



Multimedia Tutorial Production Guide

McKinney Engineering Library



A guide to the production of multi-media library instruction using streaming media technology.

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Is Streaming Media the Right Choice?



There are a variety of media formats that can facilitate the successful delivery of online instruction; the one you choose should reflect the goals and abilities of your instructors and learners.

This guide is based on the redesigned online Engineering Communications Tutorial at the University of Texas, developed by the McKinney Engineering Library in partnership with the Digital Information Literacy Office and Digital Library Services Division. The tutorial underwent analysis and revision with the goal of creating effective library instruction with guidance in multiple languages and diverse media. Streaming media was the format selected for the project because it would allow the development team to use separate audio files for each language while drawing from a common bank of visual imagery. The images and audio files could be synchronized using the Synchronized Media Integration Language, or SMIL.

Other formats—such as Flash and simple HTML—were rejected for a variety of reasons. Although Flash offers many interactive features that lend themselves to the development of

rich learning experiences, Flash animation is far more time-consuming to produce and more complex to modify than a SMIL-based tutorial. In addition, Flash production requires a highly-specialized set of technical skills and costly software. The use of simple HTML was rejected because an audio component was deemed crucial to the multi-lingual sections of the tutorial.

When you are deciding on a format for your tutorial, remember to consider your audience's learning environment. If you expect the majority of learners to use a dial-up connection or older, lower-speed computers, you may wish to avoid bandwidth-intensive solutions that rely upon the latest browsers and plug-ins. FlashMX is an example of current technology that is not ubiquitously available. Even SMIL, the technology recommended in this guide, has cross-platform limitations.

Looking Ahead

Although this guide focuses on the production of audio/visual elements, the Engineering Communications Tutorial development team acknowledges the importance of active learn-

ing in online library instruction. Nancy Dewald notes in the *Journal of Academic Librarianship* that “active learning is accomplished with individual or collaborative exercises, questioning by the librarian... or other forms of practice to reinforce instruction.”¹ Similarly, Brandon Hall states in the *Web-based Training Cookbook* that “Interactivity makes the difference between a program that simply presents information, and one that actually trains the user.”² By integrating streaming media instruction with interactive segments like quizzes, assignments, or follow-along exercises, the effectiveness of your tutorial may be improved. Keep in mind that even on the Web, *doing* is a better teacher than simply watching and listening.



Planning Your Instruction

Instructional designers spend a great deal of time planning instruction before actually creating any instructional materials. This step is vital whether you are a teacher planning classroom activities, a writer developing a textbook, or a course developer for online instruction.

Before you begin creating your online library instruction tutorials, take the time to thoroughly identify and organize the information you want to deliver. Remember that “library instruction is best-received when it is course-related, and specially assignment-related.”³ Assuming that you have already identified a genuine need for online instruction on the topic of your tutorial, the next step is to analyze your learners and establish instructional goals.

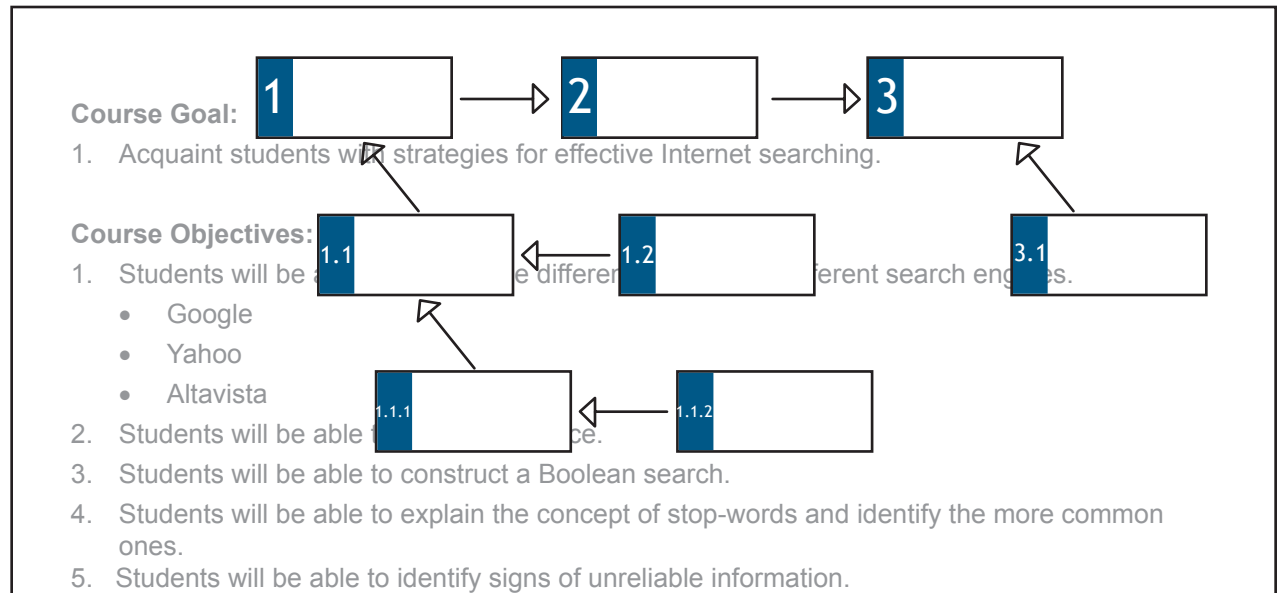
Analyzing your Learners

Consider the age, experience, cultural background and technical expertise of your learning audience. Are they a homogenous group with similar goals or do they vary widely? What are learners’ probable goals in completing the online tutorial? What aspects of online instruction might they prefer to classroom instruction? How will they use the knowledge they gain?

Once you have successfully answered these questions, you are in a good position to create online instruction that will be both meaningful and enjoyable for your learning audience.

Clarifying Instructional Goals/Objectives

Think about your instructional goal for the learner. Does it match the probable goal of the learner



him or herself? Now determine *what the learner will need to be able to do* to demonstrate that the instruction has achieved the stated goals. Write out instructional objectives in the form of activities that the learner will be able to perform when finished with the tutorial. This exercise will help you structure your tutorial to the greatest advantage of your learner. It will also assist you in evaluating whether or not your completed tutorial meets all of its instructional objectives.

Finally, make an outline of the topics you’ll cover over the course of the tutorial and think about the most sensible order in which to present them.

It may also be useful to list the skills that learn-

ers will need to master *before* they can successfully complete the different sections of your tutorial. Looking at this list may bring attention to the areas that require the most attention and may even suggest topics of instruction that weren’t in the original outline. For example, if students must know how to construct a boolean search string in order to complete a tutorial about your library catalog, you may wish to include a section or even a separate tutorial on the subject of boolean logic.

Consult “Tips for Developing Effective Web-based Library Instruction” by the ACRL for more recommendations.⁴

Determining Available Technology/Skill Sets

The technology with which you choose to deliver your instruction should complement the instructional goals and audience profiles that were defined in the first section. This guide focuses on the use of streaming media (using Real® media delivery tools) to deliver audio, video, animation and slide-show presentations. Bear in mind that the use of streaming media can be augmented by more interactive material that engages your learner in *active learning*.

If you are using this guide to prepare your tutorial, you need to have some basic knowledge of:

- SMIL (an XML-based mark-up language like HTML)
- audio recording
- image manipulation (Fireworks®, Photoshop®, etc.)
- Real® media formats

Optionally, you may wish to use video or animation, in which case you'll need to be familiar with:

- digital video editing
- video screen capture (Camtasia®)
- Flash® animation production

Software/Hardware Requirements

Many of the files required to produce your tutorial can be created using a variety of applications that are available at little or no cost.

A basic text editor like WordPad or Notepad can be used to create all of the SMIL, RealPix and



RealText files that will synchronize the audio and visual components of the finished tutorial.

The audio for your tutorial will need to be digitally recorded and saved in the appropriate Real format. This process requires a computer equipped with a sound card, high-quality microphone and software for recording and editing the audio files. An inexpensive option for audio software is the RealSystem Producer Basic, which is freely downloadable (as of summer 2002) at www.realnetworks.com.

Image manipulation can be done using a variety of applications including the ever-popular Photoshop and Fireworks. In addition to being able to create the images, you'll want to know

something about optimizing them. Optimizing images allows you to reduce file sizes with as little image degradation as possible.

If you wish to use video in your tutorial, the obvious requirements are a video camera and video editing application. In addition, you will need to become familiar with the options for synchronizing your audio and video segments as well as optimizing video files for streaming in Real media format.

For screen capture video, the product Camtasia is one of the only products on the market and can be found through www.realnetworks.com.

Flash animations can be played in RealPlayer 7 or 8 and the RealOne Player, although sound effects embedded in the Flash animation itself will not be heard. Instead, sound must be synchronized using SMIL. Flash animations can be created using either Macromedia Flash or Adobe LiveMotion.



Script Creation

The first step in producing your instructional materials is creating the audio scripts for the individual sections. The audio will guide the learner through the information in each section of your tutorial, so the script should be crafted with your instructional goals and objectives in mind.

Create scripts for each section of the tutorial outline that you developed in the instructional planning stage. Include staging notes in your script that describe what the learner might be seeing while the script is being played. This will assist you when you create the visual materials. In addition, the types of visual cues that you plan to offer your learners may alter the script considerably.

Once you have created your scripts, proceed to the visual media creation step. **DO NOT RECORD** your scripts before you have created your visual media. You will likely discover new and creative ways of presenting the information throughout the visual media creation process, which can result in significant script revision.



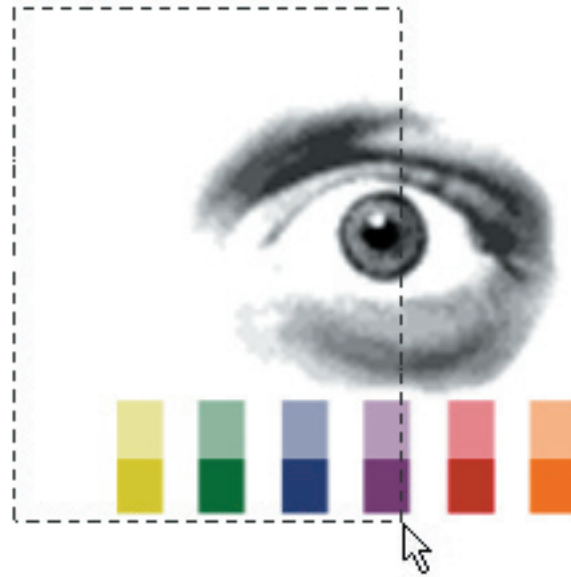
Visual Media Creation

The options for visual media creation are limited only by your imagination—and project deadline! Between static images, animations, video, and text there are infinite combinations of rich, expressive visual delivery methods for your instruction.

The next step is to create visual media that will be displayed as the learner listens to your audio lecture. Using the script that you wrote, begin creating visual pieces to accompany each portion of the lecture. As you assemble a series of images, you will likely find that your audio script requires revisions here and there. Remember as you create your media that your learner will need at least several seconds to absorb each new piece of visual information.

*It is important to save your images in **GIF** format.* Gif is the only image format that supports streaming. (Animated gifs are supported as well; however, to obtain the smallest possible file size, you may wish to use short Flash animations rather than animated gifs.) You don't need to do anything special with the gif files themselves; you will learn how to synchronize the images with the audio when we create our SMIL file later on.

Your final tutorial will run in a Real Player window of a specified size. Before you begin creating your media, be sure to establish the size of your tutorial. **DO NOT** plan on using the entire screen for your presentation. In order to keep download times reasonable, you'll need to restrict the size of your tutorial to around 500x350 OR LESS.



The final determination should be based on the quality of server you will be using to host the tutorial and the type of media that will be present. For example, Real video requires more bandwidth than Flash animations, so a tutorial containing a lot of Real video should be smaller on the screen than one containing Flash.

Image Creation for Beginners

Perhaps the easiest and fastest method of creating visual media is through the creation of PowerPoint slides. You may create an entire presentation in PowerPoint and then save your slides as gif images.

(The precise method for exporting your slides as images may vary depending on the version

of PowerPoint you use. Refer to the PowerPoint help documentation for further directions.)

More on Image Creation

If you are familiar with PhotoShop, Fireworks, or other image creation applications, creating your visual media can be a lot of fun. Although streaming your media allows you to use larger file sizes than would be reasonable on a standard Web page, you should not neglect image optimization. If your final presentation is too large, it will take a long time to load, and may not play as smoothly as you'd like. Since you are saving your images as gifs, optimization means reducing the number of colors as much as possible without significantly reducing the quality of the image. Refer to the help documentation of your image creation application for details.

Flash Animation

Flash animations can be played through Real Players 7 and 8 as well as the RealOne Player. If you would like to animate sections of your tutorial, Flash provides a low-bandwidth alternative for doing so, as long as you keep a few rules in mind.

First, sounds that you create in your Flash movie will not play through Real. Create silent animations and synchronize any audio using SMIL.

Second, don't spend too much time perfecting the timing of your Flash pieces. As with video, Flash segments will need to be synced up with the Audio portion of your tutorial later on and this will likely include some tweaking within the

Visual Media Creation

Flash segment itself. Short, simple animations are the easier to integrate with audio than prolonged displays.

Third, the more keypoints in your Flash movie, the larger the file. Keep keypoints to a minimum. Complex scripting should also be avoided. Although Real maintains that interaction with Flash elements as defined using ActionScript is preserved through the Real player, we recommend extensive testing before you include significant interactive elements in your Flash pieces.

Don't forget that the use of Flash for our purposes is only to enhance the display of visual information. If you find that Flash is becoming the centerpiece of your tutorial, you may wish to reassess the decision to use streaming media as your method of delivering instruction.

Video Production

Digital video is a bandwidth intensive medium that requires some special skills to edit and prepare for presentation. If there are segments of your tutorial that will benefit greatly from the inclusion of video, use it. However, if your tutorial does not require video to be successful, you may choose to use other, less complex visual elements.

One way of using instructional video is to capture actions on a computer screen with a product like Camtasia. This can be helpful if you are trying to convey procedural knowledge such as interaction sequences with a computer program

or Website. Screen capture video is not as effective for teaching conceptual knowledge such as Boolean logic or information evaluation.

Regardless of the software/hardware or format in which your original video is captured, you will need to convert the file to Real media format (.rm). Real Producer, Camtasia, and other media creation applications provide options for saving your files in Real media format. Your settings will vary according to the type of server that will host your media and the connection speeds of your users. To determine the appropriate settings for your tutorial, consult your Webmaster and the Real Networks online documentation.



Audio Media Creation

There are as many software combinations available for audio media production as there are for visual media production. In addition, a range of audio recording hardware is available depending on your needs and expertise. Remember that the quality of your audio is affected by the quality of every step in the recording and editing process; the microphone, the mixer, the sound-card and the software you use will all influence the caliber of your final presentation.

The simplest hardware option for recording your audio is using a high-quality microphone that plugs directly into the back of a computer with a sound card. In conjunction with free software such as Real Producer Basic, or Windows Sound Recorder, this method will result in serviceable audio files, but not professional grade sound. If high-quality audio is a priority for your tutorial, secure the use of a professional-grade microphone and mixer.

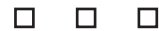
Regardless of how you capture your audio tracks, media cleaning software such as Media Cleaner® will help reduce background noise and increase the quality of your final product.

Since animation and video sequences have their own timeline, the synchronization of your audio with animated or video segments will demand considerable attention. For video segments, you may choose to incorporate your audio into the video file itself. Remember that audio in Flash movies will not play through Real player.

As with video, your final audio files will need to

be saved in the Real media format (.rm) using settings appropriate for your server and audience. See Real Networks documentation for details.

TIP: When you save your audio files, be sure to use the same Real media settings for your audio as you used to save any video.



Synchronizing Your Tutorial with SMIL

SMIL, the synchronized multimedia integration language, is an XML-based mark-up language. If you've ever used HTML to create a Web page, SMIL will look somewhat familiar.

A very simple SMIL file and an included RealPix file appear on the right.

Notice that in SMIL, as in XML, *every* tag is closed using the '/' character. If the tag does not contain other tags, the '/' character simply appears adjacent to the closing '>'.

The two most important sections of the document appear in red and blue. The red section simply describes the layout of the presentation. The root-layout appears in every SMIL file; it defines the dimensions of the entire SMIL presentation. Once the root layout has been established, individual regions are defined within the root area in which the visual media may appear. In this file, only one region has been defined. It begins 0 pixels from the top of the presentation and 0 pixels from the left and occupies the entire presentation area.

In the blue section, the individual pieces of media are synchronized. The audio and the first image begin simultaneously (as indicated by the <par> tags), but the first image disappears after 6 seconds. Note that the audio file is referenced with the full URL using the protocol "rtsp" instead of "http"; this is because the audio file is hosted on a machine running Real Server. The second image appears 6 seconds into the audio piece and disappears at 12 seconds. The third image

tutorial.smil

```
<smil>
<head>
<meta name="title" content="Engineering Communications Tutorial"/>
<meta name="author" content="Tutorial Team"/>
<meta name="copyright" content="(c)2002 McKinney Engineering Library"/>
  <layout>
    <root-layout background-color="white" width="500" height="330"/>
    <region id="graphics" top="0" left="0" width="500" height="330"/>
  </layout>
</head>

<body>
  <par>
    <audio src="rtsp://real.myserver.edu/tutorials/audio.rm"/>
    
    
    
    
  </par>
</body>
</smil>
```

slides.rp

```
<imfl>
<head width="500" height="330"
  title="Indexes"
  author="Engineering Communications Tutorial Team"
  copyright="(c) 2002 McKinney Engineering Library"
  timeformat="dd:hh:mm:ss.xyz"
  duration="0:13.0"
  bitrate="100000"
  aspect="true"/
  background-color="#ffffff"/>

<image handle="1" name="images/slide1.gif"/>
<image handle="2" name="images/slide2.gif"/>
<image handle="3" name="images/slide3.gif"/>

  <fill start="0" color="white"/>
  <fadein start="0" duration="1" target="1"/>
  <crossfade start="3" duration="1" target="2"/>
  <wipe direction="up" start="6" duration="2" target="3"/>
  <fadeout start="12" duration="1" color="white"/>
</imfl>
```

Synchronizing Your Tutorial with SMIL

file—called “slides.rp”—is a RealPix file. The contents of the RealPix file appears to the lower right. RealPix is a lot like SMIL; it’s a mark-up language that makes it easy to define transitions like fade-outs and wipes between your images. Notice that the RealPix file contains references to three images, for a total of six visual media files to be played with the audio file.

TIP: You may wish to create a skeletal SMIL or RealPix file that sequences your visual media without precise timing. Then listen to your audio track, note the times at which image transitions should occur and modify the SMIL file accordingly.

Real Networks maintains excellent documentation on producing multi-media presentations with SMIL and RealPix. Refer to thier support website (<http://service.real.com/>) for detailed help files and to learn about more sophisticated SMIL syntax.



Publishing Your Tutorial Online

The final step in producing your online tutorial is publishing it on the Web. Your tutorial may consist of just one SMIL presentation, or it may be a series of presentations. You must decide how to present these files in a way that facilitates your instruction. You may wish to provide a link to the SMIL presentation directly from an existing Web page. Or you might create a special “tutorial” Web page with links to one or more related presentations. Alternatively, you can embed your presentation in HTML files, which allows for substantial control over the viewing environment. (In addition, embedding in HTML allows you to include quizzes, assignments and other non-multimedia elements in a consistent framework.)

By now, you will have determined whether Real Server is available to host your media. If so, be sure to place any media, RealPix and SMIL files on the Real Server. If you elect to embed your multi-media segments in an HTML framework, place the HTML files in your usual Web-publishing folder.

TIP: Remember that streamed audio and video hosted on a machine running Real Server are retrieved using the “rtsp” protocol instead of “http.” Be sure to reference your media appropriately.



Evaluating Your Tutorial

Evaluation is a crucial step in the instructional design process. Evaluation allows you to continuously increase the effectiveness of your instruction and hone your design skills. Since your instruction is an online tutorial, you'll face unique challenges in evaluating your work—but don't be discouraged! You will likely learn as much from the evaluation process as you did throughout the planning and production stages.

Your tutorial has elements of both a Website and instructional material. To accommodate these dual purposes, we'll look at two different evaluation processes, one that examines the usability of Web resources, and one that assesses the success of the instruction itself.

Usability

In recent years, usability has taken center stage in the world of Web development. Becoming familiar with standard usability heuristics (such as those published by Jakob Nielsen), can help you make good design decisions throughout the planning and production processes.

Remember, usability encompasses a wide range of Website characteristics such as accessibility for the disabled, visual and syntactic organization, navigation and labeling, and many other distinct features of interaction. When you test the usability of your tutorial, do it in multiple browsers and platforms--the most basic test of usability is whether or not your site can be seen by Mac and PC users with a variety of browsers.

The best way to test your finished tutorial for us-



ability is to observe first-time users navigating your page or site and accessing the instructional materials. Don't worry about the success of the instruction itself while you test for Usability. First determine whether or not users understand how to use the tutorial and can do so successfully. Usability problems can create false negatives when you test the efficacy of your instruction; it's best to eliminate lingering usability problems before evaluating the instruction itself.

Evaluating Instruction

Instruction is generally evaluated using learner assessments of some kind. Assessment may include an interview, a skills demonstration or a written test. By carefully planning and choosing participants for the evaluation, you can

determine whether or not users of your tutorial are learning the skills you are trying to teach.

Be selective when choosing evaluation participants. Don't use staff members or even regular patrons of your library to test library instruction unless they are the intended learners. While it is tempting to use the resources close at hand, you'll be surprised at the fresh perspective and ideas that outsiders will bring to the project.

When designing the test itself, use the instructional goals you developed in the planning stage. Imagine ways that your learner could demonstrate newfound competencies; whether you use a written skills test, a personal demonstration or a personal interview, be sure to maintain a consistent format for each evaluator. Finally, remember that you are testing your instruction—not the evaluators!



Thanks and Credits

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For More Information

Visit the Engineering Communications Tutorial on the McKinney Engineering Library Homepage: www.lib.utexas.edu/engin.

Contact McKinney Engineering Library for more information about our online library instruction initiatives: englib@lib.utexas.edu

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