Florida Journal of Educational Research:

Exploring the Online Potential

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Abstract

Beginning with this issue, the Florida Journal of Educational Research will be published only in an online version; there will be no printed copy. The move to an online publication will decrease printing and mailing expenses, and it offers the potential to expand the media provided with each issue. This article provides techniques and guidelines for incorporating media elements, such as animations, audio, video, and data files, to augment a research article. Links to online articles are included to provide examples of media-enhanced research.

Introduction

With increased access to the Web, more and more journals are being published electronically – either exclusively on the Web or in both print and online versions. Electronic publication of journals can save on the printing and distribution costs, and it offers the potential to decrease the time to publication by about two-thirds (Resh, 1998; Tauber, 1996). Although some scholars question the acceptance of online publications by academia, a study published by the *Journal of Electronic Publishing* reported that, "online-only peer-reviewed content is cited in the literature at a fairly normal rate (range, 2.1 - 4.1 more citations on average for print articles), and that users access, download, and use the content in a sustained manner" (Anderson, Sack, Krauss & O'Keefe, 2001, p. 12). The Anderson et al., study also confirmed that tenure committees (in pediatrics) accepted online-only publications in refereed journals for tenure decisions. A similar investigation targeted administrators in Florida's ten universities and reported, "sixty-seven percent of all respondents in the study agreed or strongly agreed that electronically published articles should be counted in the tenure and promotion process" (Sweeney, 2000, p. 5).

In addition to the savings in time and money, electronic publications offer many new options for enhancing articles and conveying information (Resh, 1998). This article focuses on how potential media elements (including graphics, animations, audio, and video) can be integrated into online publications. For each medium, background information is provided, as well as links to examples of online research with appropriate use of the medium. Guidelines for submitting media elements to enhance future editions of the *Florida Journal of Educational Research* are outlined.

Expanding the Horizon

Before investigating individual media elements, it is appropriate to emphasize that an electronic journal can be, and perhaps should be, more than just an online version of the printed pages. In addition to active links to other online sources and internal links within a document, online articles can incorporate a wealth of visual and aural information. Two excellent examples of online articles are provided by *Interactive Multimedia Electronic Journal of Computer Enhanced Learning* (Wake Forest University) and *Music Theory Online* (Society of Music Theory, Inc.).

For example, the article, *A Learner-Centered Approach to Multimedia Explanations: Deriving Instructional Design Principles from Cognitive Theory*, provides online examples of the software programs and treatments used in a research study (Mayer, 2000). The article discusses the Split-Attention Principle and reports a study that asked students to view an animation depicting the process of lightning. The animation was viewed with either concurrent narration or concurrent on-screen text. The ability to provide online examples of both treatments augments this article.

Likewise, in the article, *Performance and Hypermetric Transformation: An Extension of the Lerdahl-Jackendoff Theory*, the author was able to include links to images containing line drawings, musical notation, and flowcharts (Dodson, 2002). In addition, recorded music, in two different formats, is included to enhance the article.

In these examples, as well as others highlighted in this article, the media elements are important avenues for conveying information related to the research. By allowing the reader to see and hear experimental treatments, view complete data sets, or observe a research participant, the article can become more engaging and meaningful.

Graphics

The use of graphics is not uncommon in print versions of research papers; charts, graphs, and

flowcharts are frequent elements. However, most research journals are printed in black and white (because of printing costs), limiting the use of color to convey information. With online publications, color does not increase the expense, and color should be encouraged, whenever appropriate. For example, note the effective use of color in the graphs in the article, *Publishing Online-Only Peer-Reviewed Biomedical Literature: Three Years of Citation, Author Perception, and Usage Experience* (Anderson, Sack, Krauss, & O'Keefe, 2001). If an article is going to be published in both print (black and white) and electronic versions (color), it may be appropriate to use a pattern to differentiate the information in the print version.

Color charts and graphs can be created with application programs (such as Excel, PowerPoint, or Word) as well as statistical programs. The images can then be saved as individual files or pasted into a document. Software programs that are specifically designed for graphic development, such as Adobe PhotoShop, Paint Shop Pro, and Adobe Illustrator, are excellent options for creating original images and altering existing images. Other possibilities for obtaining images include using clip-art or scanning images from existing hard-copy graphics or photos (be sure to check copyright restrictions). Online publications can also be enhanced with digital photographs – digital cameras are becoming extremely common, and, with digital images, you do not need to develop film or scan photographs.

When a research paper containing images is displayed on the web, the graphics can be embedded into the document, or they can be displayed in separate windows (depending on the size of the graphics and the author's preference). For example, the article, *Efficacy and Safety of Pimecrolimus Cream in the Long-Term Management of Atopic Dermatitis in Children* (Wahn et al, 2002), provides thumbnail images (small images that convey the general essence of the content). Readers are then encouraged to open the larger versions of the image in either the same window or a separate window.

Animations

Unlike a print journal, it is possible to take advantage of animations in an online journal. Animations can serve numerous functions, such as showing changes in data, displaying processes that might otherwise be difficult to explain, and allowing readers to interact with data. For example, a simple animation is used in the article *News from Online: Chemistry and Art* to explain the process of neutron activation analysis. There are only a few images that make up the animation, but the animation allows the process to be visualized.

There are many ways to create animations, but the easiest is to use an animation program such as GIF Construction Set for Windows (US$20 shareware; download), or GifBuilder for Macintosh (download free). For example, suppose your article focuses on how quickly the Internet has evolved, and you want to show data on the rate of change in international Internet connectivity. An animated map within your article would be useful to illustrate the expansion of Internet connectivity in a quick and understandable visual representation.

For PC users, the steps to making a simple animation (focusing on Internet connectivity) using GIF Construction Set are as follows:

1. Create at least two frames/images in an electronic graphic format such as GIF or JPG. Make sure all of the frames are the same size and have a consistent color scheme, etc. Figure 1 illustrates the six images that were created for the Internet animation.

2. Select the Animation Wizard under the file menu of GIF Construction Set, and follow the directions. (Advanced users can build the animation without using the wizard.)

3. The wizard will prompt you to make decisions, such as: Do you want the animation to play once and stop or to loop? Which palette do you want to use, a photorealistic one (for photos or computer art) or one better equipped for line drawings? How much delay time do you want between your image frames? As you create the animation, you can experiment with the timing and other options until you are pleased with the results.

4. The last step, when using the wizard, is to import the images that will be used into the animation program. Once this is finished, click "Done" and view your animation using the "View" button. If things are not exactly as you would like, you can start over or make small adjustments to the animation by using the options in GIF Construction Set.
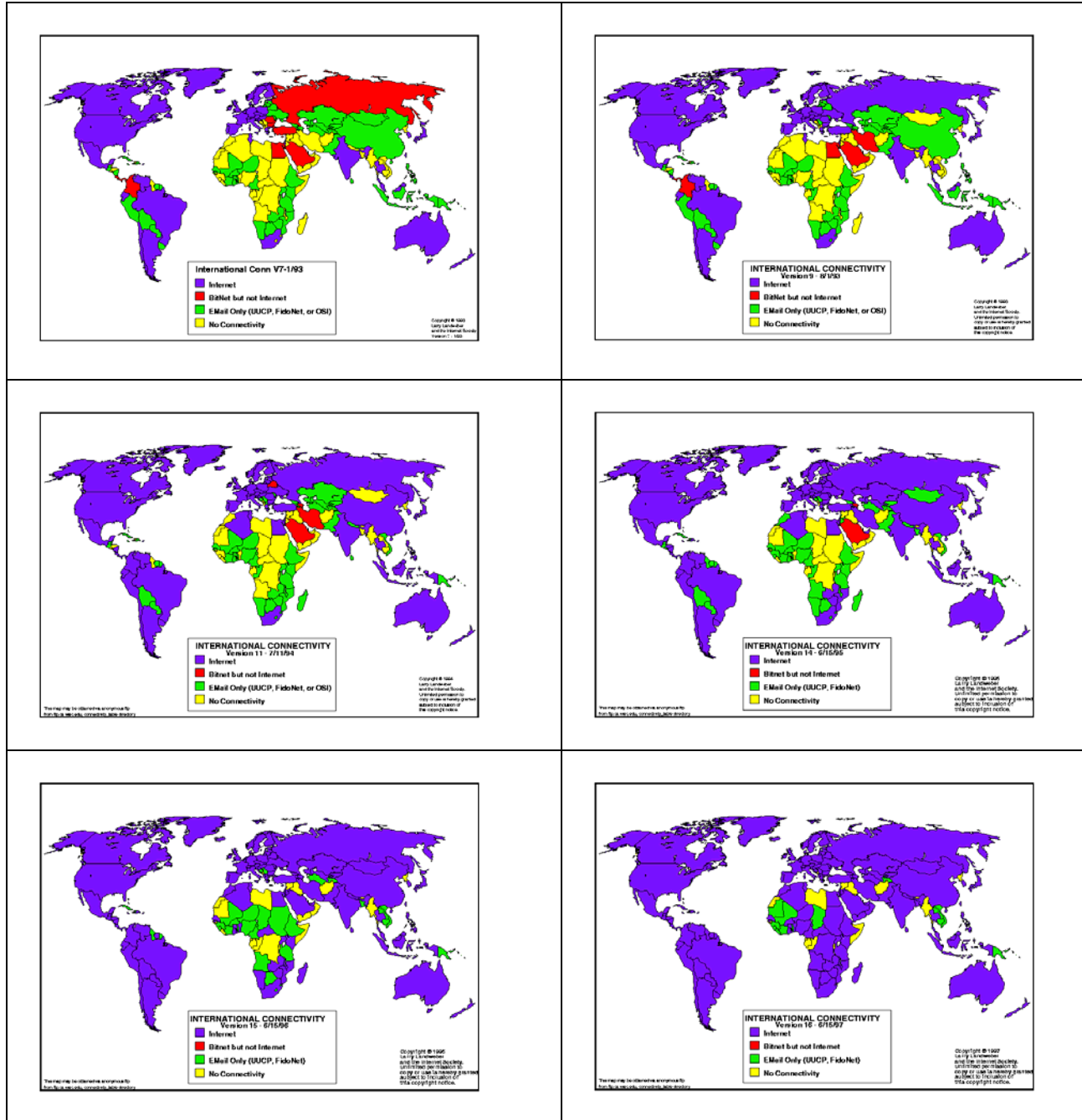
Figure 1. Images for International Connectivity Animation (Landweber, 1997).

Figure 2 illustrates the completed animation. Note that by using a GIF animation program, a single GIF file is created that contains the multiple images of the animation. This animation is made up of six files saved from the Internet and placed in Gif Construction Set via the wizard. The animation was created to play once and stop with a 2 second delay between frames.
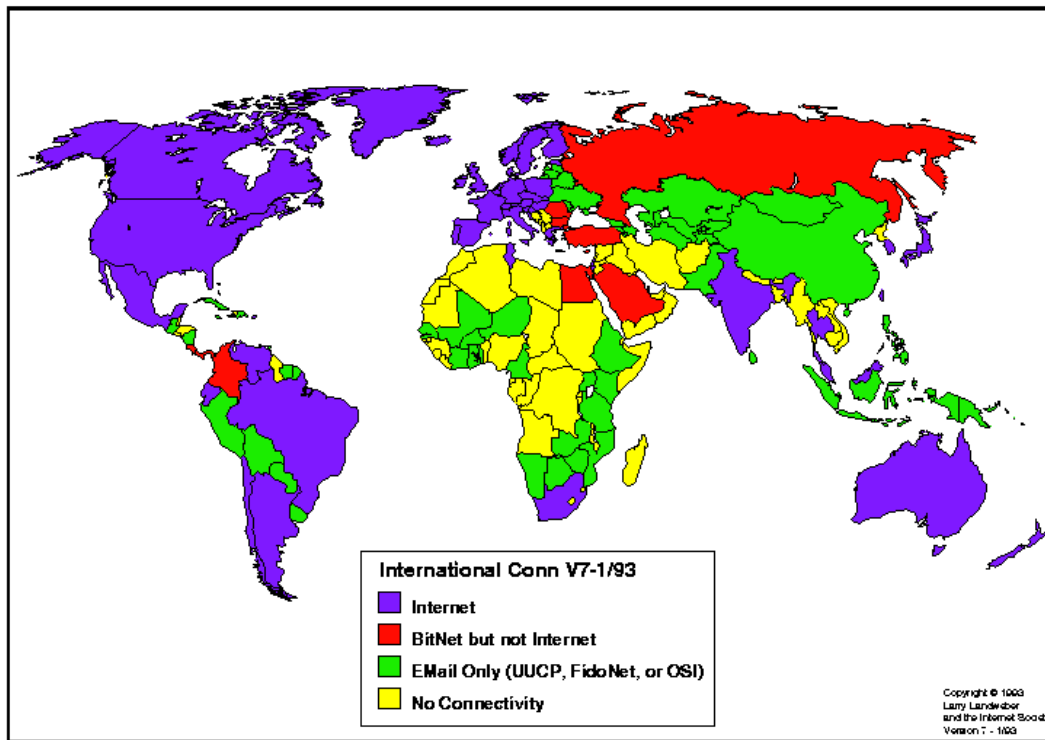
5

Figure 2. Animated International Connectivity Map.

GifBuilder is available for Macintosh systems, and it is very easy to use. The steps to making simple animations are as follows:

1. Have at least two frames that you want to animate in an electronic graphic format such as GIF or JPG.

2. Open GifBuilder.

3. Open the folder with your graphics.

4. Drag and drop the graphics into the Frames box and save your animation.

5. That is all there is to it. You can now make small adjustments to your animation using the tools under the "Options" menu, which are very similar to those mentioned above in the Gif Construction program.

For more complicated animations, you can use programs such as Macromedia's Flash or Fireworks. This article will not go into the details of creating a Flash animation; however, excellent instructions on several types of animations can be found on the *Webmonkey site*.

Audio

Although audio is used less frequently in electronic journals than images, it is feasible to supplement your articles with sound. Examples of the use of audio in publications can be seen in various e-journals. For example Anders Eriksson (1999) published *A Laboratory Course for Undergraduate Students of Phonetics* in the *Interactive Multimedia Journal of Computer-Enhanced Learning*. In this article, the purpose of the audio is to provide interactive demonstrations of the perception experiments, which are much more meaningful if you can hear them.

Creating audio files is not complicated, but you will need a software application for recording and editing your files and plenty of disk space to work with the files (audio files can be quite large). A good place to start is to explore the utilities and software that are installed on your computer. These utilities can generally record from a variety of sources and save the files in a variety of formats. For example, Windows comes with a program called Sound Recorder, and the Macintosh operating systems include SimpleText. There are many other shareware programs you can also use, such as Cool Edit 2000 for Windows or Studio Sound 2.0 for Macintosh. If the project is complex, you might prefer a more comprehensive application such as *Sound Edit 16* by Macromedia. This program is sufficient to accomplish all but studio-quality audio editing and recording. It can also be used to mix audio tracks and convert to and from a variety of different audio formats.

Follow these steps to digitize audio on your computer:

1. Digitally capture your sound by opening a new file in your recording software and recording from your microphone, CD player, or another audio source. Select a high quality sampling rate (about 44 kHz) for music and a lower sampling rate (11 or 22 kHz) for speech.

2. Edit the audio file to remove any unwanted pauses, noises, or other distractions.

3. Choose a format for saving and encoding your audio so it can be played back on the web. There is no single, agreed upon format for audio files on the web. However, for the purposes of this journal, we suggest that you use universal audio formats such as WAV (for Windows computers) or AIFF (for Macintosh computers). It is also possible to save audio files in more compressed audio

formats such as MP3, Real Media (RM), or QuickTime (QT or MOV); however, these formats may require a plug-in (a small application installed within a web browser) on the user's computer. You can submit audio files to FJER in almost any format; the editors will convert them.

Video

Digital video is by far the most complex element to include in an online article, from both the author's and the reader's perspective. To create video files, the author must have access to video equipment, as well as hardware and software for editing the video files. From the readers' perspective, video files can cause frustration if their Internet connection is slow or if they do not have the requisite software (plug-in) on their computer to play the files.

When video is digitized, the resulting files are huge; one second of video can be 27 megabytes if it is full-screen, full-motion, and full-color. Files that large would take *forever* to download over the Internet. Therefore, digital video on the web must be very small (in file size and window size) and less than top quality (only a few frames per second). The digital video files in the following examples are each formatted in a different way (and may require different plug-ins). In all cases, the video is displayed in a small window and is less than TV quality.

- *Terra Incognita: A Multimedia and Robotics Interactive Performance Centered around Edgar Allan Poe's "Dream-Land"* (Sgouros, Kousidou, & Melanitis, 2002). This article uses the progressive download format of QuickTime, which means it begins to play as the file is transferred (after a short delay when the first segment is downloaded). If your Internet connection is fast enough, the file may play smoothly; otherwise, it will stop and wait for more information to be downloaded. Note that the files are only about one megabyte in size; they play for only a few seconds; and the size of the video window is very small.

- *Digital Lectures: If You Make Them, Will Students Use Them? Constraints on Effective Delivery of Flexible Learning Systems* (Bell, Cockburn, McKenzie, & Vargo, 2001). This publication uses the AVI format, which is generally downloaded completely before it plays. The filesize of this movie is 4.9 MB, and, after it is downloaded, the movie plays for 15 seconds. However, depending on the speed of the connection, it may take several minutes for the file to download. The video window is small and the quality is moderate.

- *Practical technological applications to Promote Pedagogical Principles and Active*

Learning In Counselor Education (Baggerly, 2002). This article incorporates streaming video that provides an overview by the author. Note that the video begins to play almost instantly – it is playing as the file "streams" across the Internet. Because the file is not downloaded, the length of the video clip is irrelevant. Streaming video offers the best option for video that is more than one minute in length. However, the quality will be impacted by the speed of the connection; streaming video through a modem will be very slow and jerky.

Even with the constraints on display size and quality, there are applications where the use of video is relevant and effective in an online publication. Research involving case studies, video treatments, or variations in environmental settings can all be enhanced with video.

Video can be digitized in one of two ways:

1. Record directly in the digital format with a digital camera.
2. Record in analog format (VHS, etc.) and then digitize the video by importing it into a computer or digital camera.

In either case, after it is digitized, the video can be edited on a computer using software such as Adobe's Premier, Apple's iMovie, or Apple's FinalCut Pro. Although recording and editing video is beyond the scope of this article, there are excellent online resources, including the *Desktop Video Handbook* and the *Digital Video Primer*.

Copyright Issues

Copyright laws are important for all publications – print or online. However, as the number of media elements in an article increases, the number of copyright considerations will also increase. In all cases, every attempt possible should be made to determine the copyright owner of text, graphics, animations, audio, video, research instruments, etc. After the owner has been identified, a copyright release should be obtained for the use of the information in the online publication.

If the copyright owner cannot be identified, you may want to investigate the fair use of the information. Fair use is generally determined by examining the following four issues:

1. The intended purpose of use
2. The nature of the actual work
3. The portion of the work used
4. The potential impact on the commercial value of the copyrighted material

There is a large amount of information on the Internet that deals with copyright available. Two

interesting articles with opposing views by Hall (2002) and Crews (2002) entitled "*The Educator's Guide to Copyright and Fair Use*" and "*New Copyright Law for Distance Education: The Meaning and Importance of the TEACH Act*" respectively might provide some insight. You can also find information on copyright laws in *Copyright Basics* at the Library of Congress.

Submitting Media Files for Publication

Documents can be submitted to FJER in Microsoft Word (DOC), RTF (rich text format), or web page (HTML) format. After an article is accepted, the editors of FJER will edit the document and convert it to the appropriate format for publication. If the article is submitted in HTML, do not include JavaScript or other programming code that may not be compatible across all browsers.

Figure graphics (e.g., charts, graphs, photographs, and drawings) can be submitted in GIF, PNG, JPG, TIFF, or BMP format. Or, they can be embedded into a Word document. All figures must be referenced within the text of the article, and they should all include figure captions. All images will be converted to GIF, PNG, or JPG when the document is placed into the online journal. Some loss of quality may result from the conversions. Animations may be submitted in any of the common animation formats.

Audio files can be submitted in almost any format -- WAV, AU, AIFF, QT, or RealMedia (RM). Each file should be less than 20 MB in size. Audio files should be identified in the text (Audio1, Audio2, etc.), and the audio filenames should include the corresponding audio numbers. If larger audio files are desired, they can be placed on the author's web server, and a link will be provided.

Video files can be submitted as QuickTime (MOV or QT), Windows Media (AVI or ASF), or RealMedia (RM). Videos should be identified in the text (Video1, Video2, etc.), and video filenames should include the corresponding video numbers. Each video file should be less than 20 MB in size. If larger video files are desired, they can be placed on the author's web server, and a link will be provided.

The appendices of an online journal can be much more comprehensive than in a print journal. For example, you can include files with research instruments, datasets, or programming code. Appendices of less than 10 MB will be accepted by FJER. If larger files are needed, they can be placed on the author's web server, and a link will be provided. Authors are encouraged to embed external links throughout their documents.

Summary

This article has provided options for enhancing online journal articles. To successfully take advantage of the online environment, media elements can be used to convey information in many different formats, including simple multimedia elements such as hyperlinks and graphics, or more detailed elements such as animations, audio, and video. The guidelines are provided to assist authors in creating media elements for inclusion with articles submitted to the *Florida Journal of Education al Research*.

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Resources

Adobe Acrobat http://www.adobe.com/products/acrobat/main.html

Adobe Illustrator http://www.adobe.com/products/illustrator/main.html

Adobe PhotoShop http://www.adobe.com/products/photoshop/main.html

Adobe Premier http://www.adobe.com/products/premiere/main.html

Cool Edit 2000 http://www.syntrillium.com/cooledit/index.html

Gif Construction Set http://www.mindworkshop.com/alchemy/gifcon.html

Gif Builder http://mac.iconet.com.br/preview/206447.html

Final Cut Pro http://www.apple.com/finalcutpro/

Fireworks http://www.macromedia.com/software/fireworks/

Flash http://www.macromedia.com/software/flash/

iMovie http://www.apple.com/imovie/

Studio Sound 2 http://www.felttip.com/

Sound Edit http://www.macromedia.com/software/sound/features.html