A Strategy for Using Podcasts for Teaching and Learning in the Biosciences

Tim Barry
School of Sport, University of Cumbria

Grant Abt
Dept of Sport, Health & Exercise Science, University of Hull

Introduction

A 'podcast' is simply an on-demand media file that can be automatically downloaded from the web to a computer or portable media player, such as an iPod, for listening offline. The use of these portable devices are emerging as a major technology within e-learning (Fischer *et al.*, 2003). While the technology to create and publish on-demand media such as an audio MP3 file has been with us from the advent of the internet, the recognition and uses for podcasts within higher education are relatively new.

The popularity of podcasts has exploded over the last two years probably due to widespread availability of broadband and increasing access to the internet at home, with more than 100000 podcasts listed on the iTunes Store as of August 2007 (Apple, 2007b). Mainstream media such as the BBC now publish many of their radio shows as on-demand podcasts. The popularity of the iPod has certainly contributed to this, with over 100 million iPods sold since 2001 (Apple, 2007a). However, it is also the creation of podcasts that has become easier to achieve. Software such as Apple's GarageBand and other audio editors such as Audacity have made the process of recording and editing audio much easier, thereby allowing enthusiasts with access to the internet (including students and lecturers) to create and publish their own podcasts. With the advent of this new technology in teaching and learning a clear strategy is needed to enable the appropriate use of podcasts to maximise their potential.

This strategy aims to provide a guide to any tutor from the Biosciences wishing to embark on using podcasts on their courses. It will attempt to classify different types of podcasts and provide a simple framework to enable the educator to assess the suitability of using podcasts to enhance teaching and learning within their subject.

Podcast Toolkit

This toolkit is a model-based resource that should help structure the tutors' engagement with the new technology, allow for reflection on the theories of learning and support planning. Through answering a series of questions throughout the model (Figure 1) the tutor will be able to make secure judgements about the appropriateness of using podcasts to enhance learning.

The **prime motivator** for the use of podcasts within a course should be the achievement of the learning outcomes or specific objectives of a learning activity. A review of the current course structure and pedagogy will allow strengths and weaknesses to be identified. As a tutor you may wish to address a weakness with

the introduction of podcasts. By addressing the questions on the **pedagogical** and **technical** issues and relating these to **learning theory** the tutor will be in a much stronger position to assess whether the introduction of podcasts will help achieve the learning outcomes or objectives.

An early decision on what **type** of podcast you wish to make is needed. There have been a variety of podcasts used across the Higher Education sector and Table 1 differentiates between those that are either tutor or student initiated. This list is adapted from Nie's (2006) extensive description on the potential use of podcasts.

Table 1 – Different types of tutor and student initiated podcasts

Tutor Initiated Podcasts	**Student Initiated Podcasts**
Entire lectures	Reflections on an activity
Visiting lecturer	Summary of key idea/theory
Pre lecture material	Discussion between two or more students of a pertinent issue/idea/theory
Seminar discussion	Assignment work – presentation, field report or project
Supplementary topics that you may not have time to cover in the lecture	Interview a specialist in a specific field
Supplementary topics explaining difficult/complex areas of course	Interview other students
Authentic audio materials	Podcast to encourage peer evaluation
Feedback to students on assignments	
Summary of journal articles on a research topic	
Record interviews with specialists in a specific field	
Provide information for field trip activities	
Provide administrative information	
Interactive podcasts with tasks/questions and links to URL sites	
Provide pronunciation of technical language or relevant sounds (e.g. Korotkoff sounds when measuring blood pressure)	

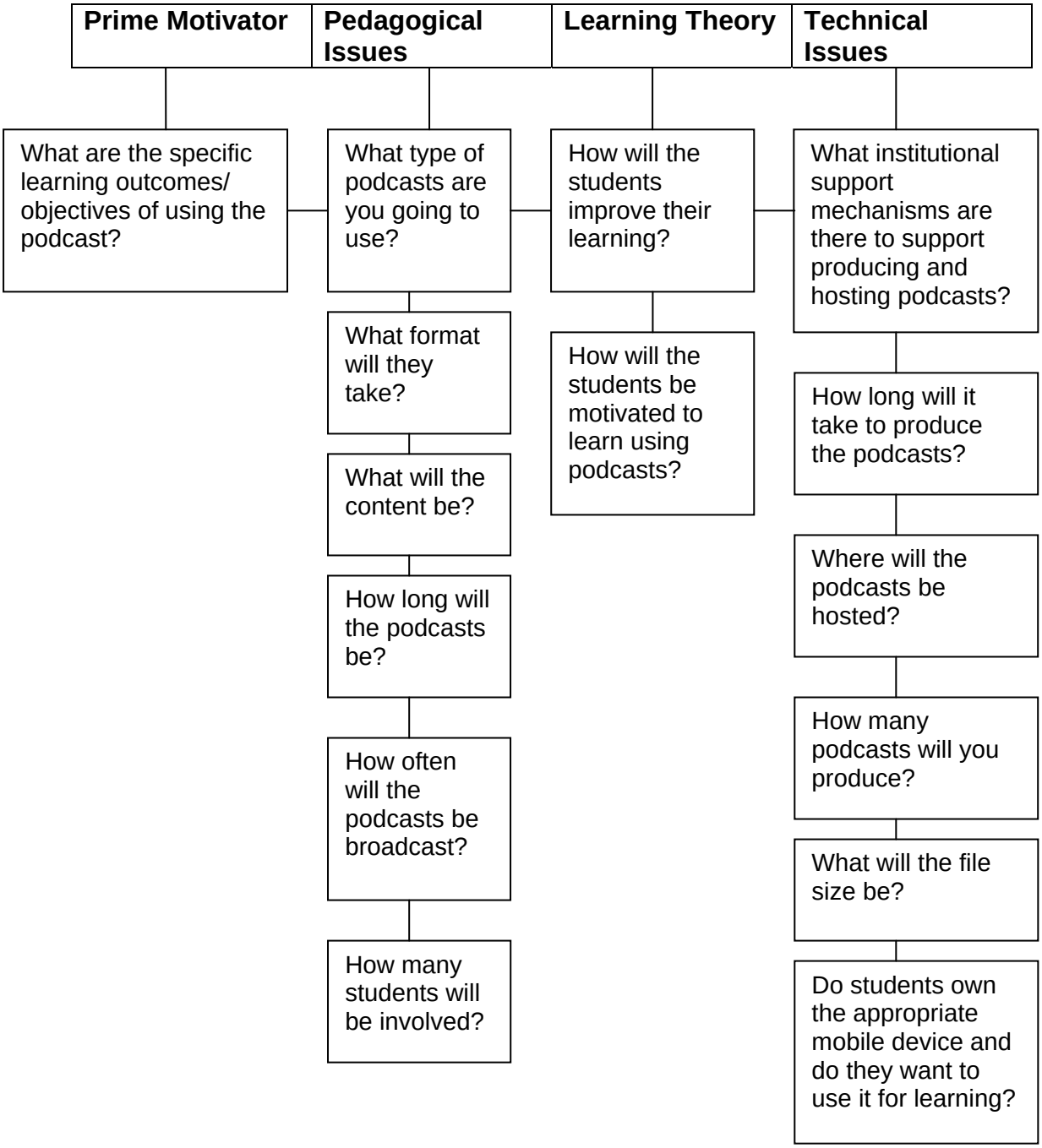

Figure 1 - Podcasting Model
This model poses a series of questions that the tutor should consider before embarking on using podcasting and the associated technology in their teaching and learning.

There are a variety of **formats** that can be used when producing a podcast. There is the simple *talk/radio monologue,* which requires variety in the pitch and inclination of the speaker. The listener should get the sense that they are being spoken to directly. The *dialogue* format can involve two or more presenters in a discussion which offers the listener variety compared to the single speaker. The *interview* takes the form of question and answer and offers the opportunity to talk to an expert in your area of study or allow students to question each other on a particular issue. With any of these formats it is helpful to have an outline script to guide the participants, which may avoid large amounts of editing at the end. A good podcast has a clear structure with an introduction outlining the content, the presenters and the aims followed by the main section. The conclusion should highlight the key points and introduce the main aim of the next podcast in the series. If you decide to produce a series of podcasts it is advisable to keep the structure the same throughout. Make it clear to the listeners when each podcast will be published. The **length** of the podcast depends on the aims and can vary from the full one-hour lecture to the three-minute interview. It must be remembered that the listener has to be engaged and maintaining their interest may influence the duration of the podcast.

Pedagogical issues cannot be decided in isolation without considering the **technological** demands of producing podcasts. As a tutor you will need to find out what institutional mechanisms exist to support the production of podcasts including copyright issues. Institutional virtual learning environments (VLE) or public domains such as iTunes can be used for hosting and /or distributing the podcasts. The web syndication protocol RSS allows the student to register for the first podcast in a series and then all subsequent productions will be automatically transmitted to the student's computer. The file size of a podcast can be large and may therefore have implications for the format and length you choose especially if your VLE has restrictions on file size.

The authors will decide the **content** of the podcasts but in doing so they should consider the device that their audience will use. If the majority of students own an MP3 player then the content should reflect the use of the aural medium by the learner. If more complex ideas need to be conveyed which require a visual aid then the 'enhanced' format can include pictures/slides or video to accompany the audio (AAC format). The tutor will need to check that students have access to software such as iTunes or mobile devices (iPods, PDA, mobile phone) that will display the visual material. More importantly it is essential to ascertain whether your students are willing to use their mobile devices for learning activities. A podcast lasting three minutes may take 1-2 hours to go through the design, production, editing and subscription process. As a tutor this time factor must be considered. Your institution may provide central services that can complete much of the technical work allowing you to focus on content and design of the format.

Linking **learning theory** with the decision to include podcasting into the teaching and learning activities will enable practice to reflect underpinning theory. Conole et al (2004) highlights the need to map the theory to the features of learning tools and resources in e-learning. Numerous models for learning have been proposed such as Kolb's experiential learning cycle (Kolb, 1984), Jarvis' model of reflection and learning (Jarvis, 1987) Laurillard's conversational framework (Laurillard, 2002) and Barnett's framework for higher education (Barnett, 1990). Naismith et al (2005)

explore six theory-based categories in their review of mobile technologies and learning (Behaviourist, Constructivist, Situated, Sociocultural, Informal and Lifelong Learning). Whichever model or theory gains favour with a tutor will often depend on the culture of the institution, the particular preferences of the tutor and the specific learning outcome required by the activity.

If a tutor favours a behaviourist approach and the need to learn through reinforcement, they may wish to record their lectures as podcasts to enable students to listen to them on more than one occasion. A tutor that prefers the sociocultural theory of learning may encourage students to produce their own podcasts in groups hoping that the collaborative nature of this task will enhance learning through communication. Most recent research literature confirms that students learn best if they are involved in the learning process and thus this may influence the tutor in deciding whether to produce the podcasts themselves or design activities that give the responsibility to the student. Atkinson (2006) believes that podcasting as a mere method of distribution of content is limited and that the real benefit to learning lies in the creation of podcasts allowing collaboration, team building and dialogue amongst learners.

Conclusion

Research has shown the benefits of podcasts include the ability to develop social networking and collaborative learning (Ractham and Zhang, 2006). Students can choose where and when they want to learn and those whose first language is not English may find podcasts particularly useful. Huann and Thong (2006) found that key skills including communication, time management, problem solving and critical thinking were developed during the production process. Research by Lane (2006) showed that podcasts improved the understanding of in class material.

However other researchers have highlighted the dangers of simply using podcasts because they are 'new.' Alexander and McKenzie (1998) stated that learning is unlikely to be improved by the mere application of a new technology. Indeed we have recently shown that students provided with podcasts did no better on an exam than students provided with the same material in written form (Abt and Barry, 2007). Kirkwood and Price (2005) report that students need to know not only *what* they are supposed to do, but *why* they are expected to do it and *how* it will enhance their learning if they are to engage with new mobile technologies. It is thus crucial for tutors who are preparing to include podcasts in their teaching to answer all the questions in the model provided (Figure 1) to ensure that the learning outcome desired is best achieved by the use of a podcast.

References

Abt, G., & Barry, T. (2007) The quantitative effect of students using podcasts in a first year undergraduate exercise physiology module. *Bioscience Education*, (In Review).

Alexander, S. & Mckenzie, J. (1998) An evaluation of information technology projects for university learning - executive summary. Available from http://www.dest.gov.au/archive/cutsd/publications/exsummary.html. [Accessed on 27 June 2007]

Apple (2007a) *100 Million iPods Sold* [online]. Apple Inc. Available from: http://www.apple.com/pr/library/2007/04/09ipod.html [Accessed 28 August 2007].

Apple (2007b) *Podcasts* [online]. Apple Inc. Available from: http://www.apple.com/itunes/store/podcasts.html [Accessed 31 August 2007].

Atkinson, R. (2006) Podcasting: Do you really need to know? *HERDSA News*, 282. 20-22

Barnett, R. (1990) *The idea of education*. Buckingham Open University Press.

Campbell, G. (2005) There's something in the air: podcasting in education. *Educause Review,* **40,** 33-46

Conole, G., Dyke, M., Oliver, M. & Seale, J. (2004) Mapping pedagogy and tools for effective learning design*. Computers and Education*, **43**, 17-33

Fischer, S., Stewart, T.E., Mehta, S., Wax, R. & Lapinsky, S.E. (2003) Handheld computing in medicine. *American Medical Informatics Association,* **10,** 139-149

Huann, T. Y., and Thong, M.K. (2006) Audioblogging and Podcasting in Education. *Edublog.net* Available from: http://edublog.net/astinus/mt/files/docs/Literature%20Review%20on%20audioblogging%20and%20podcasting.pdf [Accessed 28 August 2007]

IMPALA (2006) A model of podcasting. *IMPALA project*. Available from: http://www.impala.ac.uk/outputs/model.html [Accessed 20 July 2007]

Jarvis (1987) *Adult learning in the social context*. London: Croom Helm

Kelly, B. (2005) RSS - more than just news feeds. *New Review of Information Networking,* **11,** 219-227

Kirkwood, A. & Price, L. (2005) Learners and learning in the twenty-first century: what do we know about students' attitude towards and experiences of information and communication technologies that will help us design courses? *Studies in Higher Education,* **30,** 257-274

Kolb, D. (1984) *Experiential learning: experience as the source of learning and development*. Englewood Cliffs, NJ: prentice Hall.

Lane, C. (2006) *UW Podcasting: Evaluation of Year One* [online]. University of Washington. Available from: http://catalyst.washington.edu/research_development/papers/2006/podcasting_year1.pdf

Laurillard, D. (2002) *Rethinking university teaching: A conversational framework for the effective use of learning technologies*. 2nd Edition. London: Routledge

Naismith, L., Lonsdale, P., Vavoula, G., Sharples, M. (2004) Literature review in mobile technologies and learning. *Futurelab.* Available from: http://www.futurelab.org.uk/resources/publications_reports_articles/literature_reviews/Literature_Review203/ (Accessed 26 August 2007)

Nie, M. (2006) The potential use of mobile/handheld devices, audio/podcasting material in higher education – a draft review. *IMPALA project* . Available from: http://www.impala.ac.uk/outputs/resources.html [Accessed 20 July 2007]

Rachtham, P. and Zhang, X. (2006) Podcasting in academia – a new knowledge management paradigm within academic settings. *SIGMIS-CPR'06*, April 13-15