Turning iPod into an Effective Portable Learning Tool
-A research project investigating the of using Podcasting in curriculum delivery

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Abstract: With the recent release of 5th generation iPods, this magic music box not only increases its storage amount, but "takes the stage for another encore;" and the new video feature has brought iPod fans a great deal of excitement. People can enjoy their favorite music and videos wherever and whenever. This phenomenon has drawn the attention from educators. Why not learning wherever and whenever? The University of Houston is one of several pioneering schools conducting research studies on how to turn the iPod into a portable learning tool to "tune" students to learning tracks. This paper will introduce the planning and implementation of our Podcasting research project, and discuss the practical applications of setting up Podcasting for instructional delivery to facilitate student learning and possibly improve learning outcomes.

Introduction

This research project is based largely on the feasibility that iPod can be an effective portable learning tool to facilitate student learning. According to a study conducted by the Pew Internet and American Life Project, college students are about three times more likely than anyone else to own an MP3 player. iPod is the most popular portable MP3 player, currently capturing roughly 82 percent of the market – and climbing (WWDC, Cupertino, California, June 10, 2005). Capable of on-demand media delivery, Podcasting made the connection between education and students when Duke University began issuing them to all incoming freshman in 2004. At that time, Duke launched a new technology outreach program dubbed, "the Duke Digital Initiative (DDI)," which found new students receiving iPods with campus materials already programmed into the devices. Turning iPod into a learning tool involves evaluating not only technical issues, but more importantly, the conceptual changes necessary for delivering educational Podcasting content to students; and, investigating how this new learning mode affects student learning styles and study habits. This presentation will introduce detailed information on 1) establishing a research team, 2) the technology involved in Podcasting, 3) delivering course materials via Podcasting, and 4) conducting a research study.

Establishing a Strong Research Team

Recognizing the cultural phenomenon that iPod has become – and its inherent potential to reach today's fragmented learner – led to a funded research study managed by the School of Communication at the University of Houston. While it is clear that iPods are quickly becoming commonplace in dorm rooms across the nation, university officials funded two mutually exclusive podcasting pilot programs in November of 2005; this paper relates to one of the two programs and will spawn several important research studies over the course of the next two years.

Organizing a research team of this type is no ordinary task, especially when the group consists of twelve members. The success of any study is predicated on the specialization and support that each member brings to the group. Therefore, it is important to ensure adequate representation from four very unique yet important areas fundamental to the podcasting endeavor (see appendix I.): Curriculum and Course Content Management; Media

Production and Instructional Design; Technology Support, Programming, and Delivery; and, Quality Assurance and Assessment.

Once each member of the research team is identified, project building can begin with logical progression based mainly upon conceptual design and organization of key curriculum and academic content needs, and component areas to be studied: course syllabi, instructor needs assessment, and media production aspects should then be analyzed and developed in order to generate a list of needs for support activities.

The Curriculum and Course Content Management group is generally comprised of faculty members who teach or assist in the delivery of the courses involved in the study. Five members of this project represent the Curriculum team, and it is these five individuals who play perhaps the most important part of the entire program – long before content is recorded, edited, encoded, or delivered – it must be conceptualized and created. Given that this project aims to test the efficacy of using iPod as a delivery mechanism (for both mobility and recitation), it is necessary to modify content to fit the needs of the project. Faculty must therefore strategize and modify delivery concepts before the first podcast is ever recorded. Of course, the other major function of the Curriculum group is to report findings of the project to the administration; so the curriculum design and subsequent content creation and delivery must accommodate the structure and needs of the study in order that a reliable and valid research project is carried out.

Once the Curriculum design group has completed conceptualization and needs assessment, the second phase (and group) can then be tasked with content creation. Media Production and Instructional Design staff will work closely with the Curriculum Design group in order to aid in the development of appropriate podcasting content. They are tasked with storyboarding or scripting the faculty's podcasts so that they can be captured digitally for delivery in one of three formats: Audio Only, Enhanced Audio, or Video. Information related to the differences of these podcasts appears later in this document.

In addition to aiding in the scripting, storyboarding, and subsequent capturing of podcasting content, the Media Production and Instructional Design group will help with editing the content to ensure quality product, encoding the podcasts for delivery online, and ultimately the delivery the encoded product to Technology Support Services for delivery of the content through the web.

Following content capture, editing, and encoding, the Technology Support, Programming, and Delivery group modifies the content for storage and acquisition on a web server, creates an instance of the podcasting content through programming and scripting, and provides the Faculty or Curriculum Design group members with a fully-qualified Uniform Resource Locator (URL), which essentially brings the cycle of design and development full-circle – with two major exceptions: Quality Assurance and Research and Reporting.

The Quality Assurance group is responsible for testing the podcasting content and for providing necessary feedback to the Faculty to ensure quality product prior to the podcasts being published. This step is extremely important during two crucial stages in a research project: first, when podcasts are being developed for the first time; and ultimately, whenever outcomes predicated on accuracy of content (like student exam scores) are being evaluated. If the podcasting material is flawed or of poor quality, there's a real possibility the results of a study can be slightly skewed.

Finally, Research and Reporting functions are carried out by all group members within the project. In fact, this study has produced several submissions to various conferences to date; given that the project is slated to span two years, it is likely that several good sub-studies will result from the initial project and datasets being gathered.

The Technology of Podcasting

Just spending a few minutes reviewing the technology necessary to make podcasts a reality can be a daunting task all by itself; terms like XML, RSS, aggregation, etc. can scare the average user away before the project ever begins. But beyond the technical terms, podcasting really is not all that different than web publishing. Thanks to modern advancements in web hosting, anyone with an edited digital audio or video file, an RSS-supported

web server, and an audience can syndicate content to anyone interested in subscribing to it. The implications to education are tremendous: for starters, the concept of "On-Demand" media delivery can allow students the freedom to download only the files that they need; and once downloaded, the freedom to take the academic material with them on their favorite, supported mp3 player.

Podcasting is a remarkable example of convergent media in action. It works by utilizing two unique technologies in order for efficient delivery: Extensible Markup Language – or XML, and Really Simple Syndication – or RSS. XML is not entirely new, though on the grand scheme of web publishing, it is indeed younger than its HTML predecessor. XML works much like HTML (Hypertext Markup Language, the foundation formatting language used in web page authoring) in that "tags" are generated and modify content in which they surround. The unique and newness associated with XML is that it's completely customizable, meaning one can build an entire library of formatting tags and produce subsequent web sites. This is particularly important when creating dynamic web pages – or pages that are data-driven or created based on variable user information.

Of course, the implications here are a bit more unique. With the advent of RSS technology, XML can be modified to aggregate RSS feeds (much like a media wire) to users who subscribe to them. In other words, XML can be used to create a web instance of an RSS Feed which actively exists on a server; and can therefore be used to automate the availability of podcasting content to anyone who subscribes.

Once XML and RSS are employed – and content is published and available for subscription on a suitable, RSS-enabled web server, the only thing left to do is advertise or provide the RSS feed information to potential subscribers. And this is where the familiarity of the web comes into play. Subscribing to podcasts is done by adding a fully-qualified URL to an aggregator (like iTunes or iPodder) so that the software can communicate with the RSS feed and populate your computer with the podcasts to which you are subscribing. In this way, iTunes or iPodder work in much the same way as your web browser: they act as an intermediary between your computer and the web server hosting the podcasts.

Once you "tune" your computer to the podcasts you intend to subscribe to, the software takes care of the rest and can be customized based on your preferences for downloading and maintaining the podcasting content. iTunes or iPodder then act as your library, housing the podcast files that you subscribe to, allowing you to view and listen to them on your computer. Add the iPod (or your favorite supported mp3 player to the mix) and your podcasts are automatically downloaded to your portable device and you can then take them with you and listen or watch while at the gym, on the bus, or at an otherwise convenient time. Essentially, learning wherever, whenever you want to.

Delivering Course Materials via Podcasting

Beginning in December of 2005, each of the four groups was assembled to begin design and development activities surrounding the podcasting project; members played an integral part in scripting, storyboarding, concept analysis, producing and directing, editing and encoding various multimedia components. Participants generally delivered components related to their specialty, while some overlap and redundancy was necessary to ensure quality assurance and functionality. Having ironed out the conceptualization and content design elements, capturing and editing of digital resources – it became clear to the team that a general understanding of various podcasts is necessary to pursue encoding and compression elements associated with delivery. Once the podcasting varieties are defined – and understood, the newly-edited course content could be adequately configured for podcast delivery.

There are three basic types of podcasts (or "Course-casts" – Greg Johnson, November 2005) currently being used today: Podcasts, Enhanced Podcasts, and Vodcasts. Audio-Only Podcast – or – "Podcast" as they have been dubbed – represent the most common and easiest type of podcast to create, edit, and deliver. They assume the least amount of resources in their delivery and are generally small in size. Since 5th Generation iPod Video units are relatively new to the market, most of the podcasts being downloaded are the traditional, audio-only podcast.

Enhanced Podcast – or – "Enhanced Cast" – are similar in nature to their Audio-only counterpart – except that these podcasts bridge the gap between the mp3 and mp4 file formats. Enhanced casts are layered audio files that use an XML file to display "chapters," or time-coded segments that respond to XML code that tells the

aggregator when to advance "slides" or graphic content to match the audio file being played. The best example of this type of podcast might be a lecture with PowerPoint. The PPT slides advance whenever the professor wants them to advance, synchronized and ordered in logical fashion to accommodate the audio files being delivered. This is where the 5th generation iPod stands out above the rest. For the first time, an mp3 player can support full-feature video (actually and mp4 – or m4a file), allowing for lecture material, video content, or otherwise necessary multimedia rich content to be delivered through an aggregator, ultimately becoming mobile on the iPod.

It is the Vodcast that brings the prospects of podcasting full-circle: students can now download and take with them academic content in a comfortable learning format. One major distinction between Vodcasts and their audio-only and enhanced counterparts is their file size: Vodcasts are large (generally speaking, around 2 MB per minute of compressed, encoded Vodcast content, depending on how it's prepared.

In addition to podcasts, it became clear that supporting content should be contemporaneously generated and delivered in order to provide students with necessary tools and resources for subscribing and maintaining the podcasts themselves. Knowing and understanding the differences between podcast types is paramount to instructional design activities surrounding such content. Examples of additional content that instructional designers must incorporate might include: podcasting tutorials and instructions, iPod and general mp3 player information to help students get connected to the course content materials and providing a method for students to obtain help or provide feedback when unanticipated support issues arise.

Conducting Podcasting Research

Podcasting is a relatively new area. Research studies are very important and necessary for the successful integration and implementation of Podcasting in the process of instructional delivery in the future. So far, very few formal studies have been done, especially in the area of effective instructional design for this new delivery media. With this pilot project, we are going to conduct a comprehensive study covering a broad area from use of technology to deliver various format of Podcasting to pedagogical efficacy of Podcasting with regard to helping students meet academic expectations and improving learning outcome.

The University of Houston is a large urban institution with an ethnically diverse student body. The majority of the students are commuters and non-traditional students. The older, working non-traditional student population has been rapidly growing. Their family lives and work sometimes affect their regular attendance in class. Some of the characteristics summarized by Online Learning, Rochester Institute of Technology are that adult learners Seek education that relates or applies directly to their perceived needs, that is timely and appropriate for their current lives, and they are self-directed; typically not dependent on others for direction.

Schools that establish high expectations for all students and provide the support necessary to achieve these expectations have high rates of academic success (Howard, 1990). Expectations have intrinsic values, and play a role in motivating students and instilling within them a responsibility for learning (Benard, 1995). One of the challenges of expectations in higher education is student attendance. Research studies indicate that attendance is a strong predictor of academic achievement (National Center for Policy Analysis). When students miss the classes, they tend to fall behind with their study, which will affect their academic achievement and attainment.

Podcasting as new channel of instruction delivery can provide on-demand course materials. Students can prescribe to the course and the updated materials can automatically feed to their mobile devices through RSS. This can help students solve the problem of missing class. After they download the materials to the mobile devices, they can listen or view the materials wherever and when they are. This flexible learning is timely and appropriate for their lives. This study will investigate how Podcasting affect their learning, in which way they benefit from it and will Podcasting help them meet academic expectations without regularly attend the class.

Blackmore (1996) suggested that one of the first things educators can do to aid the learning process is to simply be aware that there are diverse learning styles in the student population. Technology can better accommodate diverse learning styles. Technology can also help teachers respond to students' diverse learning styles by creating rich environments that engage students' tactile, visual, and auditory senses (Suydam, 1990). The new generation of

iPod is capable of everything; you can listen to audio materials, browse photo slideshows, watch video podcasts, music videos and your favorite TV shows. Instructors can take advantage of this mobile technology to deliver course materials through Podcasting. Internet online learning freed students from classroom learning, mobile devices, iPods will outreach learning to students wherever they go. The study will also gather student feedback on their preferences of using iPod as a learning tool, and if this mobile leaning tool makes any difference in study habits or better accommodate their individual learning style.

Conclusion

Podcasting used for instructional delivery is still in the stage of its infancy. It is not clear at this point how Podcasting can most benefit student learning, what type of podcasts will be most attractive to students, what are the most effective way to deliver content material via Pod/Vodcasting, what strategic planning is necessary for a successful implementation. These are some the questions that we hope to answer through research data. Another intention of our research is to develop principles and standards for Podcasting best practice for this new delivery media to ensure successful implementation in the future.

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Appendix i. iPod Pilot Program
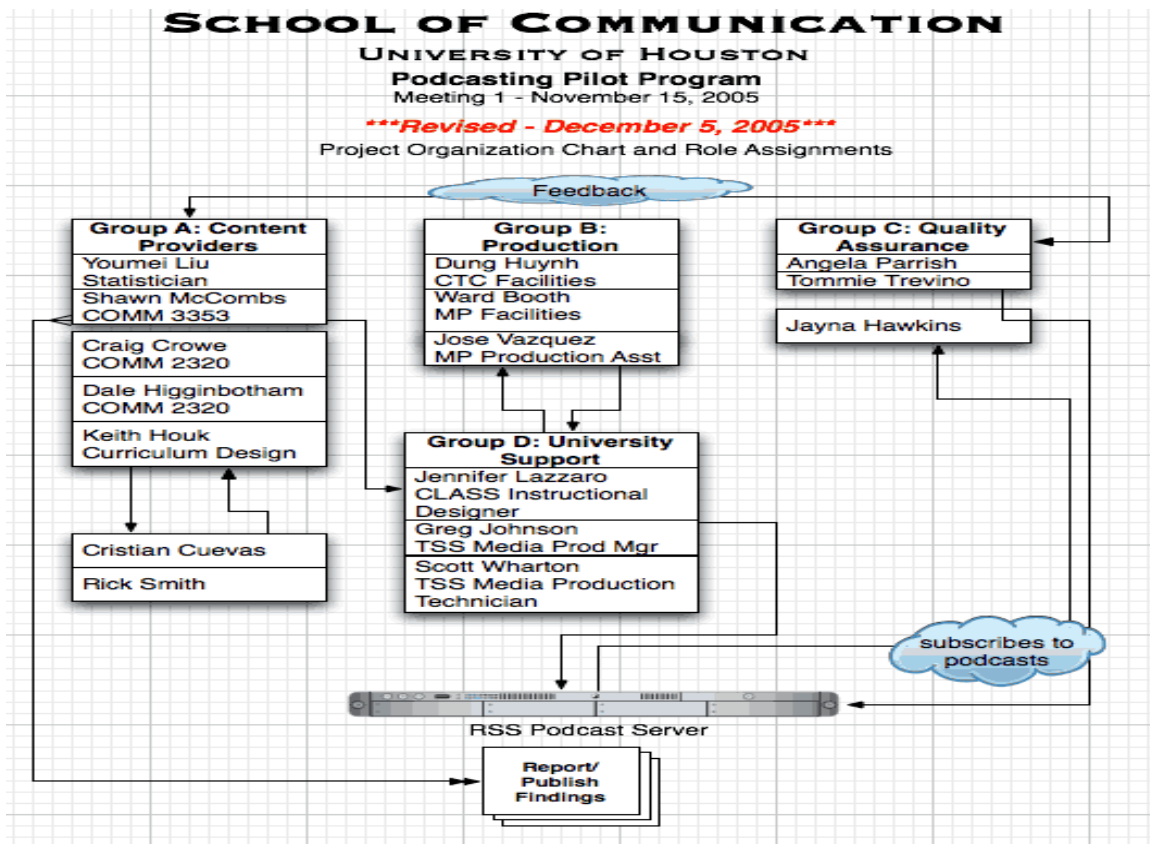
Appendix ii.   School of Communication Project Diagram