Introduction
Podcasting is a new technology filtering into education from its original uses in entertainment, journalism and personal broadcasting. Students’ learning supported by specially produced podcasts, which we call ‘profcasts’, differs from their learning through structured campus or other e-learning processes. This chapter describes a recent pilot study of integrating weekly profcasts in a blended learning environment at a UK University and suggests guidelines for profcasting in such a setting. Following a literature review on the use of audio technologies in education and, more recently mobile learning technologies, the chapter introduces the pilot study and its results. It discusses the findings in relation to two main questions: How does students’ learning supported by podcasting differ from their learning through structured campus or e-learning processes? What are the issues in relation to switching from using MP3 players for entertainment to learning? The chapter proposes guidelines for integrating profcasts within a blended learning environment, for testing with larger numbers of staff, students and disciplines. Finally, it sketches further research on podcasts for learning being carried out under the IMPALA (Informal Mobile Podcasting And Learning Adaptation) project based at the University of Leicester.

The background
The study arose from our interest in digital audio loaded onto students’ own mobile devices, especially MP3 players such as iPods, which offer platforms for a variety of services with potential impact on learning and teaching in HE. Widespread penetration of broadband internet connections, increasing personal ownership of MP3 players and freely available and easy to use software and internet tools all work in favour of greater use of ‘personal broadcasting’ for content delivery and student engagement (EDUCAUSE, 2006).

Podcasting and MP3 players are new to education, yet already widely used by students for entertainment. The academic community is showing a strong interest in podcasting, with at least 20 experiments running in the UK already. We feel that research-based pedagogical models are urgently needed for academics to use in supporting and enhancing students’ motivation and learning through podcasting, or, as we call it, ‘profcasting’.

Research into students’ experience of podcasting is in its early stages. Few studies exist of the impact on students’ learning of the newest learning technologies (Littlejohn, 2004). Literature on podcasting is limited to descriptions of small projects and positive but informal accounts of user satisfaction in small trials. Issues in using podcasting in formal higher education await examination. Chan and Lee’s (2005) pilot study of podcasts for 28 Australian undergraduates shows that informal short audio clips help address students’ anxieties and concerns about the course and assessment, while Clark and Walsh (2004) suggest that podcasts offer a flexible medium, with portability and social acceptance of use in public settings. Chinnery (2006) uses podcasts to bring an authentic cultural experience to students’ learning of foreign languages.
The core content medium in podcasting is audio, not new to education. Durbridge (1984) identified audio’s educational advantages as its ability to influence cognition through clarity of instructions, and emotional aspects of learning by conveying immediacy and a connection with the teacher (see also Bates, 1981; Laaser, 1986; Power, 1990; and Kates, 1998). Tutor-initiated audio embedded into email messages yielded increased student participation in group activities, and added a sense of online community and satisfaction with the overall learning experience (Woods and Keeler, 2001).

Evaluation of learners’ engagement in large scale mobile learning experiments (‘MOBILearn’; JISC, 2005) has drawn researchers’ attention to unique experiences that these environments can offer. The pedagogical potential of mobile learning technologies include: support of learning activities (Sharples, 2001), catering to specific needs and cognitive abilities of diverse learners (Kukulska-Hulme and Traxler, 2005; JISC, 2005), providing situated and authentic learning experiences (Sariola and Rionka, 2003) and offering a personalised learning experience (Plant, 2001). Taylor et al (2006), McAndrew, Taylor and Clow (forthcoming) and Scanlon, Jones and Waycott (2005) emphasise that the capabilities of mobile devices combined with their advantages to a learner on the move can create opportunities for learning activities impossible in conventional learning environments or through other learning technologies. Sharples (2000) proposes that PDAs can provide the learner with flexibility and freedom to learn from any location as well as tools to engage in lifelong learning.

The profcasting pilot study

Our pilot study was within a UK research project entitled Informal Mobile Podcasting And Learning Adaptation (IMPALA, www.impala.ac.uk). IMPALA will deliver a testable and transferable pedagogical model of podcasting for student learning in HE.

The pilot study took place at the University of Leicester in 2006, over one semester of 12 study weeks in an undergraduate module in Electrical Engineering called Optical Fibre Communication Systems. Thirty 2nd and 3rd year campus-based students studied the module online, using Blackboard VLE. The professor began weekly podcasts to supplement his online teaching through updated information and guidance on the weekly activities, and to motivate his students by incorporating relevant news items and a fun item such as a joke. The podcasts complemented e-tivities (structured online group activities) based on Salmon’s (2000, 2002) 5-stage scaffolding model by providing summaries and further guidance to students. Each podcast appeared on the VLE at the beginning of the study week, for 9 consecutive weeks.

The podcasts were about 10-minurtes long and the format was:

1. an introductory news item
2. the main content section typically referring and extending this week’s work and referring to last week’s
3. lighter weight but fibre optics related items, e.g., a joke at the end, or rap.

The impact of the profcasting was studied through both qualitative and quantitative data collection methods. Qualitative methods included personal interviews with six students and the module tutor. Student interviews, lasted about an hour, were conducted using a semi-structured interview schedule developed to explore how student learning is supported by podcasts and students’ preparedness for using personal entertainment devices for learning. Interviews with the tutor were informal and were conducted a number of times over the course of the semester by email, telephone and during personal conversations. The focus of
these interviews was to obtain information related to the pedagogical rationale for each podcast and the integrating podcasts with e-tivities, online lectures, assignments and other learning resources. Formally conducted interviews were recorded on tape and transcribed verbatim for analysis to identify key themes and issues.

Quantitative data were collected through an end-of-semester evaluation questionnaire developed to identify students’ access to technologies for listening to podcasts, pattern of listening, reasons for not listening, perceived pedagogical benefits of listening to podcasts and their recommendations for podcasts. The questionnaire was administered through the VLE and 24 students completed the questionnaire. The data were analysed using basic descriptive methods using Excel to derive percentages and numbers for each item on the questionnaire.

Additionally, threaded discussions on Blackboard and the personal reflections of the authors (of this chapter) as e-moderators of the module also contributed to the analysis. Questionnaires, interviews and the content on the threaded discussions were helpful in exploring student experience of learning from podcasts, their perceptions of how these contributed to learning and issues related to using their personal MP3 players to listen to academic material.

Results and discussion

Access to podcasts

The students indicated they owned or had access to at least one MP3 player or other suitable playback facility (see Table 1).

<table>
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<tr>
<th></th>
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<tbody>
<tr>
<td>None</td>
<td>2</td>
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<tr>
<td>An iPod</td>
<td>3</td>
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<tr>
<td>A mobile phone</td>
<td>4</td>
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<tr>
<td>An MP3 player</td>
<td>3</td>
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<tr>
<td>An iPod, an MP3 player and a mobile</td>
<td>1</td>
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<tr>
<td>A laptop</td>
<td>6</td>
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<tr>
<td>An iPod and a laptop</td>
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<tr>
<td>An MP3 player and a laptop</td>
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<td>An MP3 player, a mobile and a laptop</td>
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The varying degree of size, portability and ease with which MP3 files can be accessed can have a bearing on students’ potential use of learning material in the form of MP3 files.

Pattern and location of listening

Most students (58%) listened to 6 or more podcasts; 32% had listened to the podcasts on the first or second day. The content was more relevant if they listened early in the week. Most said they listened while not engaged with any other learning activities; this demonstrated the podcasts’ potential to reach students on the move.

Most (55%) listened to podcasts off campus, indicating a potential for making academic content available for listening beyond the formal institution. Of the 16 who accessed podcasts on the university campus, 5 used a wireless network.
Of the 21 students who indicated that they had listened to podcasts regularly, 20% said they saved to an MP3 player and 28% to their laptop, to listen to later. The reasons for not downloading varied: one had a technical difficulty; 4 said that listening once was adequate, and 8 students pointed out they could access the module and podcasts anytime anywhere. Only 3 students said they preferred to use their MP3 players for music only; possibly space in the players’ memory was the key issue and/or a reluctance to upgrade.

**How did profcasts help student learning?**

The questionnaire asked students to select the most important aspect of learning through profcasts. Based on the number of responses, four items on the questionnaire (aspect of learning) ranked highest:

- Podcasts provided a good introduction to online learning material
- Podcasts helped me to organise my weekly learning activities
- Podcasts helped me to stay focused on the course
- Podcasts provided a sense of informality

Six items on the questionnaires (listed below) were ranked low by the sample of students on the pilot study module.

- to use time effectively
- to understand more about e-tivities
- by providing a summary of e-tivities
- to stimulate my interest in the subject
- motivational
- helped with assessed work (assignments, exams)

Students’ responses show that podcasts were helpful in supporting many organisational and affective aspects of learning. Students were carrying out most of their learning and studying tasks online, most of the time independently. Podcasts offering organisational and affective support were seen as particularly helpful for their learning and completion of the module.

**Organising learning and studying**

Students reported how podcasts helped them to organise their weekly learning activities. One student said podcasts ‘gave focus for the week’s work.’ Through podcasts he identified which sections to concentrate on in on-line lectures during that week.

Advice on the time needed for each section helped students studying online, as identified by a second student:

> First I went to the group discussion and I saw what was going on. And I went straight to the [online] lecture because we are supposed to finish learning unit 2 before next week for the test. So my target is to finish it. The professor said we should dedicate 6 hours a week to reading. So Saturdays and Sundays and I do them as long as it takes.

A third student pointed out how podcasts had helped one of his peers:

> It was really helpful to him because … the stuff that he couldn’t understand he got off the podcast before he went back to his notes to study them.
Podcasts also persuaded students to log on to the module regularly, almost like tuning into a weekly radio programme.

By being a weekly thing it gets you to log on just out of interest. Because of the format of it, it’s intriguing to see what jokes are going to come up this week!

**Positive attitudes towards the professor**

Students gave their initial reactions to the profcasts, from which they gained a positive picture of their professor, whom they met only occasionally face-to-face. Such emotional engagement is beneficial for student learning.

I told to myself that this is a great professor. Some stuff he tells us on there, for example he talks about the activities of the week, from the newspapers, which is great, I enjoy that. … . And the joke at the end and then there is a competition on the joke!

**Sense of informality in learning**

Some students highlighted a sense of informality that podcasts bring to their online learning. One student said that podcasts were:

… more informal, different, not serious, sitting down with a pen ready to take notes and not worrying about missing an important point.

The informality was brought about by adding current news (about fibre optics) and humour to the podcasts. It stimulated students’ interest in fibre optics: one student commented that adding a news item helped them to look at the subject from a different perspective.

… it is not just restricted to optical fibres you do get to hear about stuff that is going on around you.

**Support for independent and online learning**

Most students said that learning online requires particular skills and they had to be disciplined about logging into the module regularly to carry out the required learning activities. As one student put it: ‘it is one kind of skill to get on with online work and testing and learning online.’

Another student described acquiring such skills:

I am new to it so it took me quite a while to get about it. … . I started off only two weeks before the assignment and then I realised that I cannot do that; I have to be clear on the schedule. My first assignment was done very haphazardly.

Judging by the experience of students who listened to them, podcasts can provide structure and be an organisational tool for online learners. Podcasts can motivate them too.

Students on the module supported by pilot profcasts were carrying out much of their learning activities individually and online; there are similarities between their context of learning and those of distance learners, highlighted by Clevelland-Inns and Garrison (in this volume). Podcasts have the potential to improve the cognitive and teaching presence to support learning, while improving students organisational and online learning skills. Podcasts can be a useful addition to the range of distance and e-learning tools identified by Aczel et al (in this volume).
Deeper engagement with learning material and a deeper understanding

Our pilot study students were used to learning from online lectures (10-15 minute audio files with text and visuals, all on the same screen) in Electrical Engineering. They accessed online lecturers from a university computer, a wireless-enabled laptop or a computer at their residence. Their experience of online lectures enabled them to see benefits of having lectures as podcasts:

… the best thing about it is that you have the ability to keep repeating your lectures and every time you listen to a lecture you get another piece of detail that you didn’t get the first time round, which is a great way really.

Being able to listen to a lecture again and testing his understanding of the subject matter was helpful, according to another student:

I listen [to an online lecture] about three times …. Fist time I go over it … I will be doing a quiz. After the quiz if I didn’t get something right … the feed back says ‘go back to that unit’, so I go through it [again] and if I have time I try as much as possible to revise…. . It gives me the flexibility. … So by the time I have finished the lecture I have actually really understood the lecture.

This student said he spent about an hour studying a 10-minute online lecture.

Flexibility for young people’s mobile life style

Two students talked about the flexibility, if lectures were to be made available as podcasts, because their life-style involves much travelling and involvement in outdoor activities. For them the availability of learning material as downloadable audio files would enable them to learn on the move. One said:

… it is mobile. If I need to travel, [e.g..] to go somewhere for the weekend, and I wanted to revise, that won’t stop me going wherever I want to go. I am with a society involved in outdoor activities, so I can load some of it and listen to it when I am hiking. It makes a bit of a change.

… whenever I am on the move, on the bus or anywhere I [can] play it instead of playing the music. … if I am really behind or really need to catch up …. . I travel a lot so I can still travel and learn at the same time.

A second student illustrated how he could benefit by having his learning material available as audio files, especially before his exams that were scheduled soon after Christmas holidays:

… during the break I normally go back home (overseas) and I travel a lot every week and I carry my books and my computers, all the learning materials. It would be good if [when I am away] I can take the lectures on my phone or the MP3. …. . Most of the time I travel alone and I drive alone and I get tired of the music so it will be silent. So it will be good if I have that sort of thing.

Podcasts can make online lectures available: this aspect will be investigated further in IMPALA project.

Moving from entertainment to learning

One student felt that although he was willing to use his MP3 player for learning as well as entertainment, he needed to be static for the first time of listening so as to be able to take notes. He doubted he could walk and listen effectively! A second student said his attention is
focused differently when listening to music and to formal educational material. Music, for this student, is something played in the background when he is engaged in other work.

The mode of listening to educational material should be different:

So it’s better if I can actually sit down and have it as work as opposed to kind of multi-tasking with it.

This was an astute comment which recognised that integration of podcasts with other activities and resources in the online course is important.

These two students’ views illustrate the difficulty of switching to using for learning a music player designed for entertainment. While they appreciated the flexibility offered by the device to access and use learning material while they are mobile, their perception of academic material as different from music has a bearing on the eventual use. For both students academic material requires serious engagement such as taking notes, not easy on the move.

The podcast design enabled some students to listen to them while doing something else that didn’t require much focus and attention. However, one student pointed out that he still prefers ‘to sit down and listen to it and move on to the lectures.’

Students commented on the length of academic material in podcasts: most preferred not more than 10 minutes. They pointed out the length of a music track as a comparison, but one student looked at the different purpose of academic material, saying that in listening to it:

… you are trying to absorb information, [it is] like a lecture so it’s different from music. With music you are seated down and you are enjoying it, so the same beat for a long time would bore you. But [a lecture as a podcast], you are not listening to the same beat. You listen to different material every other time.

A second student identified a further distinction between music and academic material on an MP3 player. Music tracks, each of about 4-5 minutes, change frequently:

… the lectures are different, it is a lot of information. When you listen to the podcasts you want to listen to the main points, you want to write them down.

Data from student interviews reveal a variety of issues related to switching from entertainment to learning. To summarise, some students need to be static for listening to academic material, despite using a mobile device such as an iPod, to be able to pay attention to the content. Concentration is required for listening to academic material compared with music aimed at entertainment. Further study is needed to understand how podcasts can be designed and developed for wider use by students.

**Guidelines for profcasting**

Our pilot study highlighted how profcasting contributed to student learning: supporting organisational aspects of learning; developing positive attitudes towards the lecturer, bringing in an informality and fun to formal learning; helping with independent learning; enabling deep engagement with learning material; enabling access while being mobile. The study also emphasised that listening to educational material is different from listening for entertainment; podcasts must therefore be integrated with other learning activities so that students recognise the relevance and the value of listening to podcasts.

Based on this pilot study we propose the following guidelines for developing profcasts:
integrate podcasts into the course with strong links to other learning activities and resources, especially if they encourage active learning and/or collaboration with others.

2. record them afresh each week and include up to date news and feedback.

3. make them partly reusable and recyclable by some sections not being dependent on news or feedback from that week.

4. make sure that the file sizes are small enough so that they are easily downloadable onto any mobile device offering MP3 playback as well as tethered computers.

5. follow a ‘radio magazine’ style rather than a lecture. Make sure that the podcast is not too long for listening.

We also propose a framework for developing profcasts (Table 2).

Table 2: A proposed profcast development framework

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<thead>
<tr>
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<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>News</td>
<td>Feedback</td>
<td>Feedforward</td>
<td>Fun finish</td>
</tr>
<tr>
<td>1 minute</td>
<td>2-3 minutes</td>
<td>2-3 minutes</td>
<td>2-3 minutes</td>
<td>2-3 minutes</td>
</tr>
<tr>
<td>Welcome, introduction to speaker(s)</td>
<td>Mention of course-related or applied issues ‘in the news this week’</td>
<td>Brief feedback from the work last week, congratulations on achievements, comments on assignments, pointers to help</td>
<td>Reminder of work this week, linking to other aspects of the online work</td>
<td>Related joke, rap, song, story or other humour</td>
</tr>
</tbody>
</table>

We invite readers to experiment with this framework and report back on the IMPALA blog at http://www2.le.ac.uk/projects/impala.

Further research

The findings reported in this chapter are part of the IMPALA research project funded for 2006-07 by the UK Higher Education Academy. The pilot study surfaced the following specific research questions for further investigation:

- How does students’ learning supported by podcasting differ from their learning through structured campus or e-learning processes? For example, does podcasting assist with student motivation? Is their learning more flexible, easier or successful?

- What kinds of pedagogical applications can be developed for podcasting through MP3 players, for students’ informal use within formal HE modules, that enhance their learning?

- Can students switch from using MP3 players for entertainment to learning?
• What are the psychological, social and institutional barriers to and advantages of more informal learning using podcasting?

The IMPALA project examines how student learning can be supported by podcasts across a much wider range of students, disciplines and institutional contexts. The disciplinary contexts include Chemistry, Engineering, English Language, Human Geography, Physical Geography, Genetics, Media and Communication, Physics, Sociology, and Veterinary Sciences involving five UK universities. To date, a range of approaches to using podcasts within the IMPALA project has emerged:

• as a teaching and learning strategy in modules populated by large numbers (200+) of students
• to provide audio-visual fieldwork guides: to explore geomorphological features, natural habitat, landscape
• to provide audio-visual laboratory work guides: instruments, techniques, software, data analysis
• to bring topical issues on the environment, sustainability and development, and informal content (local community voices and subject experts’) into the formal curriculum
• to encourage student collaboration and active learning through student-created ‘digital story telling’
• as extensions to lectures: summaries, additional learning resources, further reading and research
• to build confidence in subjects such as Mathematics
• to support workshops in scientific subjects such as Chemistry
• to develop students’ study skills during the first year at university
• to support online learning of campus-based students

By evaluating student experience of using podcasts and staff experience of developing and implementing podcasts, in specific disciplinary and institutional contexts, IMPALA will deliver pedagogical models for integrating podcasts in higher education. The project website and the blog at http://www.impala.ac.uk provide useful resources and findings for researchers and practitioners interested in podcasting in higher education.

References

Aczel et al (in this volume).

Cleveland-Inns and Garrison (in this volume).


