AUTHORING FOR WEB-BASED TRAINING: WHAT ARE THE OPTIONS?

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ABSTRACT

With the growth of the World Wide Web, the training industry is beginning to take advantage of the potential for cost-effective, worldwide delivery of interactive courseware. Initially, most of the documents and programs on the World Wide Web were created in HTML and programs such as PERL. Authoring languages, such as Authorware, ToolBook, and IconAuthor were limited to delivery via diskettes, CD-ROM, or local area networks.

Recently, Authorware, IconAuthor, Quest, and other authoring systems have added new features that allow for development to take place across multiple platforms and to accommodate delivery via the World Wide Web. This paper will focus on the considerations for selecting a Web-based authoring tool that is appropriate based on courseware content, target audience, and delivery requirements.

In particular, an outline will be provided that includes the advantages and disadvantages of using Macromedia's Authorware and Director, AimTech's IconAuthor, Quest, and Asymetrix's ToolBook II for Web-based delivery of training. Topics will also include comparisons between the authoring tools and other Web-based development programs, such as HTML, Java, JavaScript, and ActiveX.

BIOGRAPHY

Dr. Ann E. Barron is an Associate Professor of Instructional Technology at the University of South Florida and the Director of the Florida Center for Instructional Technology. She is also the Vice President and Chief Technology Officer for Interactive Media, a subsidiary of Analysis & Technology. She has published several books, including *Multimedia Technologies for Training: An Introduction*, and she is the Executive Editor of the *Journal of Interactive Instruction Delivery*.

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INTRODUCTION

The Internet and the World Wide Web offer tremendous opportunities for efficient, worldwide delivery of training and educational programs. Never before have we had such an easily accessible network for the dissemination of information and instruction.

The delivery of Web-based training (WBT) can vary from simple e-mail messages to very complex multimedia environments with real-time interactions. The selection of the most appropriate training solution will be determined by the type of Internet connections the users have, the amount of record-keeping required, the degree of interaction desired, and the benefits of including multimedia components. This paper examines authoring environments for Web-based delivery of training courses, including HTML, Internet programming languages (such as Java), plug-ins for authoring systems, and Internet-enabled courseware.

CREATING WBT WITH HTML AND JAVASCRIPT

HTML is the "native" language of the World Wide Web and can effectively create pages with hyperlinks to text, audio, and video. An advantage of using HTML as the basis for authoring a course is that all browsers will recognize and interpret the files without additional plug-ins or player applications.

HTML documents can be created in a simple text editor or in more sophisticated page creation programs. For example, Microsoft has produced FrontPage, Netscape offers Composer, and Adobe markets PageMill. All of these programs have WYSIWYG editors that can create HTML pages, including features such as tables and frames, with little, if any, coding.

Although HTML is relatively easy to use and easily interpreted by all browsers, there are some limitations, namely in the degree of interactivity. Most HTML documents are relatively static, and the author has little control over the final page layout because the user can change the settings for screen width, graphics, text size, and text colors.

Because of these limitations, many developers are now enhancing their HTML pages with JavaScript. JavaScript is a specific-purpose scripting language that can be used to customize the behavior and functionality of a Web browser. JavaScript is capable of extending the functionality of Web pages, adding dynamic behavior, interactivity, and other features. Unlike Java, which is a programming language used to create applets that can be displayed by a browser, JavaScript cannot create a stand-alone program.

One of the reasons JavaScript has received so much interest is because it shares the Java name. However, JavaScript is very useful in its own right. The syntax and structure of JavaScript are quite simple and the commands can be embedded directly into the HTML code.

The dynamic capabilities are probably the most useful features of the JavaScript language. JavaScript can be "event-driven" and can respond to changes in the browser. Typical event changes include the loading of a page, entering text into a text field, making a selection with a radio button, clicking a button, clicking a link, etc. Based on certain events, JavaScript can then control the browser, create new frames, or open new windows. In addition,

JavaScript programs can access a user's cookie files; identify the user; count the number of times the user has visited; find out the last time the user visited; or save any other useful information (such as management records) to the cookie file.

CREATING WBT WITH PROGRAMMING LANGUAGES DESIGNED FOR THE INTERNET

Another method for providing increased interactivity in WBT is to develop the courseware with a programming language such as Java. Java is an object-oriented language that creates small, compiled programs called "applets" that can be sent over the Internet and incorporated into Web pages.

Using Java, one can conceivably create any type of program that can be run on a computer -- including word processing programs and fully interactive WBT. (For examples of Java applications, visit http://www.gamelan.com.) The possibilities are limitless.

Advantages of Java

- Java is platform independent -- it will run on any computer operating system.
- Java does not require plug-ins or other programs to be installed on the client computer.
- Java is secure -- it is designed to minimize the threat of others tampering with local files.

Disadvantages of Java

- Java is a complex programming language and can be difficult to learn
- If Java files are large, they may require the user to wait as they are transferred through the Internet.
- It may be difficult to convert existing courseware into Java.
- The "sandbox" that protects against harmful applets also limits some of Java's functionality.

Because Java is so powerful, yet difficult to learn, there are several software programs that are designed to create Java applets without extensive programming skills. For example, Jamba, by AimTech, is a visual Java development tool for creating Java applets. Likewise SuperCede Java Edition, is the first in a line of RAD (Rapid Application Development) development environments from Asymetrix. Both of these environments allow developers to learn and use Java interactively by dragging and dropping objects into a “script” that converts to Java code.

CREATING WBT WITH AUTHORING SYSTEMS AND PLUG-INS

Most browsers know how to interpret HTML and Java files, but they do not know how to run multimedia files (such as digital audio and digital video) or program files (such as those written with authoring systems). A plug-in is a software program that tells a specific Web browser how to run a file that is not native to the browser. Plug-ins expand the browsers’ abilities without requiring changes or new versions.

Plug-ins place the burden of handling new file types or applications on the browser, not the server. Plug-ins are small modules that temporarily "plug in" to the browser program. When the browser program no longer needs them, they "unplug" themselves.

As the popularity of the Web has increased, more and more software companies have developed plug-ins that will enable their particular programs to run within a browser environment. For example, you can now download a plug-in for PowerPoint, install it on your computer, and run PowerPoint programs through the Web.

Likewise, the authoring systems (such as Authorware, IconAuthor, Quest, and ToolBook) have created plug-ins for their programs. It is important to note that specific plug-ins must be downloaded and installed for each

application and that plug-ins may be specific to a particular computer platform (such as Windows), and they may be specific to a particular browser (such as Netscape).

Advantages of Using Plug-ins

- Most plug-ins are free and can be downloaded without cost or license.
- After the browser is configured with the plug-in, it will automatically interpret all courseware written with that particular authoring system.
- The courseware executes directly in the browser.
- In most cases, previous courseware can be updated to run with a plug-in.

Disadvantages of Using Plug-ins

- A Web browser is required to run the course.
- The browser controls may be visible, (in addition to the navigation built with the software tool) and cause confusion for the learner.
- Although the files are compressed and optimized for delivery over the Internet, they must still be transferred as they run. If a student is connecting with a slow connection (such as a 28.8 Kbps modem), the courseware may run excruciatingly slow.

Shockwave for Authorware and Director

The most popular plug-in for WBT is called Shockwave by Macromedia. This plug-in is designed to deliver courseware developed in Authorware and Director. Since 1995, when Macromedia's Shockwave authoring tools and plug-ins became available, thousands of Web sites have become "shocked," and many WBT programs have been developed.

Shockwave technology consists of three components:

- A Shockwave-enabled authoring tool.
- Afterburner, a post-processor that compresses and optimizes the file for distribution over the Internet or Intranet.
- Plug-ins for Netscape Navigator and Microsoft Internet Explorer.

Shockwave is a multimedia development program for creative professionals with little programming experience. It gives them the ability to quickly and easily create interactive applications that are portable across multiple platforms.

Neuron for ToolBook II

ToolBook II is a multimedia authoring system by Asymetrix. It includes a plug-in (called Neuron) that allows developers to publish native ToolBook files that will run on the Web. The Neuron plug-in handles all of the application requirements, including getting any clip-based media, system books, and DLLs from the Web site.

One major advantage is that Neuron includes a way of providing security by offering two modes. In nonsecure mode, Neuron has access to most of ToolBook's features. In secure mode, Neuron has access to a subset of those features that could protect the user system against books that might carry out processes not allowed. Finally, Neuron provides ToolBook developers with a utility that helps transfer books and clip-based media to a Web site for others to run (it is not available in the beta version Neuron 5.0).

Other ToolBook II products, such as Instructor, Publisher, Assistant and Librarian offer additional possibilities for WBT. Instructor offers a cost-effective product for educators who are interested in developing CBT; Publisher is

designed for applications that do not require management features; and Assistant is an easy-to-use system that does not require any scripting or programming.

CREATING WBT WITH INTERNET-ENABLED TRAINING APPLICATIONS

Internet-enabled applications are programs that can operate in an Internet environment, without a browser. In other words, these technologies run on the hard drive or network of a local computer, but they contain links out to the Web that will be activated if the computer has an Internet connection. In this manner, the majority of the courseware may be locally available (and run quickly), while still taking advantage of the numerous resources and dynamic nature of the Web.

Advantages of Internet-enabled Courses

_ A browser is not required to run the program.
_ Hybrid delivery is supported -- some files can be local and others can be on the Web.
_ The author controls all of the navigational options (since a browser is not required).

Disadvantages of Internet-enabled Courses

_ Additional hard-drive space or CD-ROMs may be required.
_ Updates may need to be delivered via CD-ROM or diskette.

Quest Net+

Quest Net+ was designed by Allen Communication to build Internet-enabled courseware. Using this tool, developers can create courses that will run full screen from a local computer and access files on the Web as needed. Their new Internet FastTracks library is full of templates, objects, and interactions that make delivery on the Internet or via corporate intranets easy to handle. This library is available free of charge to all registered Quest Net+ users.

Although some of the files in QuestNet+ courses must be located on the hard drive, these files can be distributed via FTP transfers or as E-mail attachments. The programs are browser independent, and they know if and when to access the Internet for particular components. The player is free to download from the Allen Communications site at http://www.allencomm.com.

IconAuthor

IconAuthor can also be developed to deliver Internet-enabled courseware. For example, it is possible to embed URL links in the code, and to access a remote database or other files. The application permits developers to create interactivity beyond HTML pages such as pull-down menus, drag & drop, timers, combo boxes, etc. Aimtech's Universal Media Access provides developers the opportunity to store files on multiple locations such as local hard drives, CD-ROM, Local Area Networks, or anywhere in the world via the Internet.

CONCLUSION

There are many alternatives for the development of Web-based training programs. WBT can be created with HTML, JavaScript, Java, authoring system plug-ins, Internet-enabled programs, and many other tools. Each of the development tools has benefits and limitations, and the selection of an appropriate tool will depend on many factors.

Although there are still major impediments in the wide-scale delivery of WBT (primarily bandwidth issues), the major authoring system companies are investing substantial resources to ensure that their tools will be maximized and ready for the Web environment.

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