

Impact of Podcasts in Teacher Education: from consumers to producers

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Abstract: Podcasts are being used in higher education, particularly in blended-learning or in distance learning. Studies in different universities have reported its use with different purposes. The research described in this paper reports to a study conducted in Portugal in three courses, one of a teaching program of Biology and the other two of Educational Master programs. The students (n=82) liked the podcasts and showed to be receptive to have podcasts in other courses. The undergraduate students only listened to podcasts. The Master students created their own podcasts to get familiar with them and to understand how easy it is to create them. They mentioned that they realized the importance of its use in learning.

Introduction

Podcasts are digital media files (audio and video) that can be subscribed to and downloaded by listeners via RSS (Really Simple Syndication). The RSS technology enables to identify and download new entries automatically to an aggregator program, enabling automatic download of new podcasts once listeners have subscribed to the “feed” source (Abulencia, 2006; Frydenberg, 2006; Richardson, 2006; Kaplan-Leiserson, 2005). Once subscribed to a site for automatic download every newly MP3 file made available can be received and played directly on the computer or loaded onto a portable player such as MP3, mobile phone or PDA. It is also possible to podcast video. Podcasting is the method of distributing multimedia files over the Internet. The term podcasting results from the combination of two words: *iPod*, the popular digital music player from Apple, and *broadcasting*. We agree with Geoghegan and Klass (2005) point of view: “podcasting is not simply a new way to distribute audio recordings; it is a form of expression, of interaction, of community building” (p. 5).

Due to its facility in editing and distributing, what started as a radio-style show over the Internet rapidly evolved to different uses (Richardson, 2006) and education is no exception. Principals can periodically record messages to community or teachers or even students, supervisors can record descriptions of their departments, language teachers can record and publish daily practice lessons that students can listen to at home or may download to their MP3 players, students can do oral histories, seminars or interviews, and the possibilities extend far from these few examples indicated by Richardson (2006).

In this paper we used podcasts in our Teaching and Educational Master programs to support students learning. As our graduate students were teachers we invited them to create their own podcasts to report their learning, an event or a reflection about a subject they were interested in. During the Master courses in ICT (Information and Communication Technology) students were introduced to the Web 2.0 facilities and instigated to use its tools to share their points of view. “That’s what the Read/ Write Web is all about: being able to share what you create with others” (Richardson, 2006, p. 118).

Podcasts in higher education

There is an increase of podcasts use in higher education with different purposes (Evans, 2007; Guertin *et al.*, 2007; Lee & Chan, 2007; Salmon *et al.*, 2007; Abulencia, 2006; Boulos *et al.*, 2006; Frydenberg, 2006) such as lectures, orientation material, conferences, language learning, project demonstration, instructions to research papers. The most common use of podcast is to record classroom lectures, but is not the most interesting podcast type.

Godwin-Jones (2005) used podcasts in language learning for “vocabulary revision, listening exercises, and interviewing with native speakers” (p. 11). Lee and Chan (2007) reported its use with distance learners to reduce the

effects of isolation and to promote inclusivity. According to these authors the emphasis should not be on recording full-length lectures or teaching complex concepts, but instead on maximizing interest and appeal to students, as well as promoting ease of listening. They developed a study at the University of Charles Sturt in Australia where they used podcasts to maximize interest and appeal to undergraduate and postgraduate students, both on *campus* and distance education. The podcasts were structured as talkback radio-style segments of 3 to 5 minutes long. The material contained in podcasts was supplementary in nature and not directly examinable. A new episode was released every week, over nine weeks. Students found the length, format, style, and the topics of the podcast suited to their needs and preferences.

In the year 2006/ 2007 in United Kingdom, ten case-studies were conducted in five universities in the IMPALA project (Salmon *et al.*, 2007). Eight courses applied podcasts, namely: Optical Fiber Communication, Chemistry, and Genetics at Leicester University; English Language and Communication, and Physical Geography at Kingston University; Geography and Environmental Studies at Gloucestershire University; Veterinary Sciences at Royal Veterinary College; and Physical Geography at Nottingham University. All podcasts were audio files except at Nottingham University and at Royal Veterinary College. In the first case they used video files about theories and GIS software, and in Veterinary Sciences they created podcasts about head structures and dissections of that body part. In the Genetics course the podcasts were produced by students and they were about ethical issues surrounding genetics. Most of the podcasts had 10 minutes long.

Kaplan-Leiserson (2005) said that “listening to digital audio content won’t replace reading, listening to live presentations, or the multitude of other ways learners take in information, but it can augment those methods”. Moreover, students like to hear their lecturers’ voice (Carvalho *et al.*, 2008; Salmon *et al.*, 2007; Richardson, 2006; Durbridge, 1984). Durbridge (1984) also emphasises the pedagogical advantages of audio over printed media, stating that the spoken word can influence both cognition (adding clarity and meaning) and motivation (by conveying directly a sense of the person creating those words). Voice is personal and the frequencies of the human voice allow us to communicate due to the “ability to adjust intonation, inflexion, phrasing, pacing, volume, loudness and timbre” (Power, 1990 in Lee & Chan, 2007, p. 87). Podcasts help in establishing social presence (So & Brush, 2008; Seitzinger, 2006), which is important in online learning, and they help to improve teacher-student relationships (Salmon *et al.*, 2007).

Podcasts Length

The podcasts length depends on its purpose and content. The Scottish Council for Educational Technology (1994) reports that audio is a powerful medium for conveying feelings, attitudes and atmosphere. It is less good at conveying detail and facts after listening to 30 minutes, but it is still useful to remember general opinions and arguments.

General recommendations indicate shorter than long podcasts (Chan *et al.*, 2006; Geoghegan & Klass, 2005). Cebeci and Tekdal (2006) recommended a length not longer than 15 minutes, because long podcasts generally result in loss of attention in listening and a subsequent decrease in comprehension. Lee and Chang (2007) created podcasts of 3 to 5 minutes in a radio style. Abt and Barry (2007) also used a radio style and podcasts ranged in duration from 5 to 14 minutes. In the IMPALA project most of the podcasts lasted 10 minutes (Salmon *et al.*, 2007). Chan *et al.* (2006, p.118) advise to “keep podcasts short, lively and entertaining”, an idea shared by other authors (Hendron, 2008, Geoghegan & Klass, 2005).

Podcasts Type

Kaplan- Leiserson (2005) considered seven uses of podcasts that can contribute to the learning process:

- a) *Assist auditory learners* – podcasts are appropriate for learners who prefer to take in information aurally. Some lecturers record their classroom lectures to help audio learners retaining the covered information.
- b) *Provide another channel for material review* - the audio files can be reviewed at leisure time for understanding or before testing. Students considered that listening to the recorded classroom lectures was a strength of the course.
- c) *Assist non-native speakers* – it is an opportunity for them to review recordings as many times as necessary for understanding. Podcasting can also be an excellent technology for learning a language, and for capturing students’ speech and pronunciation.
- d) *Provide feedback to learners* – “a professor’s voice adds to the feedback” pointed out Margaret Maag, an assistant professor that recorded a 3 to 4 minutes feedback on her students’ group presentations.

- e) *Enable instructors to review training or lectures.*
- f) *Replace full classroom or online sessions when content simply requires delivery* – learners may access it whenever and wherever they want.
- g) *Provide supplementary content or be part of a blended solution.* The material may be available for access on a voluntary basis, or it may be a required component of a classroom or online course.

Gribbins (2007) mentioned the use of podcasts to share announcements, describe homework assignments, and distribute lectures to students. Calder (2006) described short snapshots on a particular topic, key point summaries of a lecture or group of lectures. Nathan and Chan (2007) created podcasts in the form of discussions between the subject matter expert and a student on various issues of Business Strategy subject. Todd (2007) stressed a wide variety of podcasts contents: textbook study guidelines, mobile language lessons, interviews, news reports, stories and simulation experiences. Evans (2007) conducted a study about the podcasts as a revision tool used by learners. In the IMPALA project (Salmon *et al.*, 2007), different types of podcasts were created, for example to: “integrate podcasts with other online learning activities, develop students’ study skills through collaborative learning, as extensions to lectures (e.g. summary lectures, podcast lectures), provide extra learning resource by bringing topic issues, support student field work (e.g. record field work, provide instructions and location-based information), provide guidance on student practical work (e.g. a visual guide on how to use software), transfer museum specimens into 3D video podcasts to show structures/ tissues of different systems, and student-developed podcast to promote active, independent and collaborative learning” (p. 33). We may conclude that podcasts type possibilities are endless.

Research

The research reported describes a study conducted at University of Minho, in Braga – Portugal, during 2007/ 2008. It focused on the use of podcasts and its implications in learning in higher education and it was performed by two lecturers with their undergraduate and master students from different courses. The aims of the research were:

- to explore podcasts possibilities in different teaching/ learning contexts;
- to identify the technologies used to listen to the podcasts;
- to analyze students’ reactions to podcasts’ characteristics, namely type and length;
- to analyze lecturers’ reactions to the use of podcasts in teaching.

Several podcasts of different type and length were created in each of the courses enrolled in this study: Heredity and Evolution (HE; Applied Biology undergraduate Program), Multimedia Systems (MS; Master in Educational Technology) and Educational Multimedia (EM, Master in Pedagogical Supervision).

Data collection instruments

To collect data, two questionnaires were developed. The first - named Digital Literacy Questionnaire (DLQ) - was filled in by students at the beginning of each course and was set to characterize students’ knowledge about Web 2.0 tools and use of mobile technology. The second questionnaire - an Opinion Questionnaire (OQ) – was designed to inquire students’ reactions to the use of podcasts and was filled in at the end of the semester. Based on their answers some students and lecturers were interviewed.

Sample characterization

The study involved 47 undergraduate and 35 graduated students (Table 1). All of them were enrolled in teaching program or in Educational Masters. The Master students were teachers. A total of 17 podcasts were created: four on Heredity and Evolution, four on Multimedia Systems and nine on Educational Multimedia.

Degree	Semester	Program	Courses	Number of podcasts created	Number of students	Gender	
						Female	Male
Undergraduate	1st	Applied Biology	Heredity and Evolution (HE)	4	47	29	18
Master	1st	Educational Technology	Multimedia Systems (MS)	4	25	16	9
	2nd	Pedagogical Supervision	Educational Multimedia (EM)	9	10	7	3

Table 1. Courses and students' sample (N=82)

The majority of students had personal computers and MP3 players but 3G mobile phones or Play Stations Portable were only owned by some of them (Table 2). All students had the necessary technology to listen to podcasts.

Computer and mobile devices		Undergraduate students			Master students		
		HE (n=47) %	MS (n=25) %	EM (n=10) %	MS (n=25) %	EM (n=10) %	
Personal computer	Desktop	10	16	0			
	Laptop	79	84	100			
Portable player	MP3 player	68	56	40			
	MP4 player	15	8	0			
PSP (Play Station Portable)		9	16	0			
Tablet PC		13	8	0			
3G mobile phone		38	36	30			

Table 2. Own of personal computer and mobile devices

Students from Educational Multimedia course did not know what a podcast was at the beginning of this study but most of the students of Heredity and Evolution (53%) and of Multimedia Systems (60%) were familiar with this Web 2.0 tool (Figure 1).

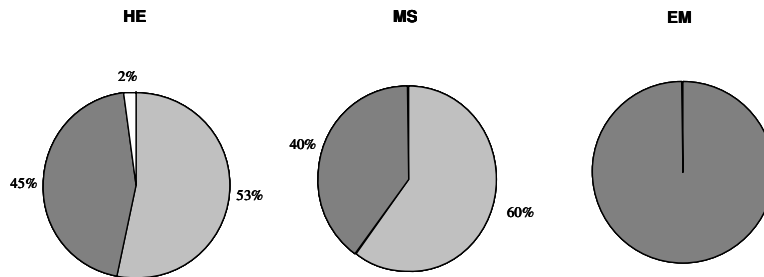


Figure 1. Knowledge about podcasts: familiar (■) or non-familiar (■) with podcasts.

Almost all the students had access to the Internet at home (Figure 2). In the particular case of the undergraduate students, they also could go to a computer lab in the University *Campus* where they had access to the Internet connection during 12 hours a day.

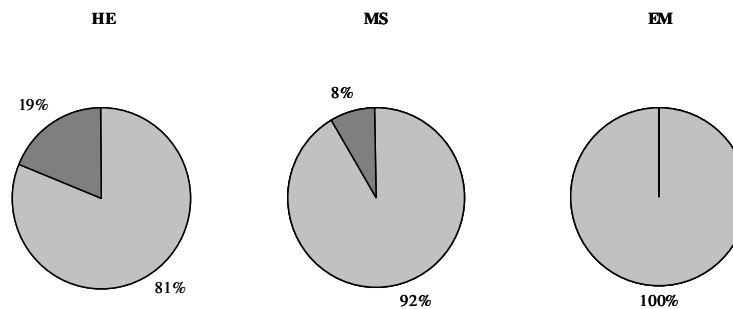


Figure 2. Home access to the Internet (with (■) or without (■) access).

Results

Podcasts type

The four podcasts created for Heredity and Evolution were designed to give sets of learning outcomes and also to give some study guidelines and search tips for each learning module (Table 3). Every podcast was followed by a brainstorming session where students analyzed, commented and discussed the subject covered by the audio file with their lecturer. Listening to these podcasts was compulsory.

Courses	Podcasts Types
HE	- Learning outcomes and study guidelines
MS	- Feedback - Orientations for the following session -[students produce their own podcasts: reflections, synthesis]
EM	- Guidelines for group work presentation - Comments to personal websites - Instructions for WebQuest report - Instructions for final assignment (individual report) -[students produce their own podcasts: reflections, peer review]

Table 3. Types of podcasts developed

In the case of Master students, several types of non-compulsory podcasts were created. In Multimedia Systems course podcasts were used with two purposes: to give feedback about students' assignments, presentations or about a general comment to their posts in the forum, and to give orientations to the next class session. The nine podcasts created in the Educational Multimedia course were used to give guidelines for group work presentation about educational multimedia software or e-games analysis, to give instructions for reports - WebQuest and Final assignment report - and to comment the personal websites developed by students.

Master students were also asked to create their own podcasts and to post them in Podomatic, to understand how easy it is to create and to update them. Teachers need to be familiar with Web 2.0 tools to use them in their teaching. They have to feel comfortable with new literacies (Richardson, 2006). The Educational Multimedia students had to review their colleagues' group assignment about educational multimedia software analysis. It was explained that they had to comment the assignment according to the analysis grid they used while doing their own group assignment. It was also explained to them that the idea was to increase their capacity to criticize multimedia educational software. In a previous study (Carvalho, 2008) students were concerned about their classmates' reactions to their comments so it was reinforced that the idea was to analyze the group assignment as critical and constructive reviewers.

Podcasts length

Podcasts length ranged from 45 seconds to 5 minutes and 15 seconds (Table 4). Podcasts created for the Heredity and Evolution course were the shortest; the longer ones were created in Multimedia Systems but they did not exceed 6 minutes. Although students from the three courses had different opinions about the maximum acceptable length for a podcast (ranging from 1 to 15 minutes), most suggested podcasts longer than the length of the podcasts given by their respective lecturers. Some students mentioned in the interview that beyond a certain duration podcasts start being "tiring" and "boring" and the necessary attention to assimilate their information is lost, an opinion also stated by Cebeci & Tekdal (2006). However, some of Multimedia Systems students stressed that "there cannot be a standard length for a podcast because its length depends on the podcast information and the way it is presented". The Heredity and Evolution students considered the length of their podcasts (45 seconds to 1 minute) acceptable and said that a longer duration will be too monotonous for a podcast concerning learning outcomes presentation. The preferable podcast length in students' opinion should last from 1 to 15 minutes – which are considered short podcasts and are recommended by several authors (Abt & Barry, 2007; Chan & Lee, 2007; Cebeci & Tekdal, 2006; Geoghegan & Klass, 2005).

The majority of the students enjoyed listening to podcasts and they showed interest in listening to other podcasts in other courses (Table 4), leading to the conclusion of podcasts acceptance. When interviewed, several students pointed out the sensation of proximity they experienced with their lecturer while listening to podcasts.

Podcasts Implemented		Listening to podcasts		Interest in listening to podcasts in other courses (%)	Mean of acceptable podcasts length (minutes)
Courses	Length (minutes)	Yes (%)	No (%)		
HE (n=47)	0'45''- 1'	77	23	81	5'
MS (n=25)	1'08''- 5'15''	92	8	100	10'
EM (n=10)	1'01'' – 3'09''	100	0	80	1' to 15'

Table 4. Podcasts length and listening

Podcasts quality

Several parameters were assigned as indicators of the quality of the produced podcasts and students were inquired about them in the Questionnaire of Opinion, filled in at the end of the course. Most of the students considered the podcasts audible, clear and their lecturers' voice friendly (Figure 3). Only three students of Heredity and Evolution course found podcasts "too long".

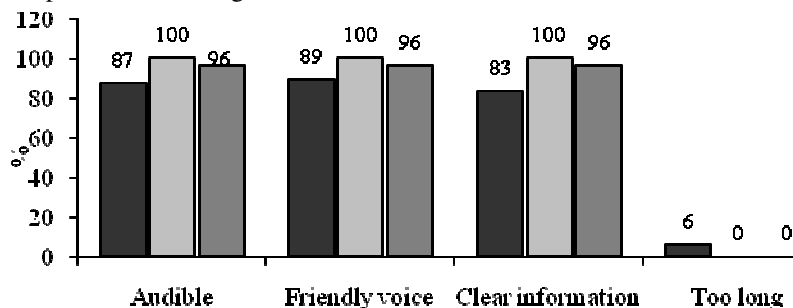


Figure 3. Quality of podcasts according to HE (■) MS (■) and EM (■) students

All the types of podcasts used did not demand listening to them several times. However, students from all courses said that they listened to podcasts more than once: 77%, 92% and 90% of Heredity and Evolution, Multimedia Systems and Educational Multimedia students, respectively. The necessity of reviewing contents or the need to understand some details were the main reasons addressed by students to listen to podcasts again, never being claimed any factor related with a poor podcasts quality.

Both undergraduate and graduate students all referred to have used the personal computer to listen to podcasts, while they were working with it, and one student of the Educational Multimedia Course also mentioned having used a MP3 player.

Students' and Lecturers' reaction to podcasts

Students' reaction

The majority of students from all courses listened to the podcasts created by their lecturers. From the results presented above, it can be inferred a general acceptance for this resource as a learning tool. Students liked almost every podcast type, their preference goes towards the short ones, and they recognized the importance of this technology in a learning context. The impact and pedagogical potentialities of podcasts in education is not only seen by students as podcasts consumers but also as podcasts producers, namely in the future as education professionals. In fact, the Master students which produced their own podcasts, learnt to use it with the purpose of reflecting about a topic or to criticize their colleagues work in their peer review task. When interviewed about this experience, all of them mentioned that they liked it and all of them, except one, intend to use podcasts in their teaching. One student said: "I liked to record my comment and I intend to use podcasts to give instructions to students about their assignments or to clarify some doubts they have. Usually, I use msn to do that but now I would like to use podcasts".

Students stressed the pedagogical potential of podcasts. Two students mentioned some technical problems with Podomatic, which occurred quite often, like to accept to record the episode. Three students considered interesting to record their peer review task. One student stated “I said what I thought about the group assignment. The novelty was the recording and that allowed me to think about different ways to do presentations”.

Lecturers' reaction

The Biology teacher considered that the use of podcasts to guide students own study is an approach that can be maintained but that would be enriched, for example, by providing podcasts with some information, explanation or discussion about the topics for which the learning outcomes were designed. This kind of podcasts would certainly help students learning and probably will motivate them to study in another ways. Nevertheless, given students' acceptance to podcasts, the Biology lecturer plans to conduct other studies to explore different podcasts types and purposes.

The Master Courses lecturer considered the podcasts very useful in giving feedback to the students about their presentations, assignments and to give orientations for readings or for the following sessions. The podcasts are useful to give guidelines - as it has been done with complementary information about the group analysis of educational multimedia software or e-games. However, they cannot be used as the only way to describe an assignment, as it was used in the Educational Multimedia course about the WebQuest report and the final assignment (individual report). Students preferred to have a written description of the assignments to underline some parts. They had to write it down (curiously they did not ask for a written version). Students said that they really enjoyed listening to personalized feedback to their website. If it was for novelty or because listening to the lecturer voice has a positive effect in students' attention to the comments to improve their assignment, is a question which needs clarification.

Conclusion

Students' preferences in what concerns podcast length clearly goes to short audio files. Students did not use mobile technology to listen to podcasts although they own mobile devices and they recognized that a great advantage of podcasts is the possibility of listening to them wherever and whenever wanted. As observed in this study, listening again to podcasts was as a way of reviewing contents or understanding missed details.

In general, the results of this study show that the introduction of podcasts in learning was an accepted innovation for students. They showed interest in listening to other podcasts in different courses and they also seemed enthusiastic about implementing their own podcasts. In fact, when asked about their experience as podcasts producers, all of the students mentioned that they liked it and they intend to use podcasts in their teaching.

Lecturers also liked the experience of creating podcasts and intend to continue using this tool, probably trying other podcasts types. Besides some aspects already mentioned, other questions seem to deserve further research. This is the case of the technology used to listen to podcasts, mainly personal computers. Would podcasts presenting theoretical content lead students to use mobile devices like a MP3 player or these are only used for leisure? Based on students' opinion about the effect of lecturer voice on their attention, would this aspect be valued by students in distance education courses?

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