

# Casting a wide net: Technical challenges of podcasting within a 'standard operating environment'

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## **Abstract**

*The attractiveness of podcasting as an alternative form of lecture delivery is immediately apparent to any end user of the technology. The students using client-based software to access the information face the 'simple' part of RSS (Really Simple Syndication), whereas the lecturer/producer often faces the more complex issues involved in making the material available in the first place. This paper will describe the experience of providing a podcast version of a lecture series under the restrictions of a university 'standard operating environment', which imposes structures, methods and tools that might not be designed for the purpose in which they are now being used. An argument will be made for a more flexible structure to allow podcasting to become available to lecturing staff who possess fewer technical skills.*

## **Keywords**

*podcast; standard operating environment; higher education; end-user computing*

## **Introduction**

Podcasting has been the break through media technology of the last few years. Since the first regular podcasts were seen on the internet in 2003, the phenomenon has quickly spread, culminating in the term 'podcast' being named the 2005 word of the year by the *New Oxford American Dictionary* (Oxford University Press, 2005). It can be argued that the popularity of podcasts is due to a combination of both the control a user has in selecting the content they are interested in hearing and the simplicity of the experience for the user. Using the RSS (Really Simple Syndication) file format, podcasts provide listeners with a straightforward subscription system (Eash, 2006). A user, once subscribed to a podcast series, will receive all the new episodes of a program produced. For the client, podcasts require only a computer (a portable music player is, in fact, not needed, but can be used), a podcast aggregation program (for example, iTunes, iPodderX, Juice) and an internet connection (Eash, 2006). The experience for the client is extremely simple and uncomplicated, a process that has been made even more attractive by the increasing sophistication of the client-based software programs available. In most cases, a single mouse 'click' on a button or a web page link completes the subscription. Given this simplicity of use, podcasts are an attractive educational tool, providing students with both new flexible means of receiving information, and 'point of need' access to that information (Eash, 2006). Although the process is straightforward for the client, it is less simple for the producer of the podcast. This process can be further complicated by the requirements of the technology environment of the producer. The current paper describes the experience of successfully creating a podcast series within a structured university information technology system.

## **Background**

Original podcasts were based MP3 sound files (MPEG-1 Audio Layer 3), but more recently 'enhanced podcasts' using the newer AAC format (Advanced Audio Coding or MPEG-2 Part 7) have emerged, which allow images and URLs to be transmitted with the audio files. Enhanced podcasts have particular appeal within academia.

As the transmission of an audiostream synchronised with its accompanying images can be created, a lecture can be re-broadcast with a large degree of the original material intact, creating a valuable and powerful revision tool for students. Further, the images themselves form 'chapters', which can be immediately accessed by students, allowing fast indexing of the material.

Although podcasting is simple for the user, the producer or 'podcaster' faces the complexity of creating not only the individual podcast episode files, but in formatting both the RSS file necessary for a podcast to work correctly, and the corresponding correct file structure on the server delivering the podcast. The XML (Extensible Markup Language) format used to create the RSS file is not intuitive and is beyond the immediate ability of most. Certainly writing or editing and RSS file would present great difficulty for those who are not technically minded. Complicating the creation of podcasts within an academic environment are the limits imposed by a university's own computer systems. For example, within the Queensland University of Technology (QUT) a standard operating environment is used.

The standard operating environment (SOE) is a centralised business model of IT service control that is increasing in popularity in Australian universities. By imposing a standard set of hardware and software features across the user experience, not only is consistency maintained, but a number of advantages are gained by an organisation, most importantly, stability, cost effectiveness and ease of data sharing (Brown & Ross, 1996). However, centralised systems tend not to be able to provide rapid solutions to problems and increase time spent by users on 'non-essential' technical issues (McBride & Wood-Harper, 2002). In contrast, decentralised models of IT support offer greater responsiveness in dynamically changing environments (Brown & Ross, 1996), but can lead to incompatible platforms and difficulties in formal support mechanisms (McBride & Wood-Harper, 2002). In 1997, Speier and Brown concluded that a 'one size fits all' model of end-user computer support might not be the most effective, yet little research has followed to further investigate these findings. Most importantly, centralised systems create limitations on the end-user that can significantly delay reactivity to new developments. Such delays can be seen in the introduction of technologies such as podcasting.

A review of the literature into podcasting reveals what would be expected for such a recent development: that most reports are scant; tend to be non-research based; and appear only in the last few years. Further, these articles tend more to report the presence of the phenomenon rather than the methods involved in using these technologies (for example, Adams, 2006; Balas, 2005; Carr, 2006; Dew, 2006; Eash, 2006; 'Growth in virtual learning, data management, blogging and podcasting expected in 2006 [Cover story]', 2006; Isakson, 2006; 'Portable education via podcast', 2006; Young, 2005). The current paper addresses this issue by describing the challenges involved in implementing an enhanced podcast series within a current university standard operating environment using a specific online learning platform and multimedia-equipped lecture theatres.

## **Method**

The podcasting of a lecture series provides students with a flexible revision tool with 'point of need' access to information (Eash, 2006). As a new technology, podcasts require some degree of technical skill to create, a process that can be complicated by the technological environment within which the podcast itself must be produced. Within QUT, a centralised form of client service delivery (the SOE) is used, which controls many aspects of both the desktop and internet environments of the academic end-users, which in turn directly impacts on the procedures required to successfully create an enhanced podcast series. The following sections outline the tools required and steps taken to successfully create an enhanced podcast series within such a setting.

## **Apparatus**

The Queensland University of Technology SOE consists of Intel-based hardware running the Windows XP Professional operating system. The base software system includes the Microsoft Office package, Internet Explorer, Eudora email client (Qualcomm) and Oracle Calendar. A computer with the base SOE was used for this project, with the addition of Macromedia Dreamweaver (Ver. 8.0.2), an approved extension to the base SOE.

A non-approved shareware version of Goldwave (Ver 5.12: Goldwave Inc) was used as a WMA (Windows Media Audio) MP3 conversion utility and audio file editor.

A Macintosh computer (model: 'Mini', running OS X Ver 10.4.7) was purchased to create the podcast files via GarageBand (Ver. 3.0.2), a program supplied as part of the free standard Macintosh suite. Podcast Maker (Ver. 1.2.6: Potion Factory) was purchased to assist in creating the RSS files. Although Podcast Maker has the ability to both manage and upload the podcast episodes to a server, this feature could not be used, as a standard file system is required. The QUT Online Learning and Teaching (OLT) system does not use the requisite file system, and therefore the podcast files were uploaded manually. The QUT OLT platform provides individual web pages for each unit of study undertaken within the university. Designed to be easily used with minimal training, the structure is tightly controlled for consistent 'look and feel' and limits access to features such as uploading of files, which are processed by http protocols only. There are no provisions for more experienced 'power' users or for variations in file structures.

Each lecture theatre used for current project was MELT (Multimedia Equipped Lecture Theatre) capable. The MELT systems allow not only for the presentation of PowerPoint slides (via a Windows XP computer) and microphone amplification of a presenter's voice, but also DVD, video and slide presentations, all controlled by a sophisticated touch screen computer interface. Further, live recordings of the audio of any lecture, via the standard microphone system used for amplification, can be made using the Windows XP computer. These audio files are then automatically stored in a WMA format on a centralised server available to QUT staff, which can later be downloaded in this digitised form. Finally, to test the completed podcasts, iTunes (Apple: Ver. 6.05) was loaded on both a Macintosh computer and a Windows computer.

### Procedure

The workflow for the preparation of the podcast episodes is shown in Figure 1.

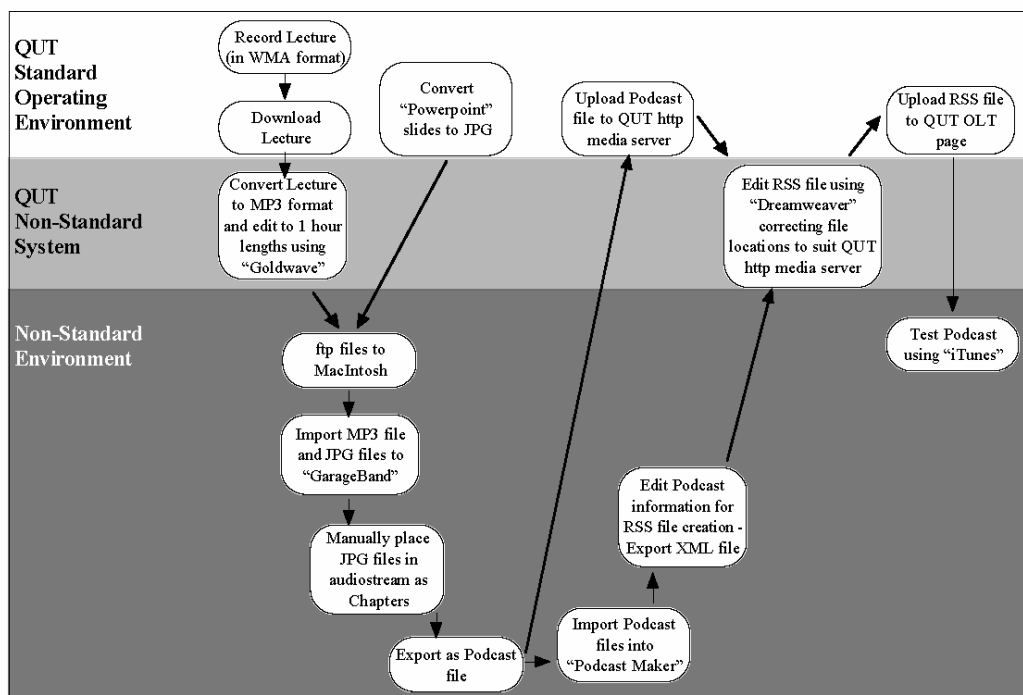


Figure 1: Workflow stages in creating individual podcast episodes within the QUT environment

Staff prepared lectures as usual using PowerPoint as a presentation tool. Upon beginning the lecture, the MELT system was used to initialise a recording, indicating the length of the lecture at this time. The lecture then began and continued as usual. After the lecture was completed PowerPoint was used to convert the presentation slides into JPG format.

The QUT MELT system took less than 24 hours on average to encode the lecture into WMA format ready for downloading from the centralised MELT server. After this sound file was transferred to the standard QUT SOE machine, Goldwave was used to both convert the file from the proprietary WMA format into the open MP3 file format, and to edit the file into 2 lecture halves. The latter was required due to a limit of GarageBand (which would be used to create each podcast episode), which confines the length of any podcast to one hour and six minutes.

The MP3 and JPG files were transferred to a Macintosh computer that was used for the majority of the work needed in the creation of the podcast. GarageBand was used to produce the enhanced podcast episodes themselves, as it offered a number of advantages over other programs, most significantly, that both the audiostream itself, and the placement of the images required for the 'enhanced' podcast could be edited within the same program. Other solutions required a separate program to edit the audio file (for example, Audacity, an open source, cross platform, sound editing program), to the program used to place the images (for example, Podcast AV by OldJewel Software, a Macintosh program that can create enhanced podcasts from pre-edited audio streams only). GarageBand does have its own limitations, for example, the apparent arbitrary restriction of podcast lengths to one hour and six mins (requiring two episodes for each two-hour lecture), and a larger podcast episode file size than that produced by other programs. It should be noted that at the time of writing this manuscript there are no Windows based software solutions for producing enhanced podcasts, although a Windows based extension to Blackboard (which will be discussed later) does exist (as do Windows based solutions for creating 'non-enhanced' podcasts).

After creation of each individual podcast episode Podcast Maker was used to edit and then generate the basic RSS file required for the podcast. Podcast Maker allows for the insertion of information about each episode, such as a description of the content, which can be used for the RSS file itself, but Podcast Maker assumes a standard file structure, not available via the QUT OLT system. Therefore, each RSS file must be edited to reflect the URLs used by the OLT system. Each individual podcast episode file was therefore manually uploaded to the OLT media server using the standard OLT http protocol. Dreamweaver was used to edit the podcast RSS file that had been created by Podcast Maker, correcting the URL locations as indicated by Podcast Maker, to those used by the OLT media server. The podcast RSS file was then itself uploaded to the OLT site. A test of the podcast was then undertaken using iTunes on both Windows and Macintosh platforms.

## Results

The creation of the enhanced podcasts would not have been possible within the framework of the QUT SOE, requiring both hardware and software that was not approved. The QUT infrastructure did provide some benefits in the procedure; in particular, the use of the MELT system to record the lectures simplified the process considerably, with no special recording equipment being required for the podcast production, although the use of the proprietary WMA encoding format for the audio files necessitated re-encoding. The creation of podcast episodes was time consuming, with each two-hour lecture requiring four to six hours' work to achieve a successful podcast. The time required can be broken into three distinct parts.

First, each episode required manual 'enhancing'. That is, the images needed to be manually placed into the audiosteam at the appropriate point. Each audiostream had to be listened to, finding the optimum position to place the next image, thus creating the reference 'chapter'. Therefore, for a two-hour lecture, at least two hours of enhancing was not uncommon. Second, a degree of time was required for encoding, both in re-encoding the WMA files to MP3, and in the encoding of the podcast episode by GarageBand itself. The third time requirement centred on the QUT http uploading system, which took approximately half an hour to load each one-hour lecture episode (downloading by the students was not limited in this same way). Not only was this system slow in itself, but it also multiplied the effects of any errors that occurred (for example, incomplete file upload, incorrect file uploaded, incorrect file settings for uploading), thus greatly increasing the time it took to create a working podcast.

QUT's OLT system was not designed for podcasting, and a number of 'work arounds' required by the podcast producer, though invisible to the students, were needed to enable the process. These factors added to both the complexity of the process and the time needed for the construction of the podcasts, which was over that which would have been required if a standard podcast file system and ftp file transfer protocol could have been used.

## Discussion

Although a successful creation of an enhanced podcast series was achieved within the formal structure of the QUT OLT environment, this process would not have been possible using the QUT standard operating environment. Further, the time costs incurred by the SOE raises questions regarding the need for more flexibility if emerging technologies are to be trialled. If they are to be embraced, even more technological support is required; without this support academics are unlikely to undertake, on a widespread scale, the complex processes requiring both the time and skill outlined in this paper. Universities are large and complex organisations, and the desire to simplify the technological support needs and costs are understandable, but the activities of each academic within each school or department are not analogous to the activities of a worker within an average business unit. Most work environments actively discourage activities seen as outside the 'core business' of the individual worker especially when dealing with technology, but such an approach may be most applicable when an individual's work is more homogenous in style (Christensen & Eikebrokk, 2004).

Academics, by the very nature of their appointments, are required to (and encouraged to) undertake individual activities, unique in both scope and form. They are encouraged to be early adopters of new technologies, and to be constantly striving to improve student learning using these technologies. This would appear to be contrary to the aims of a centralised and inflexible IT system.

Hybrid support systems, which centralise some structures, and distribute some business responsibilities, while using 'horizontal structural overlays' to manage the IT system, would appear to offer a more appropriate model for universities hoping quickly to respond to new technologies (Brown & Ross, 1996). These hybrid systems do have their costs, especially in terms of new divisions of labour, difficulties in coordination of support and the increased staff burden of the 'structural overlays' (Brown & Ross, 1996).

Podcasting is relatively new, and it is only recently that software has appeared that automates some of the processes involved in creating enhanced podcasts for presentations such as lectures. For example, Profcast (Humble Daisy: for Macintosh only, and therefore not compatible with the QUT MELT system) allows for automation of the 'enhancing' process, simultaneously recording the audiostream and synchronising it with PowerPoint slides as they are presented. These can then be either immediately exported as podcast episodes, or into GarageBand for further editing. The production of the podcast RSS file is still required, and although programs like Podcast Maker simplify this task, and in fact can even assist in uploading the podcast episodes to a server, they assume a common file structure, one that may not be used within the university undertaking the podcast. A level of technical skill is thus required on behalf of the podcast producer to create a working podcast: a level of skill not all potential podcasters possess.

A more complete solution is provided by the Tegrity extension for the Blackboard online teaching platform (Tegrity Inc.). The Tegrity system claims to not only record and synchronise presentations creating the enhanced podcast episodes, but to also create the podcast files themselves, thus completely automating the process for the academic. With the recent announcement of 'iTunes U' by Apple Computer, universities can now also use the familiar iTunes interface, customised to each university, and presenting their own educational content (Young, 2005).

## Conclusion

Further research is required to ascertain the efficacy of podcasting as an educational device. Certainly, the first step is to enable the structures to allow the technology to be used. Only then can we evaluate how students are using this new and interesting educational tool. The upcoming (2006–2007) US academic year looks set to become the year of the educational podcast (Adams, 2006; Balas, 2005; Dew, 2006; Eash, 2006; ‘Growth in virtual learning, data management, blogging and podcasting expected in 2006 [Cover story]’, 2006; Isakson, 2006; ‘Portable education via podcast’, 2006; Young, 2005). Whether universities who rely on centralised IT management systems and strictly controlled standard operating environments will be able to adapt to take advantage of these new and upcoming technologies or not remains to be seen.

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