Everyone's learning with podcasting: A Charles Sturt University experience

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The authors have been involved in a year long project in which a group of second year undergraduate students is placed in charge of producing a series of educational podcasts targeted towards other students undertaking a number of information technology subjects. The exercise has proved to be a valuable learning experience for all those involved: the listeners, the producers and the educators. This paper describes the authors' ongoing efforts and discusses the impact of the activities on each of the groups involved. It concludes with suggestions for other educators interested undertaking similar efforts, which may contribute to best practice as the field of educational podcasting continues to develop and evolve.

Keywords: educational podcasting, MP3, mobile learning, peer teaching, learning by teaching

Introduction

Podcasting technology allows audio content from one or more pre-selected feeds (channels) to be automatically downloaded to one's computer as it becomes available, then later transferred to various types of companion media such as iPods and MP3-capable mobile phones, for listening to at a convenient time and place, or "on the move". Because these media forms do not rely on the visual senses, they allow learners to carry out other tasks while listening. Additionally, these devices have a high level of social cachet, particularly with younger students. There has been significant recent uptake of MP3 players and podcasting, both in mainstream society and in higher education.

The authors' educational podcasting efforts began with an attempt to use pre-class listening material as a means to address the preconceptions and anxiety that students bring into the classroom in a first year undergraduate information technology subject at Charles Sturt University (CSU) (Chan & Lee, 2005). The project has since expanded substantially to include the production and distribution of podcasts for other 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 begins with a discussion of podcasting and its educational applications, and briefly showcases some of the authors' work in this area. It then considers, in turn, the impact on the various parties involved: the listeners, the producers and the educators, before providing suggestions for tertiary teachers interested undertaking similar efforts.

Audio in teaching and learning

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, thus paving the way for true mobile learning.

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 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.

MP3 player ownership and podcasting adoption

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 aged 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 had downloaded podcasts for later listening. A more recent study by Nielsen/NetRatings (Carson, 2006) revealed that 6.6% of the US adult online population (9.2 million users) recently downloaded an audio podcast. Web users between the ages 18 and 24 were almost twice as likely as the average user to download audio podcasts, signalling that adoption should continue to grow.

Overview of podcasting technology

The term "podcasting" is a portmanteau that combines the words "iPod" (Apple's popular portable music player) and "broadcasting". Podcasting differs from simply making media files available for download from a web page, or streaming (playing the media as it downloads), in that it avoids a "click and wait" situation by having a computer that is continuously online so that bandwidth-intensive content can be "dripped in" and made available when ready (Curry, 2004). This is especially useful where high-speed, reliable broadband access is not readily available.

Podcasting is based on Really Simple Syndication (RSS, variously termed Rich Site Summary and RDF Site Summary). RSS-enabled web sites generate a feed of Extensible Markup Language (XML) data summarising the content of the site. This XML is maintained either manually – a process that is simpler than authoring (X)HTML for a web page – or more commonly, generated on-the-fly by server-based software. For example, many weblog and content management systems automatically syndicate RSS. On the client-side, programs called aggregators periodically poll subscribed feeds for updates and deliver new content directly to the user's desktop. Content can be filtered and aggregated from multiple feeds.

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 feed. The podcatcher monitors the feed for

RSS 2.0 (RSS Advisory Board, 2005) <enclosure> elements, which specify the URL of the media file, its size and MIME type. Downloaded files can be transferred to a variety of portable devices, including MP3 players, handheld computers, laptop computers and tablet PCs, as well as many modern mobile phones and personal digital assistants (PDAs). Users without access to such devices can simply listen to the content on their PCs.

Podcasting at CSU: Beyond recorded lectures

There has 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, using the same technology as the commercial iTunes Music Store.

Many existing educational uses of podcasting focus on the use of the technology to deliver instructional content such as lectures, which can lead to questions of pedagogical soundness and risk adversely affecting class attendance. Used appropriately, however, podcasting can enhance classroom learning by encouraging students to engage with the material and adding yet another modality of learning (Carson, 2006). The authors believe the true potential of this technology lies in its community-building value, and its use as a vehicle for disseminating learner-generated content. As mentioned earlier, they began their foray into podcasting in the Autumn (February to July) 2005 semester at CSU's School of Information Studies, with an attempt to examine how short audio clips can be used to address the preconceptions and anxiety that students bring into the university classroom (Chan & Lee, 2005). Creating a productive and satisfying learning experience involves actively engaging students and having them take responsibility for their learning (Schunk & Zimmerman, 1998); their pre-conceptions and anxiety act as an up-front impediment to this. In addition, modern teaching and learning methods based on social constructivist theory such as discovery-based learning, problem-based learning and collaborative learning, have a significantly higher probability of success if students come to class already inspired to learn and willing to participate (Ramsden, 2003). The authors believe that pre-class listening material, delivered in a timely fashion via podcasting, can be part of an effective solution to help alleviate these problems, and do so more flexibly and effectively than traditional methods like subject websites and printed handouts.

The podcasting project at CSU now incorporates a myriad of contexts and applications both within and outside the university. The authors' emphasis was not and continues not to be on recording lectures, but instead on producing short, 3 to 5 minute talkback radio-style segments, 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. The lecturer and/or other subject matter experts are occasionally brought in as "guests" to offer insight into, or clarification of, the more difficult or complex issues and topics. The material contained in the podcasts is supplementary in nature and not directly examinable, although it was designed to provide background material and expose students to terminology used in the subject, in addition to allaying their concerns about issues such as textbooks and assessment.

Podcast episodes from the various subjects included in the project have included the following:

- "Oops, I missed my first lecture", in which two students converse about what happens in class in Week 1, from both a subject content and an administrative perspective;
- "Right to copy or copyright?" – An interview with the University's copyright coordinator (a qualified lawyer), covering issues such as why students should be concerned about copyright and how they might accidentally infringe on copyright;
- Various "topic trailers" providing a lead-in to and broad overview of each topic to prepare students for the lecture and other learning activities;

- Assignment tips, hints and post-assignment feedback from the lecturer;
- An interview, conducted over Voice-over Internet Protocol (VoIP), with a textbook author based in the United Kingdom.

The scriptwriting, editing and recording process of the podcasts was driven by a group of volunteer students who were not presently enrolled in, or had previously completed, the respective subjects. There was minimal lecturer intervention in the process.

Who's learning from podcasting at CSU?

Various parts of the podcasting project at CSU seek to study the impact of the podcasting efforts on the listeners, producers and educators, and the learning afforded by their participation. Some of the findings in each of these areas are described below.

Listeners

Participants, context and methods
The participants for this part of the study were from a convenience sample comprising both on- and off-campus students enrolled in an undergraduate IT subject, ITC204 User Interface Design and Evaluation, as well as its postgraduate version, ITC504 Interface Usability, in Autumn 2006 at CSU. The total student population size for the two subjects was 55. The two subjects 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 or fortnight. At the end of the 13-week semester, e-mail invitations were issued to the students to participate in an online survey, which was advertised as being completely voluntary and anonymous. At this time, a total of nine podcast episodes had been released. A subset of the data collected that is relevant to the present paper is presented below, namely the responses to the questions relating to uptake levels and educational value of the podcasts.

Results and discussion
23 students responded to the survey, representing a 42% response rate. The results of the survey were very encouraging. Uptake of the podcasts was excellent, as can be seen in Table 1. 82% of respondents reported that they had listened to seven or more of the nine available podcasts from start to finish, and many reported that they had listened to episodes multiple times. All respondents had downloaded at least two of the podcasts. In addition, respondents were generally in agreement that the podcasts were of educational value to them, and that they were beneficial to their understanding of the subject content (Table 2). They largely saw listening to the podcasts as a worthwhile activity and would recommend the podcasts to other students studying the subject.

Table 1: Responses to questions of the ITC204/504 end-of-semester podcasting survey that relate to uptake levels (*N*=23)

To date, how many of the 9 available podcasts have you…	**Mean**	**Median**	**Mode**	**Standard deviation**
Q2: Downloaded (whether or not you have listened to them)?	7.91	9.00	9.00	0.70
Q4a: Listened to from start to finish?	7.57	8.00	9.00	0.73
Q4b: Listened to in part only?	1.55	0.00	0.00	2.48
Q4c: Listened to multiple times?	3.05	3.00	3.00	1.18

Table 2: Responses to questions of the ITC204/504 end-of-semester podcasting survey that relate to educational value of the podcasts (*N*=23)

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:	**Mean**	**Standard deviation**
Q8b.I find listening to the podcasts educational.	6.04	0.35
Q8m Listening to the podcasts helps clarify and/or enhance my understanding of the subject.	5.87	0.43
Q8r I feel that listening to the podcasts is not a productive use of my time.	2.22	1.01
Q8s I would recommend that other students undertaking this subject listen to the podcasts.	5.95	0.53

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Question 9 of the survey was an open-ended question that asked respondents what knowledge and/or skills they learnt through listening to the podcasts (whether subject-related or otherwise). The responses were categorised and the results are summarised in Table 3.

Table 3: Responses to Question 9 of the ITC204/504 end-of-semester podcasting survey (*N*=23)

Q9: What knowledge and/or skills did you learn through listening to the podcasts (whether subject-related or otherwise)?	**N**	**%**
Category*		
Roadmap/direction for study/thinking; general hints/tips; progress check	6	26.09%
Exposure to podcasting technology	2	8.70%
Reinforcement/clarification of subject-related concepts; different mode and style of presentation of the same material	4	17.39%
Assignments – Clarification of requirements, assistance and/or feedback	9	39.13%
Other	1	4.35%
Not answered	7	30.43%

Note. * Categories are not mutually exclusive, i.e. each response may fall into multiple categories.

Many respondents found the podcasts especially useful for clarifying requirements and receiving general feedback in relation to the assignments – In fact issue spoke the loudest in the responses. For example:

> [The podcasts helped clarify] exact details about the assignments, [so that I could] focus my work on…[achieving]…exactly what the lecture[r]…[was]…expecting

Another resounding issue in the responses was that the podcasts were useful in supplementing the other resources, such as the textbook and subject outline, by providing reinforcement and clarification of important concepts. They served as a valuable study tool as they provided guidance and direction to the students, helping them make more efficient use of their time:

> I found that the…[podcasts]…were…[excellent]…in backing up info from the text. Although I can't say the…[podcasts]…allowed me to gain…[knowledge]…on the subject it did back up what I had learned in the text. Much like a phone call to the lecture[r] to see if I was progressing in the right direction.
>
> Bridges the learning gap between our perceptions of what we read and what is actually required…

Producers

The idea of having students as podcast producers fits into the "participation model of learning" (Sfard, 1998), as opposed to the "acquisition" model, whereby learning means becoming part of a community, through participation and contribution of learning resources. Students are creators and producers of knowledge, ideas and artefacts (Collis & Moonen, 2001). Having students from earlier cohorts of a subject teach or impart their knowledge and experiences to new students is consistent with the principles of peer tutoring or teaching (Brown & Campione, 1992; Beasley, 1997). Advocates of peer tutoring assert that it is a valuable exercise for both the tutors as well as the tutees, since it is a cost-effective way to provide academic support to the tutees, but also affords the tutors the experience of "learning by teaching". According to Topping (1996), the mere process of preparing to peer teach may enhance cognitive processing in the tutor, as it promotes attention to and motivation for the task, and calls for the tutor to revisit, re-organise and re-integrate existing knowledge. The act of tutoring itself involves further cognitive challenge as the tutor must simplify, clarify and exemplify.

The authors studied the following in relation to the producers:

- motivation for involvement in the project, given that their participation is not rewarded by remuneration or academic credit;
- benefits realised as a result of participation;

- learning outcomes attained by the producers (both generic skills and subject content);
- lessons learnt by the producers;
- recommendations on how to improve the experience.

Participants, context and methods
In March 2006, the five members of the producers team included three males and two females, aged 18 to 20, who were enrolled in the Bachelor of Information Technology and Bachelor of Business/Bachelor of Information Technology degree courses offered by CSU. These students expressed an interest in participating, following an announcement and brief overview of the project by their lecturer in class. It was made clear from the outset that their participation was strictly voluntary and non-assessable. The group initially met on a weekly basis, which was reduced to a frequency of once a fortnight as the semester progressed and their own study workload increased. The meetings were structured though relaxed, lasting for approximately one and a half hours each.

The producers brought to the group varying levels of knowledge and skill, and different sets of backgrounds and experiences. They were not provided with formal training, but rather were introduced to the script writing, editing and presentation process by means of examples. They gradually developed competence in the various facets of the process through undergoing a number of practice runs, with decreasing levels of guidance and "hand-holding", as well as through their interactions with one another.

Focus group interviewing was selected as the data collection method to elicit the views and experiences of the producers. A list of questions was developed to help guide the focus group. These questions were not intended to be followed to the letter, but instead were designed to assist the facilitator and participants by acting as a starting point to trigger or prompt discussion, as well as providing a broad focus to keep the conversation relatively on topic:

1 What are the major incentives / sources of motivation driving your interest in the project, especially given the fact that your participation is not rewarded through formal academic credit? Would you have preferred to have your involvement assessed and rewarded formally?
2 How did being involved in the scriptwriting, editing and presentation of the podcasts to support the topics in ITC*XXX* benefit you? What did you learn from a subject content point of view? How about other generic knowledge and skills (e.g. teamwork, interviewing skills, research skills)?
3 What lessons have you learnt from the project, which might form the basis of advice / recommendations for other educators and groups of producers pursuing similar projects?
4 Do you have any further suggestions on how to make this a really good experience for all those involved (producers, lecturers, listeners)?

The data analysis approach used was derived from Berelson's (1952) content analysis approach. In the case of the present study, the unit of analysis chosen was the sentence or phrase, i.e. sentences in which the producers expressed a view that contained explicit statements of their experience, which were clustered together as themes. A quantitative content analysis approach enabled the researchers to search for verbal indicators of the particular themes and variables as defined by the five aforementioned issues, namely: motivation for participation, benefits of involvement, skills developed, lessons learnt from the experience and suggestions for improvement.

The content analysis was conducted in four steps. A complete transcript was first made from the audio tape recording of the focus group discussions. To ensure anonymity, participants' real names were replaced with aliases during the transcription process. The next stage was to agree on a protocol for identifying and categorising the target variables, and training coders to use this protocol. In this case, two of the authors undertook the coding task. The transcripts, in the form of text files, were searched for indicators of the above themes, i.e. instances where students expressed a view that was clearly indicative of the variable being investigated. For example, in seeking indicators of motivational reasons for engaging in the podcasting exercise, certain keywords signalled motivational statements:

> I think one of my main incentives, well not so much incentive as more motivation, was to give back to the community and to the students coming along.

These instances were collated, classified and then counted. Following the coding, the coders' decisions were compared to establish interrater reliability. The final stage was to combine the results of the coding process and report on the incidence of the target variables.

Results and discussion
A total of 24 message units were found in the transcripts, relating to the five major variables being investigated. The content of the producers' responses is coded in Table 4, according to the major variables and the subcategories identified.

Table 4: Content features of the producer focus group discussions

Variable	Subcategories				Message unit count	%
Motivation	Community involvement (1)	Enjoy volunteering (1)	Learn podcasting skills (1)	Learning opportunity (1)	4	16.67
Benefits of involvement	Career in IT (1)	Subject matter and IT skills (1)	Learn podcasting skills (1)	Scriptwriting (1)	4	16.67
Skills developed	Research skills (1)	Being critical of others' work (2)	Teamwork (3)	Learning to communicate (2)	8	33.33
Lessons learnt	Need for presentation skills (1)	Importance of scheduling (1)	Awareness of script reading (1)	Editing (1)	4	16.67
Suggestions for improvement	Keep it short and sweet (1)	Target areas of interest to students (1)	Consider ethical issues (1)	Be creative, go beyond lecture content (1)	4	16.67
				Total:	24	100.0

Motivation to participate in the podcasting project as producers was characterised by a number of diverse responses. Motivational factors included desire for community involvement and volunteering, and to contribute to the learning of other students.

In terms of benefits afforded through participation, students reported that these were development of specialist IT and podcasting skills, career development, and scriptwriting.

Participants elaborated on the types of skills they valued most, which were generic rather than specialised in nature. About one third of comments made related to the development of generic attributes such as research skills, teamwork, the ability to critique others' work and learning to communicate. Student elaborations and utterances on these skills were the most salient feature of the transcripts.

Finally, in response to questions asked about what lessons were learnt as a result of their involvement, participants displayed high levels of meta-cognitive skill in being able to identify areas where they had skills deficits, i.e. oral presentation skills, scheduling, script reading and editing. Other findings related to how the experience could be improved, both for the participants themselves and for other students. The participants were aware of the need to keep podcasts short and focused, creative, closely aligned with the interests of listeners and not simply a reiteration of lecture content.

The results showed that the majority of message units (about 31%) were focused on the generic skills that students developed as a result of participating. If the variable "benefits of involvement" were combined with "skills developed", the results would show that 48% of utterances were related to advantages that students experienced as result of their participation. Overall, these results show that student involvement and engagement in the production of content for podcasts was a positive learning experience. The analysis of the focus group discussions demonstrated that producers reflected on the activity and viewed it as a form of experiential learning that yielded positive gains in terms of technical and generic skills.

Educators

This part of the project is very much a work in progress for which more substantive data needs to be collected. The ultimate aim is to develop a set of best practices for the design, development and distribution of the types of educational podcasts described earlier in the present paper. Anecdotally, the educators involved in the project report on having learnt the following through their experience:

- The length of the podcasts must not exceed the attention span of the listener and should therefore be given careful consideration. In this project, the authors have worked on the principle of 3 to 5 minute podcasts as this is roughly the length of a song. Further research must be carried out to ascertain the optimum length for different types of podcasts, and for different target audience groups.
- Choice of topics is of primary importance. Listeners (at least those involved in the project, i.e. university students) appear to value topics that are of an "applied" nature, i.e. that contain information they can take away and immediately use to optimise their study time (even if the concepts presented are theoretical), assist them in completing assignments, solve particular types of problems/exercises, etc. Dry or highly abstract topics may call for additional strategies to keep students engaged.
- Audio podcasts should not be used to convey information or explain concepts that are best presented visually. For example, the producers team abandoned a podcast script idea on XHTML coding because of the difficulty in explaining the intricacies of code aurally.
- The ability to produce high fidelity sound does not appear to be critical to the success of educational podcasts. Students tend to be quite tolerant in this regard, so long as the speech is sufficiently audible and clear. With this in mind, there is no need for sophisticated, studio-grade sound recording/editing hardware and software. To date, the project has relied solely on inexpensive, handheld computer microphones and free/open source software.
- Listeners generally are not concerned if the presenter of a podcast does not have a "radio announcer's voice". This having been said, contrast in pitch between voices can have a bearing on the ease of listening. For example, in a dialogue-based podcast it appears to be preferable to combine one higher pitched (male) and one lower pitched (female) voice.
- Listening to podcasts may not be an ideal method of learning for all groups of learners. For example, although substantive data is not available at this stage, in a postgraduate distance education cohort consisting of mature age, working professionals, the students appeared to favour text-based material in print or electronic (web-based) form. In fact, some even asked for transcripts of the podcasts to be supplied so they could avoid having to listen to them!
- Some students need coaxing to encourage them to create their own podcasts, as many prefer to take on a passive listening role, at least initially. This may be a function of the student's personality.
- In training producers, the technical aspects of podcasting are of secondary importance. The real challenge is in teaching them creativity.
- Using a pseudonym when presenting podcasts in order to keep the producers' real identities secret can remove inhibitions and encourage them to contribute more readily and freely.

The authors would like to make the following recommendations to other educators interested in undertaking similar educational podcasting endeavours:

- Keep podcasts short, lively and entertaining. Refrain from podcasting lengthy lectures/monologues.
- Podcasts should not be thought of as a replacement for classes, but rather as complementary to lectures. For example, pre-class podcasts can be used to whet students' learning appetites so that they come to class excited about the material. Such podcasts can also make for more effective use of class time, since students come to class with some background knowledge on the topic and are therefore better prepared to engage in discussions and collaborative learning activities.
- Refrain from duplicating content that is available elsewhere, such as lecture notes and textbooks, or that will be covered during class. If you must do this, simply summarise salient points and provide additional commentary/insight.
- Don't podcast just for the sake of it: consider its suitability for the subject/topic and target audience.
- Think of ways to use the technology to empower learners to generate their own ideas and content: take a step back and let the students do the thinking/talking!

- Provide adequate technical support so that students can focus their attention on learning, creativity and knowledge construction rather than troubleshooting the technology. Take steps to ensure that the technology does not become a distracter.
- Provide gradually decreasing levels of assistance to students as they learn how to produce their own podcasts. In the early stages you might supply students with a script or script outline to work with as a starting point. As they build experience and confidence, allow them to not only modify the scripts and improvise while presenting, but also to take the initiative to come up with their own ideas and scripts.
- Don't underestimate the importance of sound project management and planning, and emphasise this to your producers.

Conclusion and future work

The educational podcasting project at Charles Sturt University has been a valuable learning experience for the listeners, producers as well as the educators. The listeners responded favourably to the podcasts through their excellent uptake of and positive feedback about the educational value of the podcasts in providing assistance and feedback with their assignments, a roadmap/direction for their study, as well as clarification and reinforcement of key concepts. Placing a group of more experienced students in charge of producing a series of educational podcasts targeted at new or novice students appears to be a beneficial exercise for the producers that exhibits many principles similar to peer teaching.

Further data collection and analysis will need to be undertaken in relation to the educators. While the technology largely has a high level of social cachet amongst the students, who have little or no trouble using it, widespread adoption at an institutional or departmental level may face resistance, or at the very least, apprehension, from academics who may question if podcasting is really worth their time and effort. The authors believe that with the aid of the appropriate tools and resources, podcasting can be easily integrated into the professional practice of all tertiary teachers. They are currently working in partnership with academics from other schools and faculties within CSU, as well as with other institutions at both a university and high school level, to explore innovative new applications for their podcasting model and approach. Work is underway that will see the development of a resources kit incorporating technical guides or "HOWTO's" relating to educational podcasting, as well as a set of best practices for the design, development and distribution of educational podcasts.

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