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Video iPod Instructional Design Considerations for Dive Training and Underwater Subject Matter

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Abstract

The latest video iPod, and similar mobile video casting technology puts true mobile technology in the hands of the masses. For only $299 US dollars you can purchase a fully functional 30 gig handheld audio/video device that will provide up to 150 hours of full motion, 30 frames per second, video and audio. However, designing audio and video content for a mobile 2.5 inch color display screen presents design considerations on three fronts – content creation, video production, and environmental usage. This paper will discuss these considerations, using current marine projects: one for a maritime heritage trail in Wilmington, NC, and the other on the proper use of the Hookah system for East Carolina University's Scientific Diving Course.

Introduction

The iPod is a new and unique medium for presenting educational and training content. Designing this content for iPod presentations, however, is not the same as designing content for the average television or computer. When a new medium, such as an iPod, is introduced, it is often thought of in terms of old medium applications. This often creates the problem of adapting learning theory to accommodate new learning technology (Stanton *et al.*, 2001). This paper is designed to identify some of the changes in the development and use of educational material that should be considered in order to create effective instructional and training materials in the new video iPod medium.

To illustrate the unusual characteristics of the iPod learning technology, this paper presents two on-going projects involving the development of video iPod content. The first case involves the development of educational material for visitors to the waterfront of Wilmington, NC. Utilizing the video iPod's mobility factor and leveraging its audio and video storytelling potential, modern visitors can connect to a submerged and largely forgotten part of Wilmington's maritime heritage. The second example examines the development of training materials and modules for use by students, participating in East Carolina University's Scientific Diving Course.

Public Outreach – Maritime Heritage Trail

The first project involves the public dissemination of a maritime archaeology project investigating submerged vessels in Wilmington, NC. One professor in East Carolina University's Program in Maritime Studies is researching use and re-use patterns of historic vessels and cultural remains of Wilmington's pre-WWII maritime industry. These remains have been reclaimed by the Cape Fear River and by overburden and vegetation along the shoreline across from Wilmington's modern waterfront. The professor has partnered with the authors to create a public outreach component of the project with the intent to enhance visitors' personal experience as each individual moves along the boardwalk of Wilmington's historic waterfront. The authors proposed something new--an iPod tour.

The authors believe that this learning environment is a perfect place to showcase the iPod's unique capabilities. An interactive experience, using iPod technology, will provide the user with a more personal experience, one that the user controls, and one that allows the power of audio and video to tell a richer, more exciting story. The authors are designing the video content to create a more 'human story' than static signage (the traditional medium of outdoor trails) alone can convey.

Visitors who want to use the iPod tour will have the opportunity to check-out the video iPod hardware from the Information Booth at the beginning of the riverwalk in exchange for some collateral, such as a driver's license. In this way, device maintenance and installation of the most current software can be controlled. In future projects, however, the authors expect to mirror a tour on a robust web site with accompanying set of videos – the same that are used for the video iPod tour. On this web site, a user would be able to download the videos for their personal iPods.

Training – Hookah System

The second project involves the use of iPod technology to augment and reinforce training modules for East Carolina University's Scientific Dive Training. For this project, the authors have chosen to use a blended training approach, mixing the use of learner-controlled technology (iPod content), print medium training, and instructor-led training for the different modules recommended by the Dive Safety Officer. The purpose is to evaluate whether this multi-layered pedagogical approach allows students increased access for reinforcement of skills presented by their instructor, and whether it improves performance during evaluation. The use of the Hookah system, in and out of the water, was explored as a test case primarily due to the relative ease of logistics for production of video content and different layers of knowledge. For instance, a student needs to learn how to operate the Hookah both on land and in the water. On land, students need to know how to operate the air-compressor, set up hoses, attach hoses to regulators, break the unit down properly, and other relevant information. In the water, students need to understand operating procedures, buddy skills, and safety procedures particular to the Hookah system.

Video content will be accessible for download on the website of ECU's Dive Safety Office. These Hookah videos were developed with instructor input and consent and were designed to support a very detailed on-line training module for the Scientific Diver training at East Carolina University. Because the type of internet connection (*e.g.*, DSL, high-speed cable) used by students could not be guaranteed, it was decided to make sure the files were small and therefore easily downloadable no matter what kind of internet connection students might have. Different formats of the videos (discussed below) also allow students, who do not have video iPods, to view the training material on-line on their computers.

Discussion

The iPod has three distinct characteristics that make it a completely new and unique medium. First, the iPod's video capacity is based on H.264 750-Kbps video at 320-by-240 resolution combined with 128-Kbps audio and displayed on a 2.5 inch screen. This means that while the fidelity of the image is very high the small screen size dramatically impacts the visual storytelling capabilities available to the producers. Second, the iPod leverages advanced audio production techniques, by delivering the audio through 'earbuds' more commonly known as headphones. This allows the producers to deliver audio messages directly to the user with minimal environmental interference thereby enhancing the effects of music, voice, and sound effects. And finally, the iPod is completely mobile, allowing the user to be un-tethered from a dedicated, static communication environment. This means that because the user dictates where and when the information will be conveyed, producers must be aware that the video messages are competing with 'real world' surroundings.

Every learning design, regardless of medium, must be developed according to certain accepted standards of development. The following factors should be considered by producers when developing learning technology: 1) needs and goals for learning; 2) learning objectives; 3) physical and/or virtual space; 4) tasks and interactions; 5) assessment methods; 6) audience and their characteristics; 7) domain area; 8) community of learners and practices; and 9) technological capabilities and possibilities (Ausburn, 2004; Kirkley *et al.*, 2005).

Using this development process we begin to see how the attributes unique to this delivery medium factor into the design and implementation of the learning message. Due to its three salient characteristics of mobility, aural message delivery, and small visual display screen, content for video iPods, such as dive training information, will not rely heavily on text for dissemination of information. Instead audio and video will play the essential roles in delivery of the messages. With this in mind, creators of content must constantly be aware that in some instances the iPod message will be competing with the distractions of the external physical environment in which it is viewed.

Content Considerations

As with all media design, a solid design methodology is essential. This methodology follows six core production phases: Analysis, Design, Development, Validation, Implementation, and Evaluation. While many of the constraints of linear video learning transfer to the iPod, the unique iPod attributes impact the content design in a number of significant ways. First, the small screen makes the use of text rich learning difficult. For that reason text use will be minimized. Similarly, video segments should be short since the iPod can be accessed in a variety of environments that will compete for the learner's attention. Content delivered in short bursts will allow information to be presented in small segments controlled by the viewer. For these reasons the authors are designing the content to minimize text usage, and all video segments are designed to be under ninety seconds in length.

Additionally, there is a question regarding how these segments of content will be presented to the learner. Most iPod users are familiar with its linear presentation of audio and video. For instance, video content may be watched on iPod easily, but what happens at the end of the video? Normally, you have to navigate through a series of menus to watch another video or listen to audio. However, one of the iPod's least lauded and under utilized features is its ability to present information interactively and out of sequence. This nonlinear ability allows visitors and students to pick and choose what information they want to access. It also presents the opportunity to present simple methods of information reinforcement. For instance, iPods can be used to ask students multiple-choice, true/false, or yes/no questions at any point in the learning process, which reinforce previous training material. This is accomplished through simple and limited markup language. Markup languages add code to text files to establish connections between files. Examples of markup languages include HTML or XML, found on web pages. Limited markup language for iPods provides for simple directives that create interactive links between the iPod's audio, video, images, and text. The authors are developing their educational content with this nonlinear capability in mind in order to provide clear and simple directions for users with a minimum amount of text (Sadun, 2006; Sande, 2006).

Environmental Considerations

While the flexibility of eMobile communication is obvious, one of the greatest concerns for designers of content for the video iPod is that the user may have significant distraction around them in the place they choose to view the material. The authors are less concerned about this occurrence for the

scientific dive training modules because the user can and is more likely to choose a quiet place to receive the message. Additionally, learning is supported by alternative mediums – instructors and written material.

On the other hand, the maritime heritage trail project adds a component of interactivity with the environment. The learner will be holding the iPod and watching the video at the same time they are looking at the exact geographical location of the submerged vessel. The outdoor viewing environment will be a separate, as well as, a collective experience. Also the viewer is expected to stop their physical movement on and off. They are expected to switch their attention from his or her external surroundings to the video screen and the audio components of the learning module. In this case study, it must be remembered that the video is simply supporting a display in the 'real world.' This means that not every video segment will require a beginning, middle, and end – a strict narrative structure. The iPod experience must be created as one that is integrated into the 'real world' of Wilmington's waterfront.

Video Production Considerations

The authors are anticipating two production considerations that make the iPod experience different from traditional video production development. First, because each user will have a headset, the audio production will play a more significant role in the storytelling than it might in other open environments. Because the user will be wearing the 'earbuds', there will be a greater opportunity to speak directly to the user and to leverage the power of sound effects to create a virtual environment. To that end, the scripts should be written to speak to the individual with one-on-one visual and audio grammatical constructs.

Visually, the small screen presents some production considerations of its own. The small screen will not display fine text, defined as anything under 36 points. Consequently, designers should develop content that is video/audio based and not text based. Additionally, the authors are storyboarding segments with limited use of variant shots. For example, the authors are designing for very few wide shots. Most of the segments will be shot in medium shots, close ups, and extreme close ups and almost all scenes will be void of text.

Video Production Process

During the pre-production phase the producer determines how the video message will be disseminated. Usually there are three choices: full resolution DVD/broadcast, the web, and small-screen mobile video. Each of these outlets brings with it certain production considerations regarding video/audio shooting and editing. However, a compromise in production techniques can be reached if the client intends to leverage all three means of distribution.

To that end, the video will be captured in the highest quality format allowed within the budget constraints. Once captured and digitized for edit, it will be edited in the highest fidelity possible. With the project completed and approved by the client it will now be reproduced for one or each of the formats. The difference is the compression algorithm used. For example – DVD/broadcast will be output at the same format the program was edited and with minimal compression to the video. Conversely, the web version of the program will be severely compressed so that it can be passed quickly between servers and the home user's computer. The compression drastically affects the quality of the video when viewed by the user.

Conclusions

It is the authors' contention that the video iPod is a unique learning technology based on its small screen, enhanced audio, and its mobility. These attributes require considerations for content design, environmental usage, and video production. It is with great anticipation that the authors will document and study the outcomes of our case studies using a variety of assessment tools including pre and post testing, surveys and interviews to identify the effectiveness of the design related to the specific learning goals proposed by each project.

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