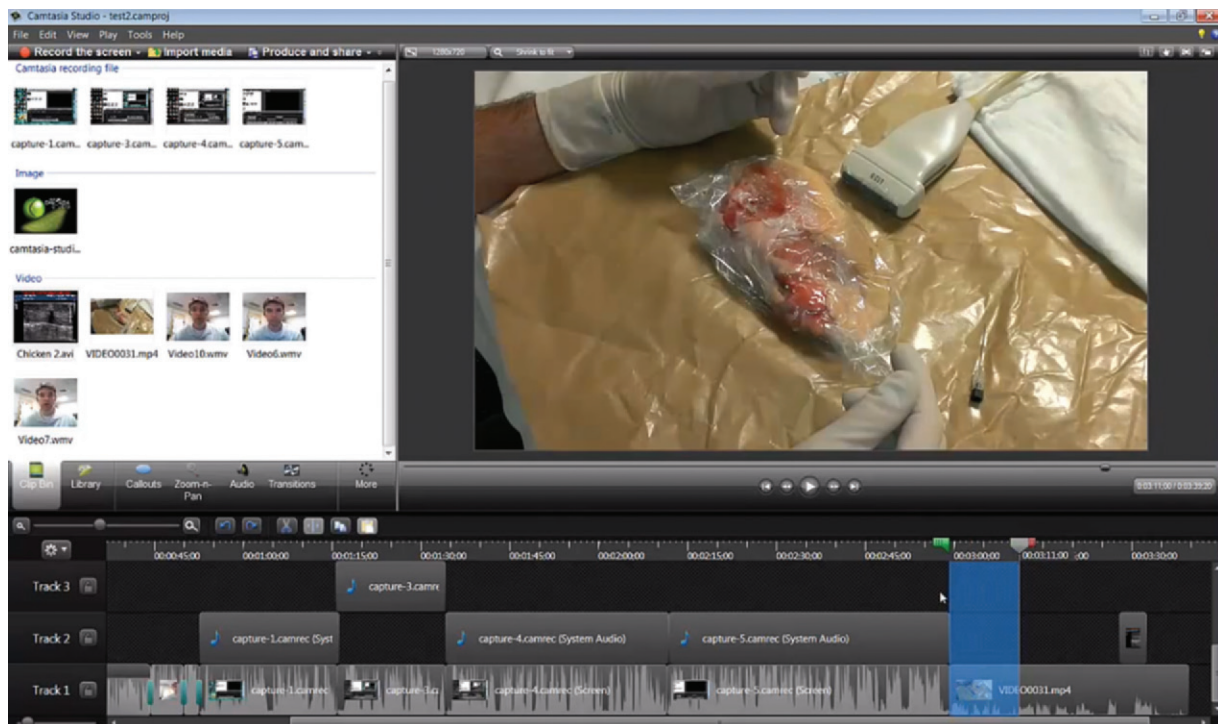

Figure 3. Screen shot shows the working Camtasia window, which demonstrates three main partitions: the clip bin (top left), the timeline (bottom), and the preview window (top right).

appearing on top of lower-numbered tracks, although two (or more) videos can be placed side by side.

Working with the timeline is relatively straightforward. A portion of the movie can be selected, and then deleted, expanded, or moved to a different point. This feature is helpful in deleting any inadvertent mistakes or pauses. A zoom function allows easy identification and selection of even small pieces of video and audio for accurate editing. Selection is as easy as using the red and green arrows, between which is the highlighted segment.

For example, to remove a narration error, the relevant section can be positioned between the red and green arrows. Pressing the delete key (or right-clicking for a small menu of available options and selecting Delete) will automatically delete that section and split the audio and video into two segments. The two segments can then be dragged together to eliminate the break. Alternatively, use of the Crop tool will allow this process to be performed in one step.

A gray arrow in the timeline indicates what is playing in the preview pane at the top right of the screen. During playing, this arrow will scroll along the timeline or can be dragged to any time point.

The different video tracks can be moved or resized within the top right preview pane as with any window.

Highlighting

Slightly more advanced options allow callouts, specialized zooms, moving of objects, and transitions. These functions are made available by clicking the tabs located below the clip bin (the tab selected by default).

Callouts (eg, arrows or highlighted areas) are graphics that are superimposed on the main

Comparison of Various Software Programs					Features		
Software	Manufacturer	Platforms	Cost (U.S. dollars)	Trial	Audio	Video	Screencast
Screenflow	Telestream	Macintosh	99.00	Unlimited time, with watermark	Yes	Yes	Yes
iMovie	Apple	Macintosh/iOS	14.99*	None	Yes	Yes	No
PowerPoint	Microsoft	Macintosh/Windows	109.99†	30 d	Yes	Yes/No‡	No
Camtasia	Techsmith	Macintosh/Windows	179.00	30 d	Yes	Yes	Yes

*Included with most new Macintosh computers.
†As a stand-alone program. Monthly subscription service is also available for $6.99/mo.
‡Video and audio can be embedded in the presentation and can play automatically.

video to call the viewer's attention to important areas or aspects of the video. This feature can be useful in (for instance) pointing out *(a)* subtle findings on a radiograph or *(b)* a needle tip on an ultrasonography (US)–guided arthrogram. Clicking on the Callout tab brings up the default callouts, which can then be added and moved, and edited within the timeline and preview panes.

Transitions can add some polish to a movie and can be accessed through the Transition tab. Any type of transition can then be dragged between elements within the timeline that are on the same track or are at the beginning or end of any portion of a track.

Exporting the Video

Video exportation is as simple as saving the file as a movie in the desired format. The .mp4 format is the default format; it is playable on all computers and is generally recommended for widespread dissemination. Several options are available for saving the image and sound quality. High-definition video is defined as video of at least 720 scan lines (1280 × 720 pixels, or 720p) and 60 frames/second.

Conclusion

A vodcast, or videocast, is essentially the video counterpart to an audio podcast and is often designed to be viewed on portable devices. Multiple software applications have been designed to help users create, edit, and export vodcasts. Many of these applications are compatible with both Windows PC and Macintosh operating systems, so that they are readily available to anyone with access to a computer. A comparison of the features of various software packages is shown in the Table.

In this article, we have outlined some of the most basic tools that are needed to successfully use Screenflow, iMovie, PowerPoint, and Camtasia when creating a vodcast. Although each application is decidedly different, overlap does exist. As a result, acquiring basic facility with any one of these programs opens up a wide range of possibilities in this age of online teaching and information sharing.

Reference

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