

Influence of Podcasts Characteristics on Higher Students' Acceptance

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Abstract: Podcasts are a new way to deliver audio information. They have been used in several universities. The study reported in this paper describes four types of podcasts of different length used in four courses. It focuses on students' acceptance of podcasts types and length in their courses. Results show their preference for short podcasts, and their interest in having podcasts in other courses. The teachers also recognized its impact in their courses. However some students prefer written information instead of a podcast, as they can underline and annotate it. Further research is needed to clarify this aspect but also to relate types of podcasts and the use of mobile devices, as well as the implications of podcasts in distance learning to diminish the transactional distance.

Podcasts in Higher Education

The term podcasting results from the combination of two words: *iPod*, the popular digital music player from Apple, and *broadcasting*. Podcasts are digital audio programs that can be subscribed to and downloaded by listeners via RSS (Really Simple Syndication). The RSS technology downloads new entries automatically to an aggregator program, enabling automatic download of new podcasts, once listeners have subscribed to the "feed" source (Kaplan-Leiserson, 2005; Frydenberg, 2006). Podcasts can be accessed on any digital audio device, including a desktop computer, Pocket PC, MP3 player, mobile phone, etc. It is also possible to podcast video.

As Kaplan-Leiserson (2005) claims, "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". Power (1990 in Lee & Chang, 2007: 87) stresses that the frequencies of the human voice allows us to communicate due to the "ability to adjust intonation, inflexion, phrasing, pacing, volume, loudness and timbre [distinguish speech from text]". Durbridge (1984) 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)".

Podcasts are being used in higher education (Evans, 2007; Guertin *et al.*, 2007; Lee & Chang, 2007; Salmon *et al.*, 2007; Boulos *et al.*, 2006; Frydenberg, 2006) with different purposes. Lee & Chang (2007) reported its use with distance learners to reduce the effects of isolation and to promote inclusivity. The most common use of podcast is recorded classroom lectures, but is not the most interesting, as we will see in this paper.

Types of podcasts in a learning context

Kaplan-Leiserson (2005) considers 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 teachers record their classroom lectures to help audio learners to retain the information covered.
- b) *Provide another channel for material review* - The audio files can be reviewed at leisure time for understanding or before testing. Listening to the recorded classroom lectures was considered by the students as 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” as Margaret Maag, an assistant professor, pointed out. She records 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.

Lee & Chang (2007) emphasis is not on recording full-length lectures or to teach complex concepts, but instead on maximizing interest and appeal to students, as well as promoting ease of listening. The podcasts were structured as talkback radio-style segments. The material contained in the podcasts is supplementary in nature and not directly examinable. The podcast episodes released included the following: various “topic trailers” providing a lead-in to and broad overview of each topic to prepare students for the core learning activities; summary or “re-cap” material to provide revision and reinforcement; assignment tips, hints and post-assignment feedback from the lecturer; and an interview, conducted over Voice-over Internet Protocol (VoIP), with the author of the textbook, based in the United Kingdom.

Malan (2007 apud Evans, 2007) uses to record his lectures to allow students to review them if they wished. He found that students valued the flexibility that the podcasts offered particularly with regard to review rather than as an alternative to attendance. Kurtz, Fenwick, and Ellsworth (2007 in Evans 2007) convert an entire lecture course into 65 podcasts, allowing class time to be dedicated to problem-solving and project sessions. Students' results improved. Gribbins (2007) refers to use podcasts to share announcements, describe homework assignments, and distribute lectures to students. Calder (2006) describes short snapshots on a particular topic, key point summaries of a lecture or group of lectures. Nathan & Chan (2007) created podcasts in the form of discussions between the subject matter expert and a student on various issues in the subject of Business Strategy.

Evans (2007) investigated the use of podcasts as a revision tool used by learners. In the IMPALA project, in UK, Salmon *et al.* (2007) created the following types of podcasts: “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 depict and show structures and tissues of different systems, and student-developed podcast to promote active, independent and collaborative learning” (p. 33).

Edirisingha *et al.* (2007) carried out a study in the module Optical Fibre Communication Systems. The following format was used: “an introductory news item; the main content section typically referring and extending this week's work and referring to last week's; lighter weight but fibre optics related items, e.g., a joke at the end, or rap” (p. 2).

Podcasts are asynchronous and mobile, these are two advantages, but there are also some limitations: it's linear and one-way, and, according to Kaplan- Leiserson (2005), it needs to be integrated with blogs, online simulations, and other more interactive channels. Edirisingha *et al.* (2007) also emphasized that podcasts must be integrated with other learning activities. Chan *et al.* (2006) advise to avoid lectures/monologues, podcasts “should not be thought of as a replacement for classes, but rather as complementary to lectures” (p. 118).

Podcasts Length

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 you will, however, be able to remember general opinions, and arguments.

An object should not be longer than 15 minutes, according to a survey, because long objects generally results in loss of attention in listening and a subsequent decrease in comprehension (Cebeci & Tekdal, 2006).

Lee & Chang (2007) podcasts length was 3 to 5 minutes, which is based on the views of Walsh (2004 in Lee & Chang, 2007), who believes in designing audio learning material in adherence to the metaphor of a song: “There’s a reason most songs are less than four minutes. If you haven’t gotten to the hook by then, you’re not going to make it in the next nine. People go to the bar during the drum solo. They do the same in their minds when you don’t tell it quick and tell it straight in your learning delivery, whatever the mechanism.” (Lee & Chang: 90)”. The students found the length, format and style, as well as the topics chosen, to be suited to their needs and preferences. Abt & 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 had about 10 minutes long (Salmon et al., 2007).

Chan *et al.* (2006) advise to “Keep podcasts short, lively and entertaining” (p. 118). Some authors asked students to specify how many minutes they would listen to a podcast that supplemented the class lecture per week. Chan and Lee’s (2005) students said between 3 and 5 minutes (29%), 6 and 8 minutes (25%), and the most popular between 9 and ten minutes (45%). The majority of Frydenberg’s (2006) sample prefers a podcast length between 6 to 10 minutes. We may conclude that short podcasts are easier to explore, to understand and to listen to anywhere.

Research

The research reported in this paper focuses on the use of podcasts and its implications for learning in higher education. Its aims are:

- to identify uses of podcasts in the different scientific domains of staff members courses;
- to analyze teachers’ reactions to the integration of podcasts in blended-learning;
- to analyze students’ reactions to podcasts’ characteristics (types and length);
- to identify whether students use mobile technologies to listen to the podcasts.

The podcasts were used in four courses, during the first semester of 2007-2008, at the University of Minho in Portugal. The podcasts created included four types: learning outcomes, interview, feedback, and session indications.

Three teachers participated in this study. They are from different scientific domains: Education, Biology, and Communication Sciences and they used podcasts in a different way as we will describe.

Data collection instruments

Two questionnaires were developed. One about digital literacy intends to characterize students’ knowledge about Web 2.0 tools, and about use of mobile technology. The other one, an opinion questionnaire, intends to inquiry students’ reaction to the use of podcasts.

At the beginning of each course, students filled in the Digital Literacy Questionnaire. At the end of the semester they were asked to complete the Podcast Opinion Questionnaire. Based on their answers some students were interviewed.

Sample Characterization

The students enrolled in this study were undergraduate students (n=139) and master students (n=25), as we can see in Table 1. Most of the students were females (106) and 58 were males.

Grade	Degree	Courses	Number of podcasts created	Number of students	Gender	
					Female	Male
Undergraduate	Applied Biology	Genes and Genomes (GG)	6	47	29	18
		Inheritance and Evolution (IE)	4	47	29	18
	Sciences Communication	Research Methods (RM)	1	45	32	13
Master	Educational Technology	Multimedia Systems (MS)	4	25	16	9

Table 1. Courses and students' sample

Podcasts were used in four courses. One in a master degree program – Multimedia Systems (MS) - and three in bachelors' degree programs, two on Applied Biology - Genes and Genomes (GG) and Inheritance and Evolution (IE)), respectively from 3rd and 2nd years - and one to Sciences Communication - Research Methods (RM), from 2nd year.

At the beginning of the study, more than half of the undergraduate students didn't know what a podcast was, except the students of IE course (Table 2). In this course, 53% of the students were familiar with podcasts as well as the majority of the master students (60%).

Podcast	Undergraduate students			Master students
	GG (n=47) %	IE (n=47) %	RM (n=45) %	MS (n=25) %
Familiar with podcasts	28	53	33	60
Unfamiliar with podcasts	72	45	60	40
Have (e.g., Podomatic)	0	0	0	0

Table 2. Knowledge about podcasts

None of the undergraduate and master students have their own podcast, for example in Podomatic, although they indicated to have some Web 2.0 tools like blogs and hi5.

The majority of the students had a laptop and MP3 player (Table 3), followed by 3G mobile phone. The MP3 player and 3G mobile phone are essentially used by undergraduate students. We realized that mobile devices such as MP4 player, PlayStation Portable (PSP) and Tablet PC are only owned by a few students, maybe due to its cost.

Computer and mobile devices		Undergraduate Students			Master students
		GG (n=47) %	IE (n=47) %	RM (n=45) %	MS (n=25) %
Personal computer	Desktop	9	10	21	16
	Laptop	87	79	60	84
Portable player	MP3 player	68	68	70	56
	MP4 player	4	15	9	8
PSP (Play Station Portable)		11	9	5	16
Tablet PC		19	13	9	8
3G mobile phone		43	38	54	36

Table 3. Own of personal computer and mobile devices

Due to the mobile devices owned by the students, as we can see in Table 3, they have the necessary means to listen to the podcasts.

Most of the students have access to the Internet at home, particularly the master students (92%). The percentage of undergraduate students without access to the Internet at home varies from 19% to 30% (Table 4).

Internet at home	Undergraduate students			Master students
	GG (n=47) %	IE (n=47) %	RM (n=45) %	MS (n=25) %
With access	68	81	73	92
Without access	30	19	20	8

Table 4. Access to the Internet at home

Data Analyses

Podcasts types and length

The podcasts used in Genes & Genomes (GG) and Inheritance & Evolution (IE) courses were both designed to present the learning outcomes and to give some study orientations for the learning modules. Podcasts length ranged from 45 seconds to 3 minutes (Table 5).

Podcasts used		Students	Listening to podcasts		Interest in listening to podcasts in other courses %	Mean of acceptable podcasts length (minutes)
Types	Length (minutes)		Yes %	No %		
Learning outcomes	1' - 3'	GG (n=47)	57	43	43	2'
	0'45'' - 1'	IE (n=47)	77	23	81	5'
Interview	37'	RM (n=45)	96	4	76	15'
Feedback and session indications	1'08'' - 5'15''	MS (n=25)	92	8	100	10'

Table 5. Students' acceptance of podcasts

In the course Methods of Research II (MR, 2nd year of the Communication Sciences degree), one podcast was used (on the Blackboard platform) corresponding to an interview with a well-known Portuguese journalist. Its length is 37 minutes. Students were given 15 days to analyze the interview and answer two questions: Which are the main concepts discussed during the interview? Which are the similarities between the procedure of a scientific research and the journalistic research? The aims of this podcast were: to train the students in the interview method of research; to introduce the students with the concept of "precision journalism"; to analyze the similarities and differences between scientific method and the journalistic method of research.

In the course of Multimedia Systems (MS) the podcasts were used with two purposes: to give feedback to the students about their assignments or about a general comment to their posts in the forum, and to give orientations to the next class session. The length of these podcasts varied between 1.08 minute and 5.15 minutes.

Students' reactions to podcasts

Most of the students in all courses listened to the podcasts, except the GG students (Table 5). These students asked the teacher to give them the podcasts contents as written texts. They were given a few hours after the podcasts release in the Blackboard platform. The number of GG students who listened to podcasts (57%) is similar to the number of students who have not heard them (43%). In IE this difference is quite clear: 77% of students reported to have heard the podcasts and only 23% reported not having done it. According to the teacher, this discrepancy may be linked to the fact that the podcasts were not provided as written versions in IE, which probably forced these students to access to podcasts and to listen to them. The length of the podcasts in the courses of GG and RM was criticized by the students. During the interview, the GG students mentioned that the type of the podcast and its length reinforced their dislike for its listening because it's "tiring" and "boring".

The podcasts were compulsory in the bachelors' courses: learning outcomes in GG and IE, and the interview to be analyzed in MR course.

In the master course, the podcasts were recommended but not compulsory, as they gave a general feedback about students' assignments or participation in the forums, as well as indications for the next session. The master students liked to listen to podcasts. Some students pointed out the sensation of proximity between teacher and students. One student wrote: "*a podcast has always some kind of suspense which causes some apprehension and curiosity. It has a much more intense effect than a written comment in regard to evaluation*" (Mac2).

Podcasts acceptable length

The GG students considered that the acceptable length to the podcasts should be around 2 minutes, which is less than the major length of their podcasts (3 minutes). The RM students also indicated their preference towards shorter podcasts (15 minutes) than the ones they listened to (37 minutes).

One student stressed that the podcast was too long what was a little bit tiring, particularly when she needed to find some specific information in the interview. This inconvenient is also reported by Frydenberg (2006).

The IE and MS students considered as an acceptable length for a podcast 5 minutes and 10 minutes respectively, which is slightly superior to their podcasts length. This opinion may suggest their podcasts acceptance as they indicated a longer duration.

On interview, IE students considered the length of their podcasts (45 seconds to 1 minute) acceptable and said that a longer duration will be too monotonous. In their opinion, the best length for podcasts should be 5 minutes but they were referring to podcasts types other than learning outcomes presentation.

One of the master students during his interview pointed out that there is not a standard length for a podcast. Its length depends on its information and the way it is presented.

Interest in listening to podcasts in other courses

The majority of the IE (81%), RM (76%) and all MS students are interested in listening to podcasts in other courses with the same or different type, which supports the idea of podcasts acceptance. On the other hand, only 43% of the GG students are interested in listening to podcasts in other courses, which reinforces the idea that they didn't like the podcasts very much.

Podcasts quality

In what concerns the evaluation of podcasts quality, students were asked to indicate if they were audible, had a friendly voice, were too long, and if the information was clear. The GG students had less agreement in the four items of podcasts quality in comparison to the others students' course (Table 6). Indeed only 58% of the GG students considered that the podcasts were audible against more than 87% of the IE, RM and MS students.

More than 73% of the IE, RM and MS students considered that the podcast voice was friendly against 49% of the GG students.

Around half of the RM students (56%) pointed out that their podcast was too long (37 minutes). Only a few (13%) GG students share the same opinion. Indeed, the length of podcasts in GG ranged from 1 to 3 minutes while the podcasts in IE never exceeded 1 minute. While interviewing GG students, they said that the length of the podcast, together with its typology, influenced negatively its listening. Students of IE also mentioned that if the podcasts would have been longer it would have not been so pleasant to listen to them.

More than 78% of the IE, RM and MS students considered that the podcasts information was clear against only 45% of the GG students.

Podcasts quality	Undergraduate students			Master students
	GG (n=47) %	IE (n=47) %	RM (n=45) %	MS (n=25) %
Audible	58	87	93	96
Friendly voice	49	89	73	96
Too long	13	6	56	0
Clear information	45	83	78	96

Table 6. Quality of the podcasts

Podcasts re-listening

As we stated earlier, more than 77% of IE, RM and MS students listened to podcasts, against 57% of the GG students (Table 5). This difference is kept in what concerns the listening of podcasts more than once. The majority of IE, RM and MS students listen more than once the podcasts (70% to 80%), and some students listen more than two or three times (Table 7). But only 34% of the GG students listened again to the podcasts, 23% listened once, and some students didn't listen at all (43% as we can see on Table 5).

Podcasts listening	Undergraduate students			Master students
	GG (n=47) %	IE (n=47) %	RM (n=45) %	MS (n=25) %
Once	23	7	16	12
Twice	34	53	60	64
Three times	0	13	13	8
More than three times	0	4	7	8
<i>Total</i>	<i>34</i>	<i>70</i>	<i>80</i>	<i>80</i>

Table 7. Podcasts re-listening

We asked the students to indicate the motives to listen to podcasts again, and they mentioned to review them and to understand some details (Table 8). This last option is pointed particularly by RM students (80%) because they have to look for specific information to critically analyze the interview. Some students mentioned that they listened again the podcasts to get the information as they missed the class. The major percentage belongs to RM

students (24%) who, maybe, expected to find class information, as they were enrolled in this course later on, but they only have an interview to analyze. Students declared that the experience was very interesting and useful.

Motives for listening to the podcasts again	Undergraduate students			Master students
	GG (n=47) %	IE (n=47) %	RM (n=45) %	MS (n=25) %
To review	30	70	62	60
To understand some details	32	64	80	60
To listen to class information if I missed it	2	9	24	8
To complete class notes	0	0	0	0

Table 8. Motives for listening again to the podcasts

Use of mobile technology to listen to the podcasts

Most of the students used the personal computer to listen to the podcasts (Table 9). Only 7% in the RM course used a MP3 player, and none of them used a 3G mobile phone. As mentioned in Table 3, they have these mobile devices. However the types of podcasts used in the courses, except the interview, did not demand listening to several times.

Mobile technology	Undergraduate students			Master students
	GG (n=47) %	IE (n=47) %	RM (n=45) %	MS (n=25) %
Personal computer	57	77	96	100
MP3 player	0	0	7	0
3G Mobile Phone	0	0	0	0

Table 9. Mobile technology used to listen to podcasts

Teachers' reactions to the integration of podcasts in blended-learning

The Biology teacher thinks that the methodology adopted in GG can make podcasts redundant in learning, as students expressed their preference towards the use of the same information in a written format. However she does not discard another possibility: that there has been some resistance to this new technology by those students. This hypothesis was somewhat supported during lecturing of IE. In fact, although the adopted podcasts were of the same type as the ones implemented in GG, no other type of written information was available, and students showed greater acceptance. In summary, and again in teacher's opinion, 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 conceived. This kind of podcasts would certainly help students learning.

The MR teacher considers that it is important for the students to listen to the interview to understand its dynamics and the emotional relationship between the intervenient. The student interviewed would like to have it in a written text, to highlight the information necessary to answer the questions. Students' opinions show that they felt attracted by this new technology but at the same time they are resistant in changing their work habits.

The Master course teacher liked this experience. It takes time, but it is very important to give them feedback audibly. The spoken word helps to transmit motivation and reinforcement in a different way than the written word, as already mentioned by other authors (Kaplan-Leiserson, 2005; Durbridge, 1984). The students like it. Podcast may be very useful in diminishing the transactional distance pointed out by Moore (1997), that affects students in distance learning, and it is one of the causes for giving up.

Conclusion

The introduction of podcasts in blended-learning courses was an accepted innovation by teachers and students. The types of podcasts used and its length were generally accepted by the students, except the interview that was considered to be too long (37 minutes). The length indicated by the students for the interview should be 15 minutes, the most. The majority of the students listened again to the podcasts to review them or to understand some details.

Students are receptive to listen to podcasts in other courses, which allows us to infer their acceptance. They also prefer short length podcasts than long ones. This opinion is also shared by the papers reviewed (5 to 10 minutes).

Teachers intend to continue to use podcasts. The Biology teachers would like to try other types of podcasts. The Communication Sciences teacher would like to explore the potential of podcasts for the visual impaired students. The Education teacher would like to study the influence of podcasts in supporting distance learners.

Only 7% of the RM students used mobile technology to listen to the interview. All others used their personal computer. Further research is needed to see if podcasts presenting content would invite students to use mobile devices. Another aspect that needs further research is related to the fact that some students prefer to have access to the written information instead of the podcasts. This is because they are used to read than to listen to or they are not auditory learners? Or they are resistant to change? These are a few questions that we intend to further study in future research.

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