

Educational Podcasting Using the Charles Sturt University Flexible Publishing Platform

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Abstract: Podcasting allows audio content from user selected feeds (channels) to be automatically downloaded to one's computer as it becomes available, then later transferred to a portable player for consumption at the user's leisure, thereby creating opportunities for mobile learning. There has been significant recent uptake of MP3 players and podcasting, both in mainstream society and in higher education. This paper describes how the Charles Sturt University Flexible Publishing System is used to provide easy-to-use podcasting functionality that is seamlessly integrated with the university's in-house learning management system. Feedback from students suggests that they are receptive to the technology and its use in enhancing learning although there may still be barriers to realising its full potential. The researchers' future plans are also discussed.

Introduction

The authors are involved in an ongoing educational podcasting effort at Charles Sturt University (CSU). The project began as an attempt to use pre-class listening material, delivered via podcasting, as a means to address the preconceptions and anxiety that students bring into the university classroom (Chan & Lee, 2005). The podcasts are structured as a series of 3 to 5 minute talkback radio-style "shows," with students from the current and/or previous cohort holding discussions on pertinent issues related to the subject and its content in a relaxed and informal style. Listening to the podcasts is optional and the material contained in these podcasts is not directly examinable; nevertheless, by listening to background material and being exposed to the terminology used in the subject, students are likely to be better prepared to participate in classes, and to do so with motivation and confidence. The podcasts are also intended to help allay students' concerns about issues such as assessment and the scheduling of classes. Podcast "shows" were initially produced for students studying an undergraduate information technology subject, *Information Superhighway*, on-campus at CSU's Wagga Wagga campus. The scriptwriting, editing and recording process was driven by a group of volunteer students who had previously completed the subject, with minimal lecturer intervention (Lee, Chan & McLoughlin, 2006). The scope of the project has since expanded to encompass other IT subjects, involving both undergraduate and postgraduate students, studying at other CSU campuses as well as off-campus in various locations around Australia and overseas.

The present paper describes how CSU's Flexible Publishing system (Charles Sturt University, n.d.) is used as a platform for publishing and distributing the podcasts, and discusses the results of a survey designed to elicit feedback from students on this aspect of their podcasting experience. The impact from a pedagogical perspective, particularly in terms of the content and presentation of these podcasts, will be the focus of a subsequent publication.

Literature Review

Audio has traditionally been neglected and underused as a teaching and learning medium (Bates, 1981; Romero-Gwynn & Marshall, 1990; Scottish Council for Educational Technology, 1994). Perhaps this may be

attributed to the popular view that “[listening to audio is] not learning...[as this] is not synonymous with comprehension and action” (Clark & Walsh, 2004, p. 25). However, Durbridge (1984) emphasises the educational advantages of audio over printed media: “As compared with a written text, the spoken word can influence both cognition (adding clarity and meaning) and motivation (by conveying directly a sense of the person creating those words).” Power (1990) concurs: “The ability to adjust or modulate [the] frequencies [of the human voice] allows us to communicate in a correct and artistic way with words and sounds...[T]he ability to adjust intonation, inflexion, phrasing, pacing, volume, loudness and timbre [distinguish speech from print].” (sec. 2.1, para. 1). He points out that “spoken words through heightened intonations or subtle nuances can communicate...emotions and create a sense of intimacy at the same time”; on the other hand, “[p]rint does not allow a learner to identify or interpret audible nuances that personalize content...” (sec. 2.1, para. 2).

Sophisticated multimedia elements like video, animation and interactive media have a high success rate in terms of boosting attention, motivation and interest, but are expensive and time consuming to develop. If well designed, they may be optimised for reuse from semester to semester, but are difficult to create or modify mid-semester to suit the needs of a particular cohort. By contrast, digital audio is cheap and simple to produce and manipulate, due to the availability of basic sound recording and playback hardware and software in homes and educational institutions. More importantly, unlike other media forms, audio liberates learners from the tyranny of the screen and “frees eyes and hands” (Clark & Walsh, 2004, p. 8) so learning can coincide with other activities rather than replacing them, paving the way for true mobile learning (m-learning) that is integrated into their lives.

Radio has been used in education ever since it became available (World Bank, 2000). Audio cassette tapes and more recently CDs have been used as a solution where the ephemeral nature and fixed transmission times characteristic of radio broadcasts (World Bank, 2000) pose a problem, where the audience is geographically dispersed over too large an area, or where radio air time is simply not readily available. Learners see cassettes as more personal and informal than radio, and cassettes have also been found to be more appropriate than audio for controlled, didactic teaching (Bates, 1981). Podcasting may offer the “best of both worlds” by combining the benefits of the broadcast nature of radio with the flexibility, learner control and personalisation afforded by recorded audio. The technology enables content from one or more user selected feeds (channels) to be automatically downloaded to one’s computer as it becomes available, then later transferred to a portable MP3 player for “anytime, anyplace” listening. Furthermore, Clark & Walsh (2004) discuss the psychological advantages of “iPod-learning” in relation to lifestyle and society. In addition to the benefit of portability, listening to an iPod or other portable music player in public is “socially acceptable,” particularly amongst younger students.

The increasing ubiquity of MP3-capable devices in mainstream society is fuelling the growth of podcasting in general, and in particular, educational podcasting. The Pew Internet & American Life Project (Rainie & Madden, 2005) reports that almost one in five (19%) of those ages 18 to 30 own MP3 players, compared to 14% of those aged 30 to 39 and 14% of those aged 40 to 48. Internet usage, level of Internet experience and the availability of broadband access were found to correspond directly to MP3 player ownership. Over 80% of college students in the US own at least one device capable of downloading and playing recordings (Diverse Issues in Higher Education, 2006). The Pew study also found that 29% or around 6.4 million of the 22 million American adult owners of MP3 players have downloaded podcasts from the Web for later listening.

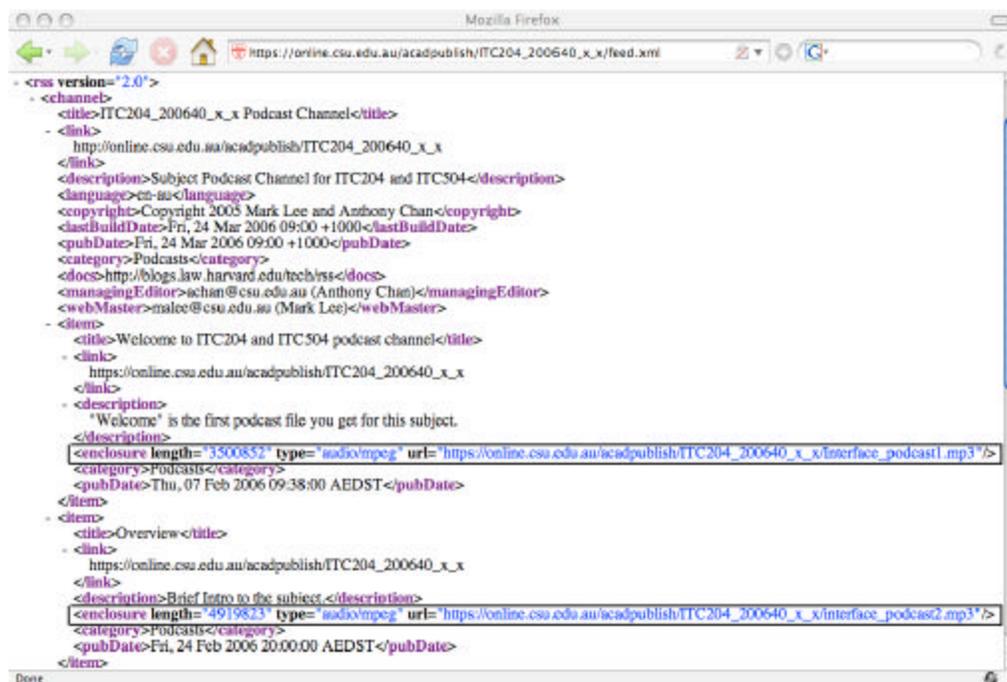
There has already been significant uptake of portable music players and podcasting in higher education, although there is currently little published academic literature in this area. Since Fall 2002, various courses at Georgia College & State University (2005), including a number of study abroad courses, have been “iPod-enhanced” to include a diverse range of audio material ranging from lectures and audio books to language study material and music. In August 2004, Duke University (2006) distributed 20-gigabyte iPods to its 1,650 commencing students, pre-loaded with orientation information. Administrative and academic materials in MP3 format are available for students to download from the Duke Web server and via Apple iTunes. In a smaller-scale project, Drexel distributed iPod Photo players to its School of Education freshmen in September 2005 (Read, 2005). Apple recently launched iTunes U (Apple Computer, 2005), a free, hosted service for colleges and universities that provides easy access to audio and video content such as lectures and interviews, using the same technology as the commercial iTunes Music Store. Other major universities that have adopted podcasting at an institutional level include University of California, Berkeley (2006), Princeton University (2005), Stanford University (n.d.), Purdue University (2006), and University of Wisconsin-Madison (2005). Applications to teaching and learning range from recording lectures as a means of freeing up class time for interaction, to exposing students to international

perspectives by inviting guest speakers from other countries to give talks. The technology is also being used to empower students and encourage active learning through having them create their own podcasts. For example, journalism students gain practice in producing their own grassroots talk shows (Diverse Issues in Higher Education, 2006).

Introduction to Podcasting Technology

Podcasting provides a low-cost, low-barrier tool for disseminating audio via the Internet, particularly when compared to the alternative of streaming the content, which involves playing media as it downloads. Streaming often results in poor performance, particularly for users who do not have reliable, high-bandwidth connections. This leads to a “click and wait” situation that adversely affects the viewing or listening experience. Podcasting overcomes this by having a computer continuously connected to the Internet, so that bandwidth-intensive content can be “dripped in” and made available when ready (Curry, 2004). Because the content typically does not need to be listened to live, this time-shifting mechanism does not pose a problem. Users can filter and search content downloaded from a single feed, or across multiple feeds, opting to listen to only those podcasts that are of interest to them. Last but not least, podcasts can be transferred to a variety of portable devices for listening to on the move.

Podcasting is based on RSS or RDF Site Summary (also called Rich Site Summary, Really Simple Syndication). RSS-enabled web sites generate feeds of XML data summarising their content, which are monitored by client-side programs called aggregators. An aggregator can be configured to periodically poll one or more subscribed feeds for updates and deliver or syndicate new content to the user’s desktop. RSS content can be filtered and aggregated from multiple feeds. RSS is a time saver as the user does not have to manually plough through a plethora of web sites for relevant material; nor does he/she need to continually monitor sites for updates. RSS documents must be well-formed and valid XML documents. The document is published on a web server, and is maintained either manually through editing by hand – a process that is simpler than authoring (X)HTML for a web page – or more commonly, generated by server-side software. For example, many weblog (blog) and content management systems automatically syndicate RSS and can be easily configured to podcast. A feature of RSS 2.0 (RSS Advisory Board, 2005) known as enclosures is used to implement podcasting. Fig. 1 shows an RSS 2.0 document containing two enclosures representing podcasts.



```
<?xml version="1.0" encoding="UTF-8" ?>
<rss version="2.0" ?>
  <channel ?>
    <title>ITC204_200640_x_x Podcast Channel</title>
    <link>
      http://online.csu.edu.au/acadpublish/ITC204_200640_x_x
    </link>
    <description>Subject Podcast Channel for ITC204 and ITC504</description>
    <language>en-au</language>
    <copyright>Copyright 2005 Mark Lee and Anthony Chan</copyright>
    <lastBuildDate>Fri, 24 Mar 2006 09:00 +1000</lastBuildDate>
    <pubDate>Fri, 24 Mar 2006 09:00 +1000</pubDate>
    <category>Podcasts</category>
    <docs>http://blogs.law.harvard.edu/tech/rss</docs>
    <managingEditor>achan@csu.edu.au (Anthony Chan)</managingEditor>
    <webMaster>malee@csu.edu.au (Mark Lee)</webMaster>
  </channel>
  <item ?>
    <title>Welcome to ITC204 and ITC504 podcast channel</title>
    <link>
      https://online.csu.edu.au/acadpublish/ITC204_200640_x_x
    </link>
    <description>
      'Welcome' is the first podcast file you get for this subject.
    </description>
    <enclosure length="1500853" type="audio/mpeg" url="https://online.csu.edu.au/acadpublish/ITC204_200640_x_x/interface_podcast1.mp3"/>
    <category>Podcasts</category>
    <pubDate>Thu, 07 Feb 2006 09:38:00 AEDST</pubDate>
  </item>
  <item ?>
    <title>Overview</title>
    <link>
      https://online.csu.edu.au/acadpublish/ITC204_200640_x_x
    </link>
    <description>Brief Intro to the subject.</description>
    <enclosure length="4919823" type="audio/mpeg" url="https://online.csu.edu.au/acadpublish/ITC204_200640_x_x/interface_podcast2.mp3"/>
    <category>Podcasts</category>
    <pubDate>Fri, 24 Feb 2006 20:00:00 AEDST</pubDate>
  </item>
</rss>
```

Figure 1. An RSS 2.0 document, used to specify a podcast feed, containing items with MP3 enclosures

At the document root is an <rss> element with a required “version” attribute. Subordinate to this is a single <channel> element containing the channel’s metadata as well as its contents in the form of <item> elements. The <enclosure> element (two examples of which are highlighted in Fig. 1) is a child element of <item>. This element contains a “url” attribute that provides the location of the MP3 file, as well as “length” and “type” attributes that indicate the file’s size (in bytes) and MIME type. For MP3 files, the type is “audio/mpeg,” however other media types, including other audio and even video formats, may be podcast as well. On the client-side, podcasting-capable aggregators or “podcatchers” are used to download podcasts. They are configured to do so by supplying them with the URL of the relevant RSS 2.0 feed to monitor for <enclosure> elements. Some popular podcatchers are NIMIQ (Windows), iPodderX (Mac OS X), Podget (GNU/Linux) and Juice (Cross-platform). Apple’s iTunes music player also incorporates podcatching capabilities as of version 4.9.

The CSU Flexible Publishing System

CSU staff and students use a learning management system called *my.csu* (Charles Sturt University, 2002), developed in-house by the university’s Division of Information Technology (DIT). *my.csu* was designed to bring together information from a wide variety of sources and make it available to users in a single, convenient location. It incorporates several communications and personal information management tools. More importantly, it acts as a portal to teaching and learning resources such as online subject outlines and discussion forums.

The CSU Flexible Publishing system (Charles Sturt University, n.d.) was developed by DIT in 2003 to provide a means for academics to disseminate electronic supplementary materials to students on an ad hoc basis throughout a semester. By using Flexible Publishing, academics can avoid having to put these materials through the tedious and time-consuming quality assurance procedures that core learning materials [1] are subject to, thereby ensuring that students are able to access newly developed resources in a timely fashion. When publishing materials, subject coordinators have the option of using either a Microsoft Windows desktop application-based Wizard (Division of Information Technology, 2003a), or by using a WebDAV capable client (Division of Information Technology, 2003b) to perform the necessary file management tasks on the web server (Fig. 2). WebDAV (Whitehead, 2005) is a set of extensions to the HTTP protocol that allows users to collaboratively edit and manage files on a web server from remote locations. For example, Microsoft Windows 2000 and higher, Internet Explorer 5 and higher, and Office 2000 and higher, are WebDAV-capable, allowing users to perform remote file management tasks as if they were operating on local disks. Flexible Publishing is seamlessly integrated with *my.csu*. Published files appear to students as hyperlinks in the online subject outline, under a section labelled “New Resources”.

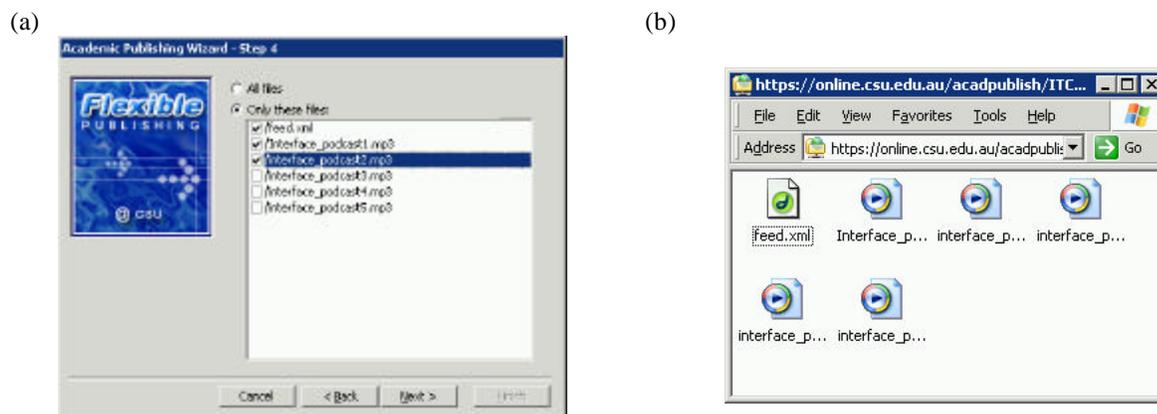


Figure 2. Publishing on Flexible Publishing using (a) Flexible Publishing Wizard; (b) Web Folders (WebDAV)

[1] University policy prohibits the publishing of core learning materials using this facility. *Core materials* are defined as those that are compulsory and that affect the assessment of a subject. *Supplementary materials* do not effect assessment but aid learning and support in relation to the core learning materials.

To facilitate the pilot project, the CSU Flexible Publishing system was configured to allow MP3 files to be published. This allows students to (manually) download the files via the “New Resources” section of the online subject outline (Fig. 3). Each file appears as a hyperlink in a standard web browser. By uploading a valid RSS 2.0 document such as the one in Fig. 1 the lecturer can create a podcast feed, giving students the added option of subscribing to the feed using podcatchers so that episodes are automatically downloaded as they become available.

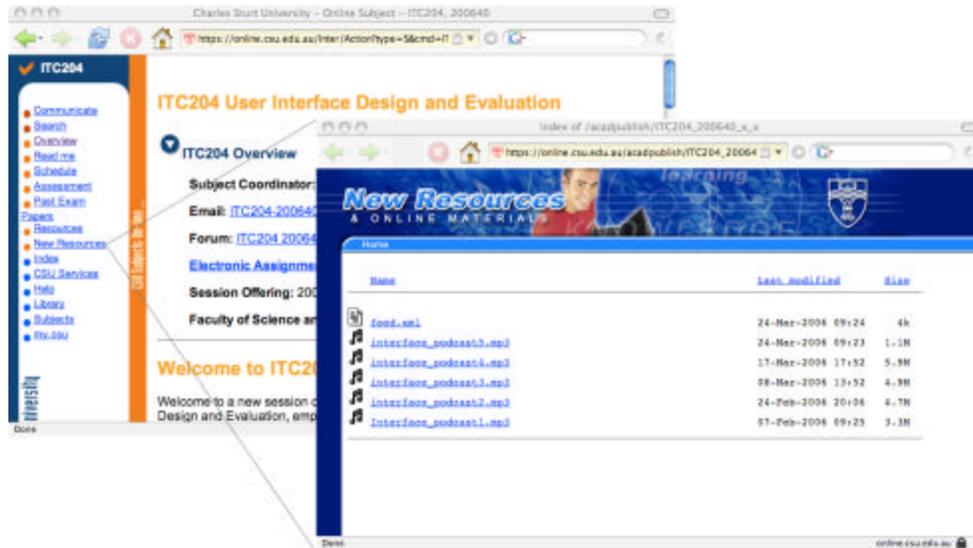


Figure 3. Accessing podcasts on Flexible Publishing via the online subject outline

The researchers set out to investigate the following:

1. The level of uptake of the podcasts amongst the student cohort and the factors associated with this;
2. The ease of use of the platform and technology for students;
3. The ways in which the students are obtaining and consuming the podcasts.

Context, Participants and Methods

The participants were from a convenience sample of 66 on- and off-campus students enrolled in an undergraduate information technology subject, ITC204 *User Interface Design and Evaluation*, as well as its postgraduate version, ITC504 *Interface Usability*, in the Autumn 2006 semester. The two versions are identical in content, and the students enrolled in both versions were provided with access to the same podcasts, with a new episode released each week. At the end of Week 5 of the 13-week semester, e-mail invitations were issued to the students to participate in a mid-semester online survey, which was advertised as being completely voluntary and anonymous. The aim of this survey was twofold: Firstly, to collect preliminary data to assist in answering the three research questions stated in the previous section, and secondly, to allow for appropriate improvements to be made during the remainder of the semester in response to the feedback. The results of the mid-semester survey are discussed below; the results of an end-of-semester survey will be presented at the conference.

At the time of conducting the mid-semester survey, a total of five podcasts had been released via the CSU Flexible Publishing system. Students were asked to respond regardless of whether they had downloaded or listened to any of the podcasts. The survey was kept open to collect responses for approximately 10 days.

Results and Discussion

28 students responded to the online survey, the results of which are summarised in Tables 1 to 3. There was excellent uptake of the podcasts (Table 1), with over 81% of respondents reporting that they had listened to three or more of the five available podcasts from start to finish, and many reporting they listened to one or more podcasts

multiple times. Only two respondents claimed to have not downloaded any of the podcasts at the time of completing the survey. The responses to Questions 12 and 13 (Table 3) further indicate that the respondents have little or no trouble downloading and playing the MP3 files using the CSU Flexible Publishing platform.

All respondents had access to one or more MP3-capable devices, with almost half having access to a portable player such as an iPod (Table 2, Q5). Yet, while the respondents generally agreed that they were more likely to listen to the podcasts because of the ability to do so on the move (Table 3, Q10), most still preferred to consume the content using a desktop/laptop computer (Table 2, Q7). Although podcasting holds much potential for mobile learning that allows learners to carry out other tasks while listening, it is interesting to note that a vast majority of the respondents prefer to set aside dedicated time to listen to the podcasts, and that most of them do this at home (Table 2, Q8 & 9). This was even despite the fact that the material contained in the podcasts was classed as supplementary in nature and not directly examinable. Perhaps this is because the students are not accustomed to multitasking these learning activities with other tasks, as they are inclined to treat them as formal, deliberate learning efforts that require undivided attention and concentration. This may be an impediment to realising the vision of true m-learning as portrayed by authors like Quinn (2000), Metcalf (2002), and Lee (2005), that is integrated into, and takes advantage of the otherwise wasted or 'stolen' moments in, learners' lives. Similarly, the respondents appear to favour manually downloading MP3's via a web browser instead of having podcatchers do this automatically (Table 2, Q6), though this may be due to the relatively small amount of content being distributed via the podcast feed.

To date, how many of the 5 available podcasts have you...	Distance Ed students (N=18)				On-campus students (N=10)				All students (N=28)			
	Mea	Med	Mod	SD	Mea	Med	Mod	SD	Mea	Med	Mod	SD
<i>Q1: Downloaded (whether or not you have listened to them)?</i>	3.67	4.00	4.00	1.53	3.56	3.00	4.00	1.67	3.63	4.00	5.00	1.55
<i>Q2: Listened to from start to finish?</i>	3.35	4.00	4.00	1.50	3.10	3.00	3.00	1.66	3.26	3.00	3.00	1.53
<i>Q3: Listened to in part only?</i>	1.55	1.00	0.00	2.07	1.80	1.00	0.00	2.17	1.63	1.00	0.00	2.03
<i>Q4: Listened to multiple times?</i>	1.14	1.00	1.00	1.10	1.33	1.50	1.00	1.21	1.20	1.00	1.00	1.11

Table 1. Responses to Questions 1 to 4 of the ITC204/504 mid-semester podcasting survey (Mea=Mean, Med=Median, Mod=Mode, SD=Standard Deviation)

	Distance Ed students (N=18)		On-campus students (N=10)		All students (N=28)	
	N	%	N	%	N	%
<i>Q5: Which of the following types of MP3-capable devices do you have access to (select all that apply)?</i>						
Desktop or laptop computer able to play MP3 files	18	100.00	10	100.00	28	100.00
Portable MP3 player (e.g. iPod)	8	44.44	4	40.00	12	42.86
MP3-capable mobile phone	6	33.33	1	10.00	7	25.00
MP3-capable personal digital assistant (PDA)	3	16.67	0	0.00	3	10.71
Other (please specify)	0	0.00	0	0.00	0	0.00
<i>Q6: How do you prefer to obtain the podcasts?</i>						
By downloading the files using a web browser (via online subject outline/my.csu)	11	61.11	5	50.00	16	57.14
By subscribing to the podcast channel with my podcatcher/aggregator	6	33.33	4	40.00	10	35.71
Using both methods above	2	11.11	1	10.00	3	10.71
I have not downloaded any of the podcasts to date.	0	0.00	1	10.00	1	3.57
Did not respond	0	0.00	1	10.00	1	3.57
<i>Q7: How do you prefer to listen to the podcasts?</i>						
Using a laptop/desktop computer	12	66.67	8	80.00	20	71.43
Using a portable device (eg. MP3 player/iPod, PDA, mobile phone)	2	11.11	0	0.00	2	7.14
Using both methods above	4	22.22	1	10.00	5	17.86
I have not listened to any of the podcasts to date.	0	0.00	1	10.00	1	3.57
<i>Q8: Where do you usually listen to the podcasts?</i>						
At home (includes on-campus residences)	16	88.89	9	90.00	25	89.29
At work	1	5.56	0	0.00	1	3.57
At university	0	0.00	0	0.00	0	0.00
On the road	1	5.56	0	0.00	1	3.57
I have not listened to any of the podcasts to date	0	0.00	1	10.00	1	3.57
Other (please specify)	0	0.00	0	0.00	0	0.00

<i>Q9: When do you usually listen to the podcasts?</i>						
While travelling	1	5.56	0	0.00	1	3.57
While waiting	3	16.67	1	10.00	4	14.29
While carrying out other tasks (e.g. household chores, exercising)	1	5.56	2	20.00	3	10.71
I set aside dedicated time to listen to the podcasts	12	66.67	4	40.00	16	57.14
I have not listened to any of the podcasts to date	1	5.56	2	20.00	3	10.71
Other (please specify)	0	0.00	1	10.00	1	3.57

Table 2. Responses to Questions 6 to 9 of the ITC204/504 mid-semester podcasting survey

Please rate the following statements using the scale 1=Very Strongly Disagree, 2=Strongly Disagree, 3=Disagree, 4=Neutral, 5=Agree, 6=Strongly Agree, 7=Very Strongly Agree:	Distance Ed students (N=18)		On-campus students (N=10)		All students (N=28)	
	Mean	SD	Mean	SD	Mean	SD
<i>Q10: The ability to listen to material while on the move makes it more likely for me to use it.</i>	4.94	1.21	5.09	1.22	5.00	1.20
<i>Q11: Subscribing to the feed using to allow automatic download of the podcasts as they become available makes it easier for me to obtain them.</i>	5.06	1.30	4.73	1.40	4.93	1.31
<i>Q12: I find it easy to access the podcasted audio files.</i>	5.83	1.20	5.00	1.18	5.52	1.24
<i>Q13: I find it easy to play the podcasted audio files.</i>	5.78	1.56	5.73	1.01	5.76	1.35

Table 3. Responses to Questions 10 to 13 of the ITC204/504 mid-semester podcasting survey

Conclusion and Future Work

From the results of the survey it is evident that the students are receptive to the educational podcasts delivered using the CSU Flexible Publishing platform, and that they have access to the facilities and technical competence to obtain and listen to these podcasts. The level of uptake thus far is extremely encouraging. However, there may be other barriers and resistance to realising the full potential of podcasting as a means of facilitating true m-learning, and to leveraging the technology's ability to deliver on-demand content through automated, time-shifted syndication. The nature of these barriers, along with strategies for overcoming them, warrant further investigation by the research team. For example, the authors believe that although learners may be comfortable with the technology and use it ubiquitously for entertainment and other purposes, to engage in deep learning while simultaneously performing other tasks requires the development of new skills/competencies, or at the very least a different mindset.

As mentioned earlier, a subsequent publication will cover the impact of the podcasts on the students from a pedagogical perspective, particularly in terms of their content and presentation. Further refinements will be made in the light of these findings to ensure alignment with and relevance to student needs. Another paper will address academic staff reactions to the use of CSU Flexible Publishing as a podcasting platform and the ease of integrating this into their professional practice. While podcasting has a high level of social cachet amongst students, who have little or no trouble using it, academics may be apprehensive, questioning if it is really worth their time and effort. Platforms like CSU Flexible Publishing can be easily extended to provide truly transparent, drag-and-drop podcasting functionality that dramatically reduces the complexity and tediousness of educational podcasting for less technically experienced educators. Last but not least, plans underway for the development of a resources kit that the authors hope will assist the uptake of educational podcasting, both at CSU and in higher education in general.

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