

# PODCASTING IN BLENDED LEARNING

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## ABSTRACT

The utilization of different kinds of podcasts (audio, video and screen casts) in a part-time degree programme based on blended learning at a university of applied sciences is presented. The high potential of podcasting to provide students with eLearning content in phases of distance learning is analyzed. Principles of web didactics are applied to podcasting content to identify course topics that can be covered by podcasts. Special attention is directed to the integration of podcasting with phases of attendance in blended learning courses.

## KEYWORDS

Podcasting, enhanced podcasts, screen casts, blended learning, distance learning.

## 1. INTRODUCTION

Higher Education is increasingly shaped by part-time (postgraduate) studies. Challenging didactic concepts have to be implemented in degree programmes to meet the requirements of part-time students. Situated learning (Lave and Wenger, 1991), which is based on the idea that learning is embedded within activity, context and culture and relies on social interaction and collaboration, is one frequently applied didactic principle in part-time degree programmes. Another approach often used is blended learning since it combines phases of attendance in the classroom and distance learning (i.e. online learning activities).

Powerful learning management systems (LMS) as a fundamental basis for learning and teaching in such learning environments are required. Many learning management systems focus on communication and collaboration among students and teachers that make up a community of practice (Wenger et al., 2002). Due to the educational concept of part-time degree programmes various tools belonging to social software are frequently used and integrated or interconnected with learning platforms, e.g. wikis for self-directed development of themes within the community, weblogs for writing research logs or to document personal learning processes, social bookmarking or social cataloguing like LibraryThing for shared reference management (Richardson, 2006).

We present an approach for supporting a part-time degree programme at a European University of Applied Sciences via podcasting. The courses are based on blended learning by combining 50% phases of attendance in the classroom and 50% distance learning. A learning platform and various collaboration tools are used in distance learning to communicate within the learning community. Podcasting provides a very efficient and flexible tool in this kind of blended learning environment.

After giving a brief introduction into podcasting we will introduce podcasting as a means for supporting education. Various kinds of applications of podcasting in high school and university teaching are presented. Then we will introduce an approach how podcasting can be efficiently used in a blended learning based course. We finish with some facts on producing and delivering podcasts and present some results.

## 2. PODCASTING

Podcasting is a blend (a portmanteau) of the words “iPod” and “broadcasting”. Apple’s famous iPod represents various kinds of portable media players that were originally intended as target devices for podcasting. Broadcasting stands for distributing and delivering audio and video content to a broad audience.

A podcast is a series of media files – audio, video or other kinds of multimedia content (e.g., including screen recordings). Originally most podcasts were 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 (IDG, 2006).

A true podcast includes subscription. Once the visitor has subscribed to a podcast (usually requires only a single click), new podcast episodes from that source are downloaded to their mobile player or personal computer automatically without having to return to the site and look out for new episodes (IDG, 2006). Subscription services are typically implemented using RSS (Really Simple Syndication) or Atom. A publisher (e.g., a lecturer in our case) updates a RSS file when he wants to distribute a new episode. A podcast consumer uses a podcatcher (or podcast client e.g. Juice, jPodder or iTunes) that checks the RSS feed and automatically downloads new episodes whenever they are available.

A number of podcast types exist, which differ in the kind of media being used and in their range of application. Audio podcasts are the simplest form of a podcast since they 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 (Braun, 2007). Video podcasts (short: vidcast, vodcast) are podcasts containing video content. Like ordinary video clips vodcasts can be distributed using RSS as a file download or a video stream (Braun, 2007; Ketterl et al., 2006a).

An enhanced podcast is a podcast that contains additional multimedia content that can be synchronized to the audio information (Ketterl et al., 2006b). 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 video screen recordings showing the activity on computer screens, whereas audio narration comments the on-screen activity (Udell, 2005; Richardson, 2006). Screencasts differ from ordinary screen recordings due to the availability of a series of episodes that can be subscribed to. They can be used for software tutorials or teaching or demonstrating software.

### 3. PODCASTING IN EDUCATION

Podcasting – the utilization of regularly broadcasted audio or visual learning content provided by the teacher or instructor – is a very promising approach in education. Especially in higher education, podcasting has high potential since learning content can be distributed easily over the WorldWideWeb using syndication feeds. Students register for feeds and then receive regular updates of learning content. The audio and video content can be consumed on computers or – much more comfortably – on portable media players at any time and any place. All in all, audio podcasts, video podcasts or screencasts can complement conventional approaches to education efficiently.

#### 3.1 Fields of Application

Podcasting can be widely used for educational purposes. A major difference when using podcasting is whether the podcasting episodes are produced by teachers or pupils/students (IDG, 2006). Students may become producers as well and instead of delivering written homework or seminar papers, they can produce audio or video podcasts. However, more widely spread are podcasts produced by teachers (Richardson, 2006). The most popular podcasts are video recordings of lectures called *coursecasts* (type: video podcast) which are a cost-efficient and easy-to-use way of producing eLearning content (Ketterl et al., 2006b; Read, 2005). Students – especially those who have missed a lesson – can repeatedly watch the presentation (time- and location-independent).

Precasts are podcasts produced in advance to encourage preparation for lessons or contain discussions about course content (Miller, 2006; Read, 2005). A similar kind of podcasting provides students with lecture content to recapitulate and deepen course content. Using multimedia content – reprocessed and delivered in audio, video or enhanced podcasts – different types of learners can be addressed. 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 new presentation channel to deliver additional eLearning content. Again all types of podcasts – audio, video and

enhanced podcasts, screencasts – can be applied to provide eLearning content. Like precasts, these podcasts – *extracasts* (short for extra podcasts) – have to be produced separately using different recording tools. Consequently, this kind of podcast usually is the most laborious and time-consuming type of podcasts for teachers. In section 4, we will describe how extracasts are used to support blended learning.

### 3.2 Advantages and Drawbacks

Podcasting has become quite popular and is used for teaching and learning purposes at schools (Richards, 2006) and universities (Nagler et al., 2008). However, a critical analysis of applications reveals several advantages but also drawbacks (Nagler et al., 2008).

Podcasting is well suited in situated learning and allows for student self-determination in a subject-oriented way of learning. It appeals to multiple senses and, therefore, attracts different types of learners. The technical requirements for recipients are negligible and software tools like podcatchers are available for free. Students can use the teaching materials independent of time and place since most of the podcasting formats are convenient for mobile usage. Asynchronous access and independent usage of teaching material is inevitable in modern study programmes – especially for part-time studies. Due to syndication feeds based on RSS, students are kept informed whenever new teaching material is available.

For teachers who have to provide educational podcasts for students, podcasting episodes (especially audio casts) can be produced quite efficiently. Although teaching with the help of podcasting is steadily increasing, podcasting is still an innovative approach to teaching. It has the ability to attract the student's interest and is a good complement to the mix of teaching methods. The variety of podcasting types provides a wide spectrum of application for teachers so they can choose which type fits best for their educational needs.

However, there are some limitations to be kept in mind since podcasting is not appropriate for all kinds of lectures. For example, it is well suited for reading classes, but not for a seminar or workshop. Teaching based on podcasts, lacks direct interaction between students and teachers. Although production costs are often mentioned as being quite low, the cost of high quality podcasting episodes (especially for precasts, screencasts and additional teaching material) is in fact significant.

## 4. APPLYING PODCASTING IN BLENDED LEARNING

This contribution presents the utilization of different kinds of podcasts (audio, video and screen casts) in a part-time degree programme based on blended learning at a University of Applied Sciences. In contrary to other applications of podcasting in (higher) education, we will focus on the specific requirements and its high potential in blended learning.

### 4.1 Blended Learning

Blended learning is a mixture of face-to-face and e-learning (online learning) and uses different WWW-based tools to support a traditional course (Allan, 2007). Blended learning introduces online media into a course programme while at the same time retains face-to-face contact and other traditional approaches to support students (Macdonald, 2008). 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 (Macdonald, 2008; Allan, 2007). Different models of teaching and learning can be implemented based on various amounts of blends of face-to-face activities and online activities (Allan, 2007).

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) (Macdonald, 2008).

The courses in our study programme at a University of Applied Sciences are made up of an equal amount of phases of face-to-face teaching and phases of distance learning (50% : 50%). Campus-based lessons are based on synchronous face-to-face learning activities whereas the 50% portion of distance learning is supported by various online activities. Our learning communities (students + teachers) use various kinds of synchronous and asynchronous communication and cooperation tools: e.g. online chat, video conferencing, live online room as well as email, forum, weblog, wiki, ePortfolios, social cataloguing, social tagging.

## 4.2 Potential of Podcasting in Blended Learning

Podcasts are an efficient alternative means of asynchronous cooperation and delivering eLearning content in phases of distance learning, which can be combined with other approaches for online learning activities. 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, video and enhanced podcasts, screencasts – can be applied to provide eLearning content. Like other kinds of eLearning content, these precasts or extracasts have to be produced separately by teachers according to the course design (see section 4.4). In contrast to conventional, entirely campus-based courses, coursecasting cannot be applied in blended learning. Basically podcasts are intended to support distance learning and not to support classroom phases. Therefore, lecture recordings are not applicable in distance learning although live recordings of face-to-face activities might be provided as an additional service.

Since blended learning is usually applied in part-time studies, it is crucial for part-time students to be kept informed of new eLearning content. By using a podcatcher, they can subscribe to the educational podcast for their course, which automatically provides them with updated teaching material.

## 4.3 Media Didactics

While delivering eLearning content for podcasts the three poles of podcasting content have to be kept in mind: media didactics – pedagogy – storytelling (figure 1). A course design for blended learning courses applying podcasting has to take all poles into account (section 4.4). However, podcasting based eLearning content has to focus on media didactics in particular.



Figure 1. Poles of podcasting content

Web didactics – a subdomain of media didactics focusing on didactics for online media (WWW-based) – transforms general didactics onto the characteristics and requirements of the World Wide Web. Our work is based on the Bielefeld-Duisburg Web Didactics (Meder, 2006; Swertz, 2004).

Podcasting episodes are a specific (WWW-based) type of eLearning content and consequently the principles and methods of web didactics have to be applied. The didactic transformation to produce didactically processed knowledge is performed in two steps: de-contextualisation (selection and composition of knowledge elements) and re-contextualisation (arrangement according to didactic principles) (Swertz, 2004). De-contextualisation of eLearning content is affected by condition fields and decision fields.

Condition fields are made up of possibilities and constraints that determine a teacher's didactic decision-making process. According to Swertz (2004), the following conditions should be considered when a web based course is created: analysis of cultural background, target audience, the organization, available resources, presettings, and requirements. Decision fields are those aspects of didactic action that can be configured and designed by the teacher. According to Swertz (2004), the following decision fields should be considered when a web based course is created: course title, competences of students (perception,

appreciation of benefit, mental activity, decision making, technical and communication skills), role models of teachers and students, selection of content, and the didactic model.

In the first step of de-contextualisation, the learning units (collection of knowledge units concerning one subject) have to be set up (Swertz, 2004). In the context of podcasts for blended learning courses, these learning units correspond to podcasting episodes. Learning units are made up of a number of knowledge units, which are determined by knowledge types (contextual, declarative, practical, source, interactive, cooperative knowledge) and media types (text, spreadsheet, speech, sound and audio, image, video). On the basis of a teacher's decision on media types, the applicable type of podcasts can be chosen: audio (i.e., only speech, sound, music) or video podcast, enhanced podcast (combination of media types, e.g. speech, text, images) or screencast (speech + screen recording → video).

In the second step of re-contextualisation, the learning units are arranged according to a didactic model. Re-contextualisation is affected by relations (correlation of units), a course model (combining knowledge units and learning units to larger blocks) as well as macro models, micro models and media models (Swertz, 2004). Macro models on the level of learning units arrange learning units within a course based on their relations. Micro models are models on the level of knowledge units and arrange knowledge units within learning units. Media models define the chronology of media types (Swertz, 2004).

## 4.4 Course Design

Using podcasts in higher education requires complex didactical scenarios (Nagler et al., 2008), which become even more complex when they are applied in blended learning courses. The course design of our blended learning courses has to include 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.

### 4.4.1 Coordinating Face-to-face and Online Phases

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.

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.

Table 1. Course model of podcasting-based course

Face-to-face activity	Temporal relation	Distance activities (podcasting)	Podcasting 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

### 4.4.2 Re-contextualisation

The choice of learning subjects that are covered by podcasts is crucial to its success. A course model and macro model have to be set up that identify learning units that can be taught in distance units easily. For example, in a course on computer-based information systems, communication systems might be covered in face-to-face units, whereas topics on information representation are covered using enhanced podcasts.

After deciding which topics have to be covered in phases of attendance and which topics will be covered in online phases i.e. with the help of podcasting, the appropriate types of podcasts have to be identified. Audio, video and enhanced podcasts or screencasts may be used. Enhanced podcasts have proven to be well suited in blended learning. For example, in our reading class on information systems enhanced podcasts are

convenient, whereas screencasts and enhanced podcasts have proven to be suitable for our web design course.

Figure 2 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).

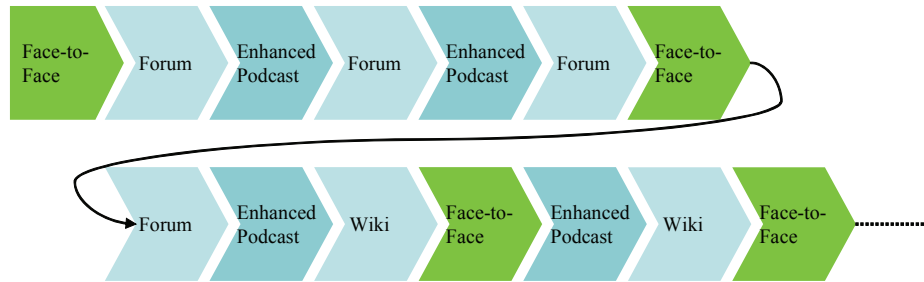


Figure 2. Sample sequence of face-to-face and distance learning

## 5. PRODUCING PODCASTS FOR BLENDED LEARNING

### 5.1 Producing Podcasts

A proper production environment is necessary to produce podcasts efficiently (Herrington, 2005). A microphone, stereo headset and a recording tool are necessary requirements. Most of the required tools can be easily operated and teachers do not need advanced technical skills to produce podcasting episodes.

For audio casts and trailers for enhanced podcasts we are using Audacity®, a popular, free, open source software for recording and editing sounds. We produce our episodes for enhanced podcasts based on narrated slide shows (based on Microsoft® PowerPoint®) using the commercial software product Camtasia Studio® (TechSmith) and additional support of Audacity®. An enhanced podcasting episode is made up of a leading-in sequence (title screen, signature tune, spoken introduction), narrated slides (screen slides with spoken explanations, including sounds) and a trailer sequence (closing screen, signature tune). Screencasts are produced in a similar way using Camtasia Studio®.

### 5.2 Delivering Podcasts

Podcasts are delivered to students using conventional links on our eLearning platform, which provides students with all the relevant information concerning courses plus postings in the lecture weblog and an optional subscription service based on RSS feed. Thus students can choose their preferred way of announcement.

Currently podcasts are delivered in three different formats:

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

An enhanced podcast or screencast episode for viewing directly on our eLearning platform is provided using Adobe® Shockwave Flash® format (embedded in the platform and available for download). SWF files can be played on any WWW-based platform by installing the appropriate plugins in the student's browsers (figure 3). Mobile users are provided with enhanced podcasts and screencasts as MPEG-4 video (format MP4), e.g. for viewing on Apple® iPhones® or other mobile video players (figure 3). Additionally, an audio cast providing the podcasted content in audio only format as MP3 files is offered to the students, too.





Figure 3. Enhanced podcast on eLearning platform for browser-based viewing and on Apple® iPhone®

## 6. RESULTS

Results in a course on information systems show that podcasting is well accepted and highly appreciated by students. A survey was carried out following a lecture in a reading class on computer-based information systems and a tutorial on web design. 18 students took part in the survey, which consisted of an anonymous paper questionnaire handed out in class (response rate 100%). The questionnaire was made up of six closed questions and one open question asking for the student's personal opinion of using podcasts in higher education. Survey results showed that 22% students used the podcasts quite often and 55% used them sometimes, but only 6% noted that they used the podcasts at regular intervals (Kollmann, 2009). 77% of the students declared that the use of podcasts affected their academic success in a positive way. However 22% of the students could not identify a positive effect at all. The first group indicated that due to the podcasts they gained a deeper understanding of the subject (33%) or could understand the topics covered in the lecture better (44%).

Although some students argued that podcasting cannot be used in all subjects, 83% declared that they would like to have more blended learning courses that combine podcasts and face-to-face lessons, whereas 11% did not (6% did not know). Despite this overwhelming acceptance of educational podcasts, 94% of the students participating in this course did not want the number of face-to-face lecture units to be reduced and replaced by lectures on podcasts. These figures clearly indicate that podcasts are well accepted among students for distance learning, but they cannot compete with face-to-face lessons at all.

Most students appreciate the regularly submitted multimedia learning content as an alternative to written material. Great importance is attached to the possibility of time-independent use of learning content. Asked for their usage behavior, the vast majority of students declared that they watch the enhanced podcasts and screencasts embedded in the eLearning platform on their personal computers. Some of them view the MPEG-4 videos online on a computer monitor. However, only a small number of students make use of mobile usage. Similarly, only a very small number of students make use of the audio podcasts due to the optional availability of enhanced podcasts covering the same topics. The enhanced podcasts provided as MPEG-4 video (MP4) for mobile use have rarely been used. 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.

Even though the podcasts are highly appreciated by students, the cost of producing high quality eLearning content by teachers has to be taken into account. Like any other eLearning content, additional course material is laborious, time-consuming and costly to produce. Although podcasts are commonly said to be simple to produce, the effort to produce precasts or extracasts (e.g. based on enhanced podcasts) with additional content (not simply live recordings of lectures) – as is necessary in blended learning – becomes quite significant.

## 7. CONCLUSION

Podcasting has been presented as a well suited method to support distance learning activities in blended learning. Teachers can easily provide students with multimedia eLearning content. Due to subscription services, students are kept well-informed about new teaching material. Like in ordinary courses, podcasts offer a lot of advantages and chances in blended learning courses. Furthermore, the different types of podcasts – audio and video casts, enhanced podcasts, screencasts – present a large variety of application scenarios. Especially enhanced podcasts can compensate for the lack of face-to-face contact in blended learning. Teachers and students can benefit from this aspect especially when teaching software courses since teachers can provide tutorials with the help of screencasts. The asynchronous nature of podcasts is a good alternative to the frequently used synchronous video conferencing solutions for distance learning.

However, teachers who want to use podcasts have to keep in mind that podcasting cannot be applied to all kinds of lectures. 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, screencasts and additional teaching material).

Due to the necessity of complex course design based on web didactics, teachers have to ensure that content follows (podcasting) format and concentrate on providing educational podcasts and not just edutainment.

## REFERENCES

- Allan, B., 2007. *Blended Learning: Tools for teaching and training*. Facet Publishing, London, UK.
- Braun, L., 2007. *Listen Up! Podcasting for Schools and Libraries*. Information Today, Medford, USA.
- Herrington, J., 2005. *Podcasting Hacks*. O'Reilly, Sebastopol, USA.
- IDG Global Solutions, 2006. Podcasting Phenomenon. Retrieved April 14, 2009, from [http://www.schulmac.ch/documents/uploads/podcasting\\_phenomenon03oct06.pdf](http://www.schulmac.ch/documents/uploads/podcasting_phenomenon03oct06.pdf).
- Ketterl, M. et al, 2006a. Alternative content distribution channels for mobile devices. *microlearning 2006*. Innsbruck, Austria.
- Ketterl, M. et al, 2006b. Studying with Mobile Devices: Workflow and Tools for Automatic Content Distribution. *Proceedings of World Conference on Educational Multimedia, Hypermedia & Telecommunications (ED-MEDIA 2006)*. Orlando, FL, USA.
- Kollmann, M. (2009). Podcasts in Higher Education. Bachelor Thesis. University of Applied Sciences Burgenland, Austria.
- Lave, J. and Wenger, E., 1991. *Situated learning*. Cambridge University Press, Cambridge, UK.
- Macdonald, J., 2008. *Blended Learning and Online Tutoring*. Gower, Aldershot, UK. 2nd edition.
- Meder, N., 2006. *Web-Didaktik: Eine neue Didaktik webbasierten, vernetzten Lernens*. Bertelsmann, Bielefeld, Germany.
- Miller, D., 2006. Podcasting at the University of Connecticut: Enhancing the Educational Experience. *Campus Technology*. Retrieved April 14, 2009 from <http://campustechnology.com/articles/41255>.
- Nagler, W. et al, 2008. Podcasting at TU Graz: How to Implement Podcasting as a Didactical Method for Teaching and Learning Purposes at a University of Technology. *Proceedings of World Conference on Educational Multimedia, Hypermedia & Telecommunications (ED-MEDIA 2008)*. Vienna, Austria, pp. 3858-3863.
- Read, B., 2005. Lectures on the Go. In *The Chronicle of Higher Education*, Section Information Technology, Volume 52, Issue 10, Page A39. Retrieved December 10, 2008 from <http://chronicle.com/free/v52/i10/10a03901.htm?rss>.
- Richardson, W., 2006. *Blogs, Wikis, Podcasts, and Other Powerful Web Tools for Classrooms*. Corwin Press, Thousand Oaks, USA.
- Swertz, C., 2004. *Didaktisches Design: ein Leitfaden für den Aufbau hypermedialer Lernsysteme mit der Web-Didaktik*. Bertelsmann, Bielefeld, Germany.
- Udell, J., 2005. What is Screencasting. *O'Reilly digitalmedia*. Retrieved April 14, 2009, from <http://digitalmedia.oreilly.com/pub/a/oreilly/digitalmedia/2005/11/16/what-is-screencasting.html>.
- Wenger, E. et al, 2002. *Cultivating Communities of Practice*. Harvard Business School Press, Boston, USA.