

Podcasting-based Mobile Learning in Blended Learning Courses

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Abstract:

Blended learning scenarios benefit from educational content delivered to mobile devices supporting full mobility of students. Podcasting and the utilization of various types of podcasts are discussed as an efficient means of providing mobile students in a part-time degree programme with learning content. Crucial to the success of podcasting is the chosen course design that mixes face-to-face phases with distance learning phases based on the delivery of appropriate content embedded in podcasting episodes. The type and output format of those episodes has to be chosen accurately according to the applied usage scenario.

1 Introduction

The educational landscape and especially Higher Education is characterized by a significant increase in the number of part-time (postgraduate) studies. New and elaborated didactic concepts have to be applied in part-time degree programmes to achieve the teaching aim and also meet the requirements of students. Blended learning concepts are often applied in part-time studies since they mix phases of attendance in the classroom and distance learning phases [1][2]. Blended learning introduces online or mobile media into a course programme while at the same time retains face-to-face contact and other traditional approaches to support students [2]. Different models of teaching and learning can be implemented based on various amounts of blends of face-to-face activities and online activities [1]. The most important aspects of blended learning scenarios are time (asynchronous vs. synchronous learning activities and communication), place where learning happens (on campus, in workplace, at home, etc.) and technology (information and communication technologies like social software) [2].

From a technical point of view, blended learning implementations use both asynchronous media like email, forums, weblogs or wikis in conjunction with synchronous media like text chat or video conferencing [1][2]. Both web-based media and mobile media can be used for communication and collaboration among students and teachers. Mobile learning approaches during distance learning phases allow students to have maximum mobility: in physical space, in time, in used technology, in conceptual and social space [3]. In an age of personal and technical mobility mobile devices – cell phones, smartphones, PDAs, audio (MP3) players, video (MP4) players – have reached a tremendous market penetration [3]. In fact, every student can be assumed to own at least one mobile device [4]. Those mobile devices allow for ubiquitous learning – they can be used anytime and anywhere [5]. However, eLearning with the help of mobile devices introduces new requirements and challenges, e.g., on eLearning content production and provisioning.

The presented approach using podcasting facilitates blended learning in a part-time degree programme at a European University of Applied Sciences. The courses in the Master's degree programme *Applied Knowledge Management* are based on a blended learning approach: courses are made up of 50% phases of attendance in the classroom and 50% phases of distance learning. All courses and especially distance learning are supported by an E-learning platform [6]. Various electronic communication and collaboration tools are used by students and teachers for communication and collaboration within the learning community [7]. Podcasting provides an efficient and flexible tool to assist distance learning phases – especially in this kind of blended learning environment.

In section 2 we briefly introduce podcasting and typical types and applications in education. Section 3 presents an approach for applying podcasting to support distance learning phases in a blended learning course. Section 4 covers the production environment and alternative ways of delivering podcasts to mobile users. Results and experiences on running the presented approach in a course on information systems are presented in section 5.

2 Podcasting in Education

Most authors refer to podcasting as a blend (a portmanteau) of the words “iPod” and “broadcasting” coined in 2004 [8]. A podcast is a series of media files – audio, video, multimedia content (e.g., including screen recordings). Primarily most podcasts were made up of audio files like segments of broadcast radio, but they became more and more multimedia in the past. Podcasts are distributed over the internet to be downloaded to portable media players and to personal computers [9]. A podcast differs from a simple series of (downloaded) media files by subscription. After a consumer (e.g., a student) has subscribed to a podcast, new podcast episodes are downloaded to their mobile player or personal computer automatically without having to return to the site and look out for new episodes [9]. Subscription services are typically implemented using RSS (Really Simple Syndication) or Atom. A podcast consumer uses a podcatcher (or podcast client, e.g., iTunes or Juice, or browser extensions) that checks the RSS feed and automatically downloads new episodes whenever they are available.

Different types of podcasts exist which differ in the kind of media and type of content being used. Simple podcasts are made up of audio files containing speech and sound. Due to their small size they can easily be downloaded and consumed on mobile (audio) players whenever and wherever the users are [10]. Video podcasts (vidcast, vodcast) are podcasts containing video content. Vodcasts can be distributed using RSS as a file download or a video stream [10][11]. Enhanced podcasts contain multimedia content that can be synchronized to the audio information [5]. Images, videos, additional links, screenshots and websites or presentation slides can be included in an enhanced podcast episode. Additionally, they can be segmented in chapters using chapter markers. Screencasts are digital movies based on screen recordings showing the activity on computer screens, whereas audio narration comments the on-screen activity [7][12].

Educational podcasting – regularly broadcasted audio or visual eLearning content – is a very promising approach in education [7]. Learning content can be distributed easily over the WorldWideWeb using syndication feeds. Students subscribe to those feeds and then receive regular updates of learning content automatically. The audio and video learning content can be consumed on computers or – much more comfortably – on portable media players at any time and any place.

There are many ways of applying podcasting in (higher) education. Mostly podcasting episodes are produced by teachers, but students may become producers as well [9]. Instead of delivering written homework or essays, student might produce audio or video content in podcasting style. The most popular podcasts are video recordings of lectures called

coursecasts (of type vodcast) which are a cost-efficient and easy-to-use way of producing eLearning content [5][13].

Another type of educational podcasts are precasts that are produced in advance to encourage preparation for lessons or contain discussions about course content [13][15]. A similar kind of podcasting provides students after a lecture with lecture content to recapitulate and deepen course content. However, precasts cannot be recorded on the fly during the lesson and are much more costly to produce. Besides preparing and delivering content presented during lessons, teachers can also use this presentation channel to deliver additional eLearning content. Like precasts, these podcasts – extracasts (short for extra podcasts) – have to be produced separately using various recording tools. Consequently, this kind of podcast usually is the most laborious and time-consuming type of podcasts for teachers to produce.

3 Mobile Podcasting in Blended Learning

3.1 *Potential of Podcasting in Blended Learning*

Podcasts are an efficient alternative means of asynchronous collaboration among the learning community and for delivering eLearning content in phases of distance learning. However, special attention has to be directed to the integration of podcasting with phases of attendance (face-to-face contact) in blended learning courses. Podcasting is used for asynchronous communication with students during distance learning phases. Teachers can use podcasts to deliver additional eLearning content to support distance learning activities. For example, they provide students with regularly submitted podcasting episodes that contain educational material the students should deal with independently. All types of podcasts – audio and video and enhanced podcasts as well as screencasts – can be applied to provide eLearning content. Like other kinds of eLearning content, precasts or extracasts have to be produced separately by teachers according to the course design. In contrast to conventional, entirely campus-based courses, coursecasting is seldom applied in blended learning (in fact it might only be used for face-to-face lessons). Basically, podcasts are intended to support distance learning and not to support classroom phases, i.e., it should focus on the impartation of knowledge that cannot be taught in face-to-face units.

Besides delivering podcasting content in various media formats (like audio, video or multimedia) different target devices like desktop computers or laptops, mobile audio or video players, cell phones and smartphones can be addressed [4] [5]. Thus, the advantages of both eLearning worlds – blended learning and mobile learning – can be combined, e.g., anytime and anywhere use plus automatic delivery of additional teacher presentations [2]+[3].

3.2 *Course Design*

Using podcasts in higher education requires complex didactical scenarios [15], which become even more complex when they are applied in blended learning courses. The course design of our blended learning courses includes precasts to prepare students for face-to-face lessons and extracasts to provide additional eLearning content to support phases of distance learning. Of course, a podcasting-based course has to be planned accurately and therefore condition fields and decision fields have to be analysed and defined properly. After performing the first step of de-contextualisation, which is quite similar to a multimedia-based lecture, the most specific step has to be performed: re-contextualisation [16].

There are several ways to arrange learning units in a podcasting-based blended learning course (course model and macro model) based on the topics covered in face-to-face and distance activities. Table 1 presents some examples of topics and podcasting types that can be

applied [17]. Depending on the temporal relation between face-to-face activities and distance learning activities the podcasts are used as precasts or extracasts. Similar types of activities may be covered in both face-to-face or distance learning – depending on the applied media types and podcasting types.

| Face-to-face activities | Temporal relation | Distance activities (podcasting) | Podcast type |
|------------------------------|-------------------|----------------------------------|---|
| exercises, use cases | ← | theory | <i>precast</i> : audio cast, screencast |
| discussion, recapitulation | ← | theory | <i>precast</i> : audio cast, screencast |
| basics | → | deeper discussion | <i>extracast</i> : audio cast, enhanced podcast |
| basics, theory | → | case studies | <i>extracast</i> : audio cast, video cast, enhanced podcast |
| basics, exercises | → | application, tutorials | <i>extracast</i> : video cast, screencast |
| exercises, deeper discussion | ← | basics, tutorials | <i>precast</i> : screencast, enhanced podcast |

Table 1. Course models of podcasting-based courses

Figure 1 shows an example sequence of face-to-face activities and distance learning activities in a reading class on computer-based information systems. Besides enhanced podcasts, additional asynchronous cooperation tools (forum, wiki) are used. Enhanced podcasts (primarily presentation slides plus narrative speech) are used as precasts and extracasts. A phase of distance learning consists of at least one or two learning units based on several podcasting episodes (an enhanced episode should not last longer than 15 to 20 minutes). Figure 2 shows an alternative sequence derived from a tutorial on web design that makes heavy use of enhanced podcasts and also combines enhanced podcasts with screencasts.

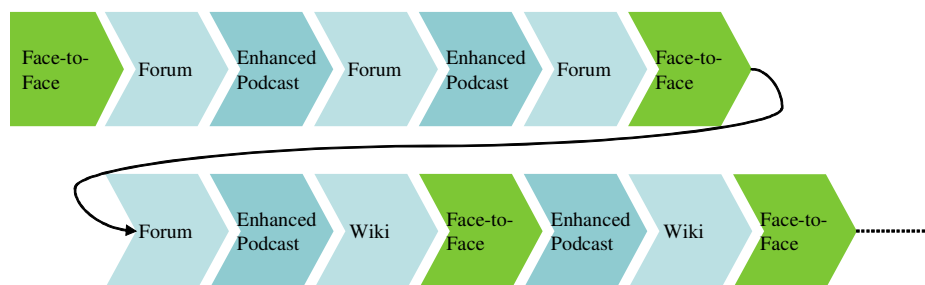


Figure 1. Sample sequence of face-to-face and distance learning: reading class on IS

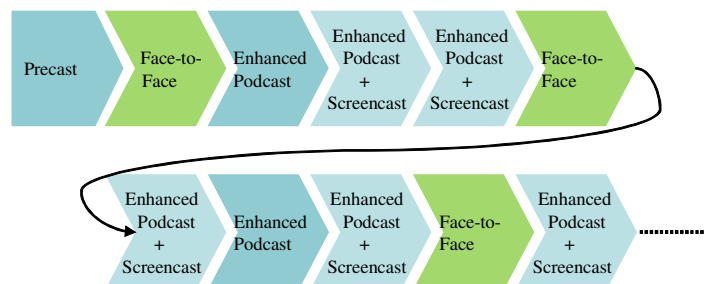


Figure 2. Sample sequence of face-to-face and distance learning: tutorial web design

4 Delivering Podcasts

4.1 Producing Podcasting Episodes

Podcasting episodes can be produced quite easily, however a proper production environment has to be set up [18]. The episodes for our enhanced podcasts are produced using the commercial software product Camtasia Studio® (TechSmith) with additional support of Audacity®. Audacity® (free, open source software) is used for audio recording and editing, eg., for trailers.

The majority of our podcasting episodes belong to enhanced podcasts (i.e., various multimedia content synchronized to audio information [5]) since this type is suited best for our blended learning environment. A typical enhanced podcasting episode is made up of a leading-in sequence (title screen, signature tune, spoken introduction), narrated slides and video content, and a finishing trailer sequence (closing screen, signature tune). The centrepiece can be made up of a linear sequence of multiple multimedia elements. Mostly we use animated and annotated screen slides (text, images) with spoken explanations, including sounds – sometimes enriched by video sequences.

Screencasting episodes are produced in a similar way using Camtasia Studio®. This tool offers an easy way of recording screen activities on the computer screen of the teacher that can be further edited and post-processed to create a fully compatible podcasting episode.

4.2 Distributing Podcasting Episodes

In fact a single podcasting episode is simply a media file that can be distributed over the internet using various distribution channels. What makes a series of episodes a podcast is the method of delivery using web syndication [9]. RSS or Atom feeds can be used by podcatchers (client software or browser extensions) that automatically identify and download new episodes whenever they are available (i.e., published by the teacher or fellow students). Subscribing to an RSS or Atom feed provides an efficient means for students to be informed automatically and have immediate access to new learning content. Especially part-time students in a blended learning programme benefit from automatic delivery services that *push* new content instead of having to search for new learning content all the time (i.e., *pull*). (Remark: additionally to feeds podcasting episodes are provided conventionally together with all other learning material on the eLearning platform which contains all the relevant information concerning courses [6]).

Our podcasting episodes are delivered in three different formats:

- § enhanced podcast and screencast in format Adobe® Shockwave Flash® (SWF-file)
- § enhanced podcast and screencast as MPEG-4 video (format MP4)
- § audio cast in format MP3 Audio

Students who want to have maximum image resolution (currently 640x480 pixels) are supplied with Adobe® Shockwave Flash® clips that are embedded in our eLearning platform (online usage) but are also available for download (offline usage). SWF files can be streamed on any WWW-based platform by installing the appropriate plug-ins in the student's browsers (figure 3). Flash clips are primarily accessed by students on (mobile or stationary) personal computers. However, web-based delivery allows for access at any time and any location (internet access assumed).

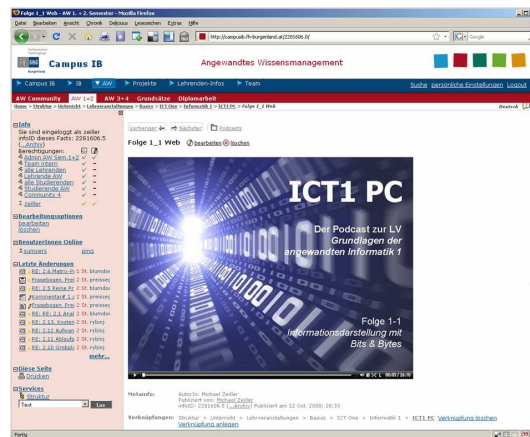


Figure 3. Enhanced podcast on eLearning platform

Fully mobile users are provided with enhanced podcasts and screencasts as MPEG-4 video (format M4V), e.g. for viewing on Apple® iPhones® or other mobile video players (figure 4). However, any video file format and multiple screen resolutions (currently 480x320 pixels) might be made available to support multiple mobile video players. Students who want to have unrestricted access at any time and any location (without restrictions) to this kind of multimedia learning content can use this type of delivery service. However, wide spread usage might be limited by the availability of high-quality mobile video players among students. Therefore, additionally to MPEG-4 video episodes an audiocast is offered, too. The audiocast provides the podcasted content in audio-only format as MP3 files for playback on any mobile MP3 player.



Figure 4. Mobile Use: Enhanced podcast on Apple® iPhone® and iPod® and Audio Podcast on MP3 player (e.g. Philips®)

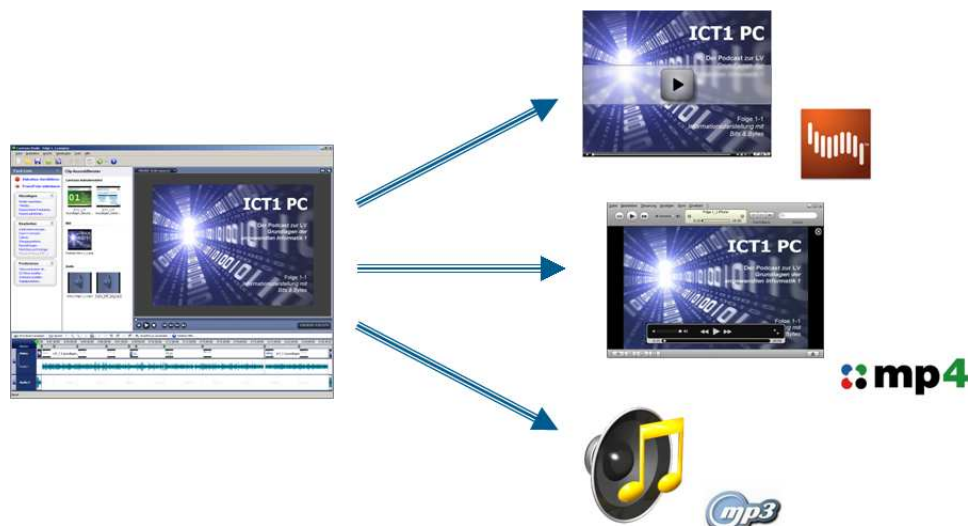


Figure 5. Multiple output formats from single episode

Due to the production environment based on Camtasia Studio® multiple delivery channels can be provided easily. A teacher has to record, compile and edit a podcasting episode only once. Afterwards, multiple output formats can be chosen. Thus, the delivery format can be adapted to the needs and technical equipment of the group of students in the blended learning course. Even multiple delivery channels can be supported as mentioned above (figure 5).

5 Field Report and Results

Applying enhanced podcasts in a blended learning course on information systems at a University of Applied Sciences showed very promising results of acceptance. Podcasting is well accepted among the majority of students and is highly appreciated as an additional way of providing educational content. A survey has been carried out in a reading class on computer-based information systems [19]. The class consisted of 18 students and all of them took part in the survey. The survey was carried out using an anonymous paper questionnaire handed out in class (response rate 100%). The questionnaire consisted of six closed questions and one open question asking for the student's personal opinion of using podcasts in higher education. Results showed that 22% students used the podcasts quite often and 55% used them occasionally. However, only one student (out of 18) quoted that he used the podcasts at regular intervals [19]. Asked for the effect of podcasting on their academic success 78% of the students indicated a positive effect. Those students mentioned that due to the podcasts they gained a deeper understanding of the subject (33%) or could understand the topics covered in the lecture better (45%). However, 22% of the students could not identify a positive effect at all [19].

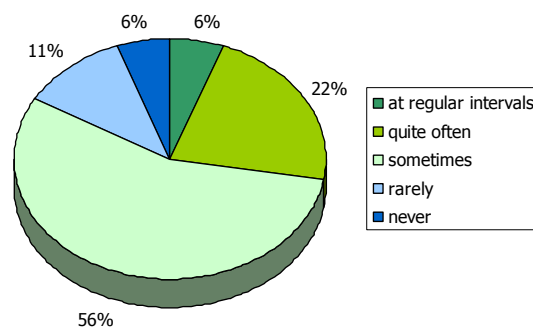


Figure 6. Frequency of use

Despite the mostly positive, but also critical feedback on usage rates 83% of the students stated that they would prefer having more blended learning courses where distance learning phases are held or supported by podcasts. 11% students disliked having more podcasting sessions (6% did not answer). Nonetheless, several students argued that podcasting cannot be used in all subjects and all types of lectures in distance learning. Despite this overwhelming acceptance of educational podcasts in this peer group, 94% of the students that gained experience in using enhanced podcasts did not want the number of face-to-face lecture units to be reduced and replaced by lectures on podcasts. These numbers clearly indicate that podcasts are well accepted among students for distance learning as a fairly new, additional means of providing learning content, but podcasting cannot compete with face-to-face lessons at all [19].

Students in the questioned group appreciated the availability of regularly submitted multimedia learning content as an alternative to written material. The chance of time-independent and location-independent use of learning content, that is much closer to knowledge imparted in face-to-face lessons than any other kind of presentation, is one of the greatest benefits of podcasting for part-time students. Asked for the reasons of using the

podcast, they named “executing the distance learning lesson” highest, followed by “refreshing the whole course”, “to revise before the exam” and “to recapitulate parts the could not understand in face-to-face lessons” (figure 7).

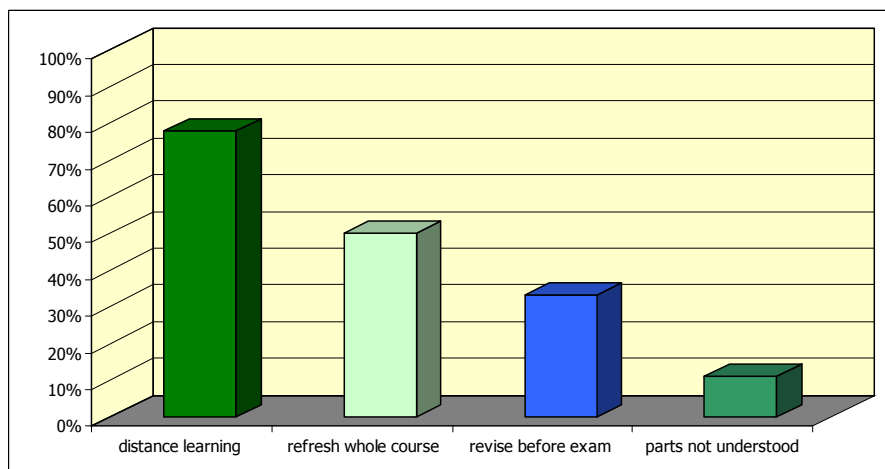


Figure 7. Reasons for using the podcast in a blended learning class

Several media channels and options of delivery formats have been provided to students to allow for mobile – location-independent and time-independent – use of the learning content (see also section 4.2). Students should be able to choose the most appropriate way of learning during distance learning phases. However, only a small number of students took the chance of fully mobile learning. The majority of students declared that they followed the enhanced podcasts and screencasts embedded in the eLearning platform on their personal computers in Shockwave Flash® format (mostly online, offline access only to a small extend after file download to a computer laptop). Some students viewed the MPEG-4 videos on a (stationary or mobile) computer monitor (both online streaming and download). Unfortunately, only a small number of students made use of fully mobile usage of video and animated content (i.e., enhanced podcasts and screencasts) on mobile devices. The enhanced podcasts provided as MPEG-4 video (MP4) for mobile use have only been used by a small number of students. This might be caused by the limited availability of mobile devices with large, high-quality displays in the target group of the lecture under investigation. Furthermore, mobile devices still do not offer the same image resolution like desktop computers or laptops. The best image quality had been offered for stationary or mobile use on computer monitors. Students preferred high image quality most and in return limited the amount of location-independency. Similarly, only a very small number of students occasionally listened to audio podcasts. Due to the optional availability of enhanced podcasts offering a much more intensive way of imparting learning content on the same topics, purely audio content was not attractive. The chance of totally computer-independent, location- and time-independent access to learning content could not compensate for the lack of visual information.

Besides the high acceptance of podcasting by recipients (i.e., students in this approach), the role of the producers has to be discussed as well. A common statement indicates that podcasts are easy and simple to produce by teachers. However, the cost of producing high quality eLearning content by teachers has to be taken into account in blended learning scenarios. Like any eLearning content, additional course material is laborious, time-consuming and costly to produce. The effort to produce precasts or extracasts (e.g., based on enhanced podcasts) with additional content – as need in blended learning courses – is quite significant.

6 Conclusion

We presented podcasting as a well suited, easy to use method to support distance learning activities in blended learning courses. Students in part-time study programmes benefit from the chance of time-independent and location-independent use of multimedia learning content much closer to content presented in face-to-face lessons than any other kind of learning content might do. Due to subscription services based on RSS or Atom students are automatically provided with new learning content as it is published by the teacher. There is no more need for spending time on searching on eLearning platform for new content.

The different types of podcasts – (audio) podcasts and vodcasts, enhanced podcasts, screencasts – offer a large variety of application scenarios. Blended learning scenarios can benefit most from podcasting since podcasts (especially enhanced podcasts) can compensate for the lack of face-to-face contact in distance learning phases. The asynchronous time-independent nature of podcast use is a well-suited alternative to the frequently used synchronous video conferencing solutions for distance learning. Mobile learning is facilitated by several output formats capable for playback on mobile devices and mobile computers. Podcasts can be used whenever and wherever students like – taking advantage of automatic delivery services, multiple channels and location-independency. Furthermore, podcasting episodes have to be kept short – like mobile learning units, too.

However, teachers who want to use podcasts for mobile learning and/or blended learning have to keep in mind that podcasting cannot be applied to all kinds of lectures and all topics.

Podcasting is well suited for reading classes, but not for seminars or workshops. Blended learning needs complex didactic scenarios and producers (i.e., teachers) have to take into account the significant costs of making high quality podcasting episodes (especially for precasts and extra learning content based on enhanced podcasts).

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