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Benefits and Limitations of Podcasts and Video Blogs as Instructional Media

Vorteile und Grenzen von Podcasts und Video-Blogs als Unterrichtsmedien

by

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Table of Contents

List of Figures and Illustrations

Foreword

Podcasts and video blogs originated at the turn of the millennium as a multimedia development of weblogs and achieved considerable success in the following years. The new content delivery concept on which they are based – that of news feed, offers a straightforward, automated and unobtrusive method of subscription-based information delivery. Their applications have expanded with time as an understanding of the communication complexities developed.

Shortly after the emergence and spread of podcasts and video blogs, it was recognized that they carry a promising potential for use in instructional settings. The difficulties of developing and utilizing such podcasts became quickly evident, because most of the benefits and limitations of electronic instructional media, although of profound importance, lie below the surface of easily observable phenomena. This area of application is still lagging behind both the development of podcasts and video blogs as channels for general information and entertainment, and the development of other media-based e-learning solutions.

This Master Thesis explores the opportunities for podcasts and video blogs in instructional settings. The overall research aim is to address the benefits and limitations of these technologies as instructional media, and more specifically for German universities. It originated from the idea that commendable good podcasting practices identified at one university be communicated to other universities in order to enhance learning effectiveness and curriculum optimization.

The Thesis employs a mixed research approach, including both theoretical-comparative and practical elements. It examines the current state and potential strengths and weaknesses of these new media as well as the level of general adoption of the technologies associated with them and takes into account the teaching and learning practices at German universities. The new opportunities that they could provide to both instructors and learners are considered and discussed. Conclusions are drawn and practical suggestions for a future implementation of podcasts are formulated.

1 Problem Background and Overall Research Aim

1.1 Success of Podcasts and Video Blogs as Delivery Systems for Individualized Entertainment

1.1.1 Main Features of Podcasts and Video Blogs

Podcasts and video blogs offer audio or video content that is suitable for playback on mobile multimedia players and is made available for a routine download from the Internet with the help of a subscription technology (Brittain et al., 2006, p. 26), also known as a feed (e.g. RSS or Atom). Analogous to the use of other media names like "television", the term "podcast" may refer to both the offered content and the method of delivery.

The term "podcast" has emerged in the last few years and is a portmanteau word that combines the words "*broadcast*" and "*iPod*" (Campbell, 2005) and was arguably introduced by a web developer Ben Hammersley (Arthur et al., 2006). Despite the name, an *Apple iPod* or even a portable media player is not necessarily needed to subscribe or listen to podcasts. Nevertheless, the Apple *iPod+iTunes* system is a very popular way to access podcasts and has contributed to their spread and development, especially in the USA , where Apple products have a significantly higher market share (more than 70% in the end of 2007 according to Reuters (Martell, 2006)) than any other competitor in the field of mobile information and entertainment.

While multimedia content for download on a website has been introduced already in the early stages of the development of the World Wide Web, the feature that defines and separates video blogs and podcasts from the earlier developments in the area is the possibility to subscribe to them and download them automatically with the help of specialized software that supports web feed formats like RSS and Atom. Additionally, podcasts in general, and video blogs aimed for consumption on a mobile device are always offered in a downloadable file format in contrast to streaming the multimedia content.

1.1.2 Initial Areas of Successful Dissemination

The most popular topics of podcasting or video blogging, at least in the initial stages of their development are in the area of entertainment and journalism and eventually resemble radio or, respectively television programs. Nesbitt (2005a) analyzes the categories with most channels on the directory site *Digital Podcast*[1]. He finds that the most frequently offered podcasts deal with music reviews and are similar to musical shows on the radio, followed by science and technology programs and humour channels.

The success of podcasting, has been very rapid and many established media companies have taken the concept from its grassroots beginnings as a tool allowing individuals to distribute their own private "radio shows", to a commercialized delivery system used for purposes ranging from public-relations and advertisement to religious services, the latter also known as "godcasts" (Crofts et al., 2005).

It is primarily considered a new way of selling entertainment to a young, more sophisticated audience, that is increasingly becoming less interested in "broadcast" selling (e.g. TV).

This is one of the reasons why podcasts may be also seen as "infotainment" media. Infotainment itself is a portmanteau word of information and entertainment, which was introduced by Neil Postman (2000). It refers to media, combining both "hard news", and fun. What is both a characteristic of podcasts and infotainment is that they are aspects of the zeitgeist and are usually oriented towards a younger and educated public.

The entertainment industry has embraced commercial podcasts as an alternative to traditional channels and the new technology has proved to be quite successful. Amongst the most popular podcasts offered on the *iTunes* platform are entertainment and comedy shows that have a target group of young, dynamic and educated audience.

Considering the American mobile lifestyle and the fact that Americans spend a considerable amount of time driving in their cars proves listening to a podcast while driving a popular and useful experience (Schulin and McCully, 2006, p. 319). In such

1 http://www.digitalpodcast.com (Accessed: 02.03.2007)

an environment podcasts are used as a personalized substitute to the traditional radio broadcasts. This trend has been closely watched by the leading car manufacturers in the American market and the Apple Corporation which work together to integrate the *iPod* into car audio systems. By the end of 2007 estimated more than 70% of the new produced cars will provide a certain kind of *iPod* integration (McCarthy, 2006).

While the spread of the concept and technology is much wider in the USA where it originated, podcasts and video blogs are being gradually introduced to the media spectrum in Germany as well. The number of grassroots podcasters is much smaller compared to the American market, but there are some examples of high profile use of the technology.

These include:

- The weekly address of the German Chancellor Angela Merkel, commenting on a current political or social issue that is provided in a number of audio and video formats, as well as a text version in accordance with strict accessibility guidelines. The service has been active since June 2006[2].
- Video blogs or podcasts offered by a number of established media news companies and television channels including the state run ARD central news program "Tagesschau"[3] or the popular 24 hour news channel n-tv[4].
- A large number of traditional radio programs are being offered as podcasts for time-shifted listening.

The German podcasting web portal *podcast.de* offers a current chart of the most popular channels in terms of subscribers. At the time this Thesis is being written, the top 30 channels include almost exclusively audio or video recordings of traditional popular radio or television shows[5].

2 http://www.bundeskanzlerin.de/Webs/BK/DE/Aktuelles/VideoPodcast/video-podcast.html (Accessed: 02.03.2007)

3 http://www.tagesschau.de/podcast (Accessed: 02.03.2007)

4 http://www.n-tv.de/podcast (Accessed: 02.03.2007)

5 http://www.podcast.de/sender/podcharts/meiste-abonnenten/ (Accessed: 10.03.2007)

1.2 Podcasts and Video Blogs as Instructional Media are Lagging Behind

The new possibilities that podcasts and video blogs provide as media communication delivery systems make it plausible to look for instructional applications of podcasts and video blogs. Both new delivery systems have gained some popularity in recent years and are gradually being implemented and employed to improve the efficiency of distance and multimedia education. At the same time, one may observe that the use of podcasts and video blogs as instructional media is lagging behind the commercial use of these delivery systems.

The development of instructional media through podcasting and video blog technology in the United States has been heavily supported by the Apple Corporation, partly because of Apple's dominant market position in the area of portable multimedia players and the interest of the company to promote the new podcasting technology as a driving force behind its *iPod* sales.

Apart from providing large numbers of *iPods* to whole classes at some universities, the company has developed a special version of its *iTunes* on-line store software, called *iTunes U*[6], that is customized for the use and dissemination of instructional podcasts at a customer university. The *iTunes* software supports the subscription and management of podcasts, as well as the automatic synchronization of newly downloaded episodes with the user's *iPod*. The client-side of *iTunes U* is virtually the same as the standard version. It is the server tools that provide instructors and administrators with the capability of uploading and easily enclosing new multimedia files into relevant feeds. Additionally, the system could be integrated into an existing learning management system, so that seamless access with a single password is possible. The system is still not available outside the USA.

Numerous institutions of higher education in the USA have implemented *iTunes U*, among others Stanford University (Illustration 1) and University of California, Berkeley[7] offer audio and video instructional content not only to their own students but to the wider public.

6 http://www.apple.com/education/solutions/itunes_u/ (Accessed: 30.09.2006)

7 http://itunes.berkeley.edu/ (Accessed: 17.03.2007)

Illustration 1: Stanford University's iTunes U portal

A widely used instructional setting for podcasts and video blogs in university settings is the so called “coursecasting”. It applies to lectures being recorded live and released as podcast episodes to students for review purposes. They are considered beneficial for students that have difficulty understanding the lecture (non-native speakers) and also as an effective revision tool. On the other hand, critics claim that the coursecasts could diminish the motivation of students to physically go to a lecture (Read, 2005).

The discrepancy between commercial and instructional use of podcasts is even bigger in German speaking countries and the rest of Europe, compared with the USA. Unlike in the USA, feed-based Internet technologies are being adopted in a much slower pace in Germany. This has an impact on their utilization in the fields of instruction and learning, where podcasts and video blogs are almost completely missing or in a very early stage of development.

Other types of mobile learning, however, mostly based on mobile phone usage enjoy a higher level of research and practical interest in Germany. This can be explained with

the massive penetration of mobile phone technology in Europe and Germany in particular.

Educational podcasts in Germany are still very rare and lagging behind the development in other fields of media-based learning. Exceptions are podcasts that offer audio courses in foreign languages which have been present in the podcast market since its early stages. There are currently very few examples of successful implementation of the technology in the area of higher education at this point of time.

One of the very first university podcasts was offered independently by students of the University of Saarland. Called *BWLpodcast*[8], meaning roughly business administration podcast, it offered episodes prepared by the involved students that provided a weekly review of the most important topics of an Introductory Statistics lecture. The podcast was active in the first half of 2006 and since then has been abandoned, but the fact that initiative students have worked on the idea and have created this series without support from the university is an indicator that the technology has an appeal as an instructional medium among young people.

A much more professional and scientific implementation of podcasts has been undertaken in a joint initiative *virtUOS* (Zentrum zur Unterstützung virtueller Lehre der Universität Osnabrück) by the Universty of Osnabrueck and the University of Applied Sciences of Osnabrueck. The *virtUOS* center concentrates on development and research of virtual education methods and technologies and instructional podcasting is one of its areas of interest. A number of professors have offered professionally developed "cousecasts" (full recordings of a lecture provided in a podcast format) to the participating students and the wider public in a free access form.

1.3 Overall Research Aim: To Explore the Potential of Podcasts and Video Blogs as Instructional Media in German University Settings

The developments in the recent years have lead many observers to conclude that the World Wide Web has changed dramatically, from centralized sources of information to a platform for the empowered user who becomes the content creator (Hall, 2006, pp.

8 http://www.bwlpodcast.de (Accessed: 17.8.2006)

123-141). A new term – Web 2.0 – coined by members of the O'Reilly Media Company (Graham, 2005), is being used to broadly describe these new technologies and practices.

The overall research aim of this Master Thesis is to address the benefits and limitations of podcasts as instructional media, and more specifically within university settings in Germany.

The present Thesis aims to look at the subject from the perspective of the German reality. Both the level of general adoption of the technologies themselves and the teaching and learning practices at German universities are taken into account.

The analysis is achieved through a mixed approach, including both theoretical-comparative and empirical elements.

For the overall research aim to be achieved, it is necessary to analyze the supply and demand sides of the new delivery technology. The supply and demand model is the fundamental model of microeconomics (Marshall, cit after Matthews, 1990, p. 15) and describes the interaction in the market for a certain good between producers and consumers.

Both supply and demand sides are in the center of a theoretical-comparative analysis that deals with strengths and weaknesses of podcasts and video blogs and the new opportunities that they could provide to both instructors and learners. Here, again, the reality of German universities is to be considered and the conclusions of some of the American studies are examined for their applicability in the different learning culture and environment.

An assessment of the demand side is best achieved by an empirical questionnaire survey, which explores the differences between audio and video media, as well as the different levels of mobility they could offer. Video, unlike audio requires the full attention of the viewer which leads to fewer opportunities for mobile learning in university settings. It is not very realistic to assume that one would watch an instructional video while driving or jogging. Listening to a podcast, on the other hand, is optimal for these and similar activities. A natural question, therefore, is to what extent video blogs can become a mainstream mobile medium.

The empirical study, described and analyzed in this Master Thesis, uses podcasts and video blogs as additional course material for a regular Business Informatics course at the author's university. Different types of content are presented to the students – from a recording of a full lecture to short excerpts or a summary. After having used the offered podcasts and video blogs, the group of participating students fills in a questionnaire that examines their attitudes and reaction to the technologies as a whole as well as the offered material.

The conclusions and suggestions are based on the findings of both the theoretical and empirical parts of the Thesis and are closely related to the overall research aim.

2 Podcast and Video Blog Technology – Content Design and Delivery Options

2.1 Technological Roots – Blogs and Web Feeds (Newsfeeds)

Podcasts and, naturally, video blogs are seen as the multimedia development of the blog (short for web log) concept. Gaining a high level of popularity since the early 2000, blogs are considered the basis and one of the definitive points of the Web 2.0 concept that sees the Internet user in a new role as a creator, as well as consumer, of information on the World Wide Web. Mortensen and Walker (2002, p. 249) define blogs as predominantly personal websites containing short articles that are being regularly updated, "time-stamped" and presented in a reversed chronological order with the option for the visitors to leave comments on the addressed issues.

While the beginnings of the blogs in the late 1990s are humble and articles consist mostly of a link to an existing web page and a short comment, the medium develops very fast and becomes a popular tool for self-expression. Whereas many blogs deal with personal issues and are similar to a personal diary, others develop into a form of journalism, often called "grassroots journalism". Some prominent blogs gain serous political weight (Trammell et al, 2005, pp. 968-982) and become a powerful election campaign instrument (Merz, 2006). A logical development leads to the establishment of blogs as alternative marketing channels, often used by large corporations and written in a colloquial language contrasting the classical formal advertising style (Kelleher and Miller, 2006). Furthermore, the concept has entered the educational field and is used as a learning aid, often in "creative writing" courses (Lowe and Williams, 2004).

A concept that is at the base of the success and proliferation of blogs is the so called newsfeed or web feed technology. While it is not a compulsory part of a blog, the overwhelming majority of blogs utilize it to automatically provide their frequently updated information to subscribed readers.

The feed formats were developed prior to the emergence of blogs and their original purpose was to "syndicate" up-to-date information from different websites and to integrate it into a third one, normally a web portal. The services that provide the

accumulated information are also known as “aggregators”. Syndication refers to the preparation of data for further distribution at different web locations (Wittenbrink, 2005, pp. 6-7).

Web feeds are written in a number of similar XML-based file formats. The most well accepted and supported ones are RSS and Atom. The abbreviation RSS could stand for "RDF Site Summary", "Rich Site Summary", or "Really Simple Syndication" with the last one referring to the most current version – 2.0. Atom, on the other hand is a newer development and is an attempt to improve and streamline the already existing RSS format. When used the latter name could refer to feeds in any format.

Currently, a large amount of software supports these formats, from server-side scripts that aggregate a number of feeds and display them on a site, to modern web-browsers like *Mozilla Firefox* and *Internet Explorer 7.0* that could transform feeds and represent them as perpetually updated favorites or “live bookmarks”. There are also stand-alone feed readers that present the information from the subscribed feeds in a manner similar to classical mail and newsgroup clients.

The underlying functionality that sets feeds apart as a new and exciting technology is the provision of relevant real-time information to the users. They do not have to search and find it by themselves, but only have to subscribe to the feeds of interest and the information will be automatically retrieved and organized as soon as it is made available.

This information could be virtually anything that resembles a publication or an article and is frequently updated.

The feed model, based on the feed technology, provides a convenient and unobtrusive way to provide information to the relevant target group. The information is being downloaded automatically only by the users that have voluntarily and actively subscribed to the particular feed. In this sense podcasting is a pull technology, considering the feed selection and a push technology in terms of the single files being automatically downloaded as soon as they are made available. A positive effect of this concept is that there is no possibility to abuse it and send “spam” content to random users.

Apart from blogs, feeds are heavily used by news sites, message forums, even web mail providers, and more prominently – podcasts.

2.2 Emergence of Podcasts and Video Blogs

The concept of podcasting begins to take shape around the year 2000 and is technically made possible a year later with the introduction of RSS 2.0. It starts to gain considerable interest not earlier than late 2004 (Farviar, 2004). The following years have seen a very rapid growth in the numbers of offered channels. The podcast-tracking website *FeedBurner* lists an estimated 202 different channels in November 2004 (BusinessWeek, 2005) while at the time of the writing of this Thesis in March 2007 there are more than 95,000 listed channels[9].

As already mentioned in Section 2.1., podcasts and video blogs developed on the basis of blogs in the area of multimedia content. Important is the information aspect of blogs that mimics written media like newspapers and magazines, but at the same time offers a completely new point of view. This eventually animated established newspaper media (e.g. The Times of London, The New York Times, Der Spiegel, etc.) to adapt and offer blogs of their own on their respective websites, and contributes to the logical next step to emulate radio and television and modify and adapt the format of particular shows to the concept of time-shifted, subscription-based, personalized and mobile multimedia entertainment.

These particular new features are the main driving forces behind the quick success of podcasts, especially among the young sophisticated audience, that considers classical broadcast media to have gradually become less exciting and too burdened with commercials compared to the emerging podcast medium (Kiley, 2005).

Crofts et al. (2005) list a number of social reasons and contributions for the growth and spread of podcasting. Among them are:

- time-shifting, place independent options that the technology provides,
- frustration on the side of the public from the homogeneous, non-customizable content of traditional media,

9 http://www.feedburner.com/fb/a/podcasts (Accessed: 10.03.2007)

- the general trend of moving towards individualized, customized media selected by the individual users.

Crofts et al. (2005) argue that media fragmentation leads to the feeling of greater control and higher satisfaction among consumers. The term “narrowcasting” (Acohido, 2005) is also used to contrast the new concept from the broadcasting mass media like radio and television.

Despite the mobile capabilities of podcasts and a name that implies use almost exclusively on an *iPod* device, a survey by Bridge Data in 2006 reveals that up to 80% of the users listen or watch the audio or video material on their computers, rather than on a portable multimedia device (Dickson et al., 2006).

2.3 Podcast Creation and Publishing

The creation and publishing of podcasts and video blogs are streamlined processes that begins with the recording of the material, followed by the editing and creation of a new podcast episode, which is being uploaded to a web server and also included into a feed “enclosure” which alerts podcast aggregators of the new material. The aggregators then automatically download the new episode. Illustration 2 presents the basic steps.

2.3.1 Recording and Compression

The creation of a podcast or video blog begins with the recording and editing an audio or video file. This file is often called an episode. After being completed, it has to be compressed in a format that is being supported by the widest range of devices and is of acceptable file size. The most popular formats for audio files are:

- Mpeg-1 Audio Layer 3, better known as MP3 and widely considered to be the industry standard (Guillemin et al., 2004) and supported by nearly all multimedia players,
- Apple Corporation's own standard Apple Audio Codec (AAC), that is being supported almost exclusively by iPod devices and the Apple iTunes music store, and provides some additional features like chapters or synchronized still images (See Section 4.3.4.),

- Microsoft Corporations Windows Media Audio format (WMA), that is supported by a wide number of portable player manufacturers and on-line music stores, and
- Ogg Vorbis (OGG), an open-source alternative format that still struggles to gain a considerable support by commercial players in the field.

The format that will be accessible to the widest number of potential users is MP3. Video formats that are used in video blogs are also chosen mainly because of compatibility issues. The most widely used codecs are *Mpeg-4* and the newer and more efficient one *H.264*. The file extensions could be, among others, .wmv, .mp4, .avi, .mpg, whereas the codec used for the compression could be the same.

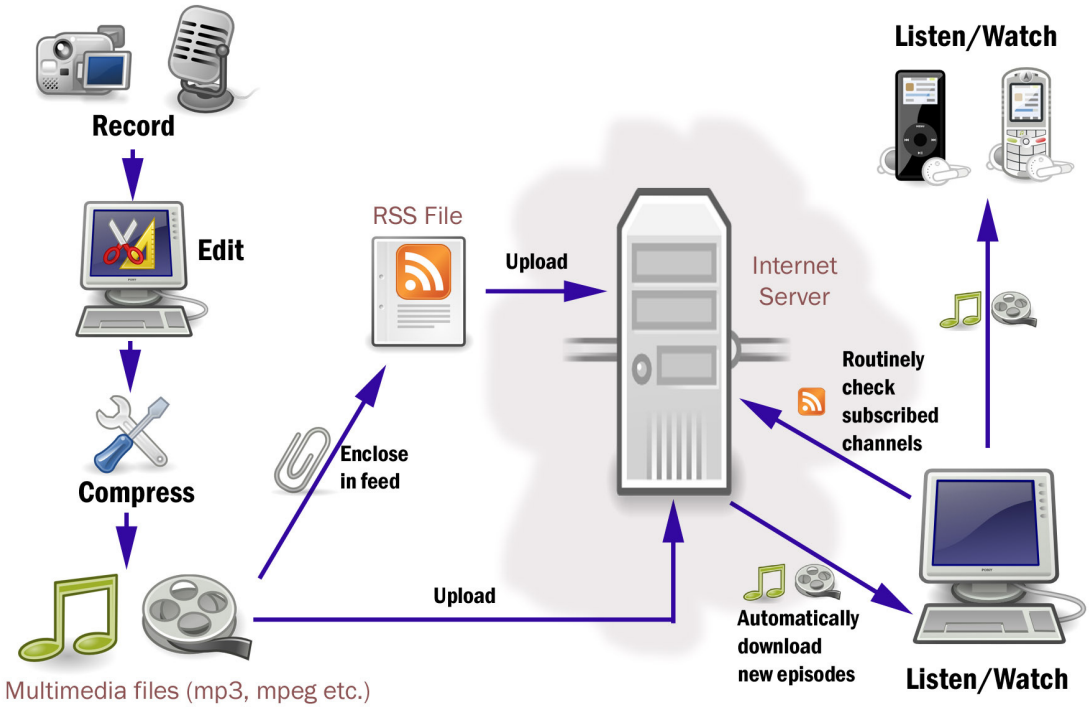

Illustration 2: Basic steps for podcast and video blog creation and use

2.3.2 Publishing

After the multimedia content is created in a compatible form the new episode has to be uploaded to an Internet server. The exact location is not relevant and different episodes may be uploaded to different places. The server has to have a high traffic limit especially in the case of high demand for the offered podcast.

The existence of the new episode has to be declared in another separate file that is the news feed. It is normally written in RSS or Atom format and is essentially a standardized XML file that provides the information on the media file's location and details such as publish date, size, title, and a description for each particular episode. This process is common to blogs and podcasts alike, but in the case of podcasts and video blogs the media files are said to be put in an enclosure, contrasting to the pure text format of traditional blog feeds. The RSS or Atom file may contain the details of all episodes of the channel, but is typically limited to a list of the most recent episodes. The file is only being updated with the posting of a new episode.

The next step is to post the feed file on a web server. In this case the location at which the feed is posted and the address at which it could be accessed, also known as a feed URI or feed URL, are required to be permanent. This exact address has to be communicated to the intended target group, most often through a link on a website or listing in specialized podcast portals, including the Apple *iTunes* music store.

2.3.3 Subscription and Automatic Download

An interested consumer subscribes to and manages particular feeds with the help of a specialized software program called an *aggregator* as a broader term, or a *podcatcher* or podcast receiver, when specially intended for podcasts or video blogs.

The podcatcher's function is to routinely download the feed files for which the user has been subscribed and to examine them for new entries leading to a new episode that is made available. In case of a new item being offered, the podcatcher accesses the address that has been provided in the RSS file and automatically downloads the new episode to the user's computer. Some applications, depending also on the portable multimedia player, provide the functionality to upload the newly retrieved files to the user's portable player as soon as the latter is being connected to the computer.

After being downloaded the new episodes can be permanently stored and played at any time and without the need of an Internet connection which makes the podcasting technology different from on-line audio or video streaming.

3 Media-based Instruction in University Settings

3.1 Face-to-face Versus Media Communication

Human communication refers to the social interaction of sharing information. Every communicative act integrates cognitive, emotional and volitional elements. The shared information is not exclusively used for knowledge enhancement, but also facilitates the creation of interpersonal relationships. Recent psychological research shows the importance of imitation for any kind of learning (Cano, 2005, pp. 203-221). Maintaining and encouraging social bonds in communicative acts support learning.

A closer and more detailed look at the concept "communication" reveals a complex picture of different understandings and interpretations. It is not the subject of this Master Thesis to delve into the different aspects and opinions on the matter, but the definition by Devito (1986, p. 61) is going to be accepted. Namely, communication "*is the process or act of transmitting a message from a sender to a receiver, through a channel and with the interference of noise; the actual message or messages sent and received; the study of the processes involved in sending and receiving of messages*". While this definition tries to be as broad as possible it assumes that communication functions properly only if the message sent is being received almost unchanged. Communication "noise" is to be put at a minimum.

According to Devito (1986) communication will have to be seen both as an act and as a process. The present Thesis analyses both the different acts of transmitting information to the students with the help of the delivery technologies being discussed, and the process of communicating to and informing students in a university setting in a broader context. Looking at the process of communication, one has to differentiate between face-to-face and media-based communication.

The face-to-face communication has the advantage that all three aspects of communication (cognitive, emotional and volitional) are present and influence learning. In the absence of face-to-face instruction some signals that are used for socializing and to interpret meaning are missing (Dow, 2002, p. 7) thus providing obstacles for learning. There are many situations, however, where face-to-face communication is not

possible. Distance, time or other types of barriers could prevent face-to-face contact between the interacting agents.

Because of these constraints, communication through media has a long tradition, and is a uniquely human process. It may be identified in the very early stages of human development even before the invention of written languages where paintings, signs, symbols, etc. could be used to convey information over a space or time boundary.

Media are all instruments or techniques used to enable communication in other than face-to-face settings. Two basic types of media may be differentiated:

- Individual or group-oriented media, which has a clearly defined recipient.
- Mass media, all means of mass communication, including print media and broadcasting (radio and TV).

Mass communication is characterized by its large heterogeneous audience that prevents the communicator from interacting personally with the receivers of the information. The audience is also generally anonymous, while the originator of the information is normally not a single individual but a complex and organized media entity. Unlike interpersonal or face-to-face communication there is generally no or little feedback from the receivers (Heath and Bryant, 2000, p. 344).

In this context it is not easy to give podcasts or video blogs a particular label. While both are media for communication and are related to other kinds of mass communication, their interactive features (especially in video blogs) together with the customization and personalization options are some of the reasons for their current success. As mentioned in Section 2.2. this “narrowcasting” concept provides new opportunities and utility to the senders and potential receivers of the communicated information.

Additionally, in the educational cases where podcasts and video blogs are used as auxiliary study material, their mass media aspects play an even lesser role, as the target group (course participants) is well defined and known and interactivity is not only possible but certainly encouraged.

3.2 Media-based Learning and Instruction

Instruction, traditionally a face-to-face act between a teacher and a student, has seen dramatic changes in the past few decades. Written and spoken words have been the main carriers of information and knowledge for thousands of years until the development of new media in the twentieth century. The revolution of communication technologies has had a serious impact on the trend towards media-based instruction practices in educational institutions of all kinds (Pittinsky, 2002, p. 14).

The far reaching effects of the lack of closeness between instructor and student are empirically demonstrated and extensively discussed by Moore and Kearsley (2005b).

Compared with face to face instruction, media-based instruction has several specific features:

- It allows a spatial separation of the teacher from the learner, so that learning is enabled in situations, where direct communication is difficult or barely possible;
- It uses delivery technology of many different kinds to bridge the gap between the lecturer and the learner;
- It puts a stronger emphasis on the design of instructional materials, so that the content may be easily understood and accepted without face-to-face communication with the teacher.

A trend of combining the virtues of classical presence instruction and media based instruction has manifested itself under the term “blended learning” (Graham, 2004).

Media-based instruction in general enhances the role conferred to learners in the instructional process and makes intrinsic motivational factors even more essential for the success of learning (Moore, 1993, pp. 22-38).

The media delivery technologies used to mediate in instructional settings may be roughly classified in four groups: printed, audio, video and electronic:

- Printed media: books, study guides, texts and other printed materials;
- Audio broadcast: instruction per radio, audiocassette, audio conference;

- Video broadcast: instruction per television, including close circuit TV, cable, satellite, video conference, recorded video or DVD;
- Electronic computer mediated communication, which includes, among others, podcasts and video blogs.

3.3 E-Learning

The most recent developments in telecommunications and other information technologies that ushered the Internet age in the middle of the 1990s have provided a new paradigm shift in the area of instruction as well. Since the pace of dynamic new developments in this area is far from slowing down, it constantly provides researchers with new areas of exploration and educators with the challenging task to constantly keep up with the technological innovations (Harlett, 2005, p. 54).

Many technologies have not yet been fully utilized in an instructional setting when they are already being made obsolete by new developments that provide higher level of efficiency or even a whole new way to store and relay information and knowledge.

It has to be pointed out, however, that despite all the developments and new opportunities, that educational science has seen, spoken and written word have remained the main two carriers of knowledge and information. The day when books and lectures held in person by a professor at a typical university are going to become history is still not in the foreseeable future. In other words, the paradigm teacher – student has not significantly changed. The new technologies have to be understood as mere tools that might be used to better fulfill certain instructional tasks and not be implemented just because of their perceived novelty (Coenen, 2002, p. 28).

The use of computer technologies as an instructional medium is characterized by the tendency that in some cases new technologies have been created for the special needs of education and instruction, and other times instruction practices have been adjusted to and improved with a computer technology that has originally been developed for a use outside the area of education. Major technological breakthroughs, especially in the area of communications and data and information management have been often hailed as the new substitutes for the classical book since the times of Edison ("*Books will soon be obsolete in the schools*" (Macklin, 2003, p. 69)). Nevertheless, the paradigm of

computer-supported learning has failed to shift to such an extent that a completely new way of learning has been created. Most of the new computer technologies have rather provided new channels of instruction and learning that are complementary to classical methods and do not replace them completely.

Computer-aided, or as it is generally called e-learning has been an important area of development in the past years and with the advent of the Internet has developed a very broad appeal and subsequently coverage in educational and commercial organizations (Sabau, 2007, p. 3). Almost every university in the world offers some support for faculty and students in the area of computer-aided or e-learning. Similarly, the intranets of most companies are tools not only for communication and collaboration, but also knowledge transfer and learning.

E-learning may be seen as the last of three generations of media-based learning:

- Classical media-based learning like correspondence education, educational extension, home studies
- Broadcast media-based learning like educational radio and TV broadcasts
- Electronic learning or e-learning like computer mediated communication, web based training, virtual education, cyberspace education, podcasts and video blogs.

For the aspect of content synchronization e-learning may be further differentiated in synchronous (real time) and asynchronous (deferred time) e-learning (Clément et al., 1992, p. 150). The communication between the learner and the learning facilitator occurs live or in deferred time. A synchronous (real time) media allows for a two-way exchange of information. In cases of one way delivery the originating site provides all the content and the receiving site is mainly passive. Two-way delivery enables real time communication and instructors take advantage of the of background knowledge of the participants to enrich the learning environment.

3.4 Multimedia Applications in Instructional Settings

Multimedia is defined by Oblinger (1993, p. 3) as a combination of "*natural presentation through text, graphics, audio, images, animation and full motion video*"

and interactivity. This description stresses on the world *natural* and contrasts it to the rigid communication of information through written text that requires abstract thinking on the side of the receiver of the information to decode and grasp it. Natural channels, on the other hand, like the combination of sound and image are arguably easier to assimilate (Oblinger, 1993, p. 3).

Oblinger's definition of multimedia is quite broad. Offering a script in a text form along with a classical lecture, or providing a map in a geography class could be accepted as early forms of multimedia instruction methods. The development of new technologies broadens the spectrum of possible media mixes. The use of computers is not mandatory for multimedia instruction although currently most of the tasks previously done with other tools have been now made more accessible and easier to operate with the help of a computer. The following examples list some of these methods and technologies:

- Overhead projectors enable instructors to better present the important points of their lectures synchronized with their oral presentation.
- Recorded sound clips are played to an audience as examples in a music class.
- Audio recording and playback are utilized in language classes to help students improve their listening comprehension skills as well as their pronunciation by listening to their own recorded voice.

Since the mainstream success of the personal computer multimedia and interactivity in education have seen dramatic improvements. The development of digital media storage technologies like CD-ROMs and larger hard drives available at reasonable prices have helped media different than plain text (especially the size-intensive digital audio and video) to be stored and easily consumed, edited and managed on a personal computer since the early 1990s (Handwerker, 2000, p.7).

The advent of the World Wide Web, the non-linear interactive navigation structure and the new communication and information channels that it offered have, on the other hand, provided completely new types of learning opportunities (Carusi, 2004, p. 500). In other words it provided a paradigm shift in the way communication and multimedia instruction are understood. While computers previously merely offered improved management of media content of different types over analogue systems, now, with their

new connectivity, they themselves have become a platform for multimedia-based learning of a new kind. This type of e-learning is not to be equaled to multimedia-based learning. The latter could include time and place constrained mix of instructional media, while the former, in its broad sense, encompasses electronically-networked learning in general that could include multimedia tools (Haas et al., 2003, p. 709).

4 Podcasts and Video Blogs as Instructional Media – Benefits and Limitations

4.1 Communication Opportunities and Benefits

Audio and video lectures have been in use for a considerably long time for the purposes of both distance and blended learning beginning with early examples like “satellite-based live video” lectures through multimedia CD-ROMs and later web-based live streaming (Bersin, 2004, pp. 5-11). Instructional podcasts and video blogs do not provide a breakthrough innovation in the underlying medium of instruction, in this case audio or video, but it is instead in the communication and delivery method, as well as the improved flexibility of consumption opportunities.

The subscription mechanism offered by all technologies using feeds like RSS or Atom is an innovation compared to the previous dissemination technologies (Schiefner, 2006). Its dual nature of a push and, simultaneously, a pull technology provides a high level of utility to both authors and consumers of the offered content. As previously discussed in Section 2.1., feeds have a pull nature at the macro level of choosing and subscribing only to channels of interest and are at the same time a push technology concerning the sending of the particular episode to the subscribed user. In this scenario the consumer is not required to actively and repeatedly search for newly available and updated content, because it is being automatically delivered as soon as it is made available. Classical methods of disseminating multimedia are normally limited to offering the material for download, as the most popular push technology, the e-mail, is not optimized and generally not used for delivering large files.

Podcasts and video blogs offer enclosed files that are being permanently downloaded to the client computer in contrast to audio or video streaming technologies that provide a real-time stream to the user and so require a “live” Internet connection. In addition, especially video streams, call for a fairly high bandwidth in order to sustain an uninterrupted video transmission. Dial-up Internet connections, being restricted to a maximum bandwidth of 56 kbps, are normally not suited for high quality video streaming.

The local storage of the complete episodes on the user's device of choice, a personal computer or a mobile device provides a time-shifting quality (Greenlee, 2004) of being able to listen to or watch relevant shows at a convenient time and without the need of a live Internet connection.

4.2 Enhanced Mobility Options

Video blogs in instructional settings are still predominantly being watched on a personal computer. Watching video even on capable mobile devices has proved to be not that popular (Wallenstein, 2006). The main reason is that the technological advancement in the area of portable video is still not far enough to achieve the popularity levels of portable audio players. While quite many of the sold portable multimedia players already support video playback this feature is not as popular even on these devices. Among the reasons are the small screen sizes, shorter battery life and the need to concentrate visually on the device which is not practical or even impossible in many "mobile" situations in which just listening is very popular (driving, jogging, etc.).

Audio podcasts as instructional media, on the other hand, offer the full flexibility of providing information in situations that were previously not considered suitable for learning. Good examples are listening to instructional material while driving, traveling on the bus, jogging, or exercising. It could be argued, however, that since the introduction of the *Walkman* by Sony and cassette players in cars listening to instructional content in these situations was made possible more than 25 years ago. It has to be pointed out that the audio cassette format was quite rigid compared to today's much smaller portable multimedia player devices. What is even more important, are the content delivery method and process, namely the feed (RSS, Atom etc.) and automatic download and synchronization with the mobile device as soon as the content is available. This streamlining of content delivery is the main feature that enables users of podcasts to not lose time or energy in finding the relevant material, but just access it at any convenient moment. As Schulin and McCully (2006, p. 316) point out, mobile audio devices are already a mature technology and are similar to a pencil – always "at ones fingertips".

4.3 Limitations and Unresolved Issues

4.3.1 Spread and Awareness for the Technology

Podcasts and video blogs, while being buzzwords in the circles of entertainment, marketing and information technology professionals - "podcast" was word of the year for 2005 according to the New Oxford Dictionary (Haines, 2005) - are still technologies in their early stages of development and adoption. They have attracted a sizable and enthusiastic following in the short period since their emergence, but are still far away from the massive adoption rates of older traditional media like television, radio or the Internet. According to Forrester Research (Li, 2006) only about 1% of the Internet users in the USA regularly downloaded podcasts in 2006, while about 25% are interested in the technology. Nevertheless, the same author predicts very high growth rates up to 2010 when an estimated 12.3 million people would be regular users of the technology. The California-based radio audience measurement agency Bridge Ratings (2005) provides an even more optimistic outlook and estimates the number of Americans who are going to listen to podcasts in 2010 at around 45 million.

It is evident from the numbers that podcasts are still in the phase of early adoption and a broad segment of potential users are still not aware of the technology or have not made use of it yet. This low level of awareness could be a negative factor in the implementation of the technology in an instructional setting. The students need to be proficient in a technology in order to make full use of it, and while the adoption rates of podcasts and video blogs are higher among young people in the age group of university students, part of the potential learners are not going to fully utilize the offered podcasts for their learning experience.

4.3.2 Computer Anxiety and Communication Apprehension

The use of technology and computers in particular has become a commonplace in everyday life and has provided improved productivity and opened new possibilities in many areas. Instruction and education are no exceptions and computer-based or e-learning is constantly gaining on importance and adoption. Instructional podcasts and video blogs are examples for one of the newest areas of development in the field.

Nevertheless, they have also brought some unresolved issues with themselves: one is the incompatibility of individual characteristics with the new technologies. The issues of psychological anxiety and apprehension towards the technologies employed as instructional media could create learning barriers for students that otherwise would not have problems with the course material itself (Fuller et al., 2006, p. 103).

Considering the novelty of the discussed media and the current relatively low level of awareness among students discussed in the previous section could further increase the apprehension towards use among students with no or little knowledge of them.

4.3.3 Production and Resources Issues

Providing podcasts as a complementary course material parallel to scripts and other documents could certainly be considered as beneficial for the students, due to the additional channel of information that offers new opportunities to study and learn. It is not the question whether podcasts provide any utility to students and instructors alike, but at what cost in terms of production time and effort these course materials are created and if the benefits offset the production effort.

While it is barely possible to accurately calculate the return of investment of an instructional video blog or podcast these issues have to be considered by anyone that plans to implement the technologies.

4.3.3.1 Perceived Ease of Production

As previously mentioned, podcasts are generally considered relatively easy to create and publish which could also explain their speedy proliferation in the past years. They are considered to be one of the pillars of the new Web 2.0 paradigm that postulates that the average user becomes the creator and not only the consumer of content (O'Reilly, 2005). To achieve this status, a certain ease of use and intuitiveness are required from a technology in order for it to be embraced and freely used by a wide range of people not technically proficient in that particular area.

Specifically audio podcasts are considered to be relatively undemanding in terms of production, because theoretically, the developer requires only a standard computer

microphone, basic audio-processing software, a fairly fast Internet connection, and the required amount of web space to upload the finished episodes to. Basic knowledge of the feed technology is also required, but there are a number of on-line services that support the enclosure of audio files into a relevant RSS document.

Video podcasts, on the other hand, are intrinsically more complex to produce because of the visual dimension that has to be addressed adequately. Apart from the challenges facing high grade video shooting like the quality of the video camera, lighting, etc., the size of the file as well as picture quality and the trade-off between these two aspects play a central role in the creation and offering of video on-line. Compression methods and video encoding are not as straightforward as audio compression (mostly in MP3 or AAC format). A number of variables have to be optimized in order to achieve an acceptable result.

Despite the notion that these technologies are generally undemanding in terms of technical proficiency and time investment, these assumptions are made for productions with a sub-par quality that might be acceptable to individual podcast enthusiasts but are not expected to be adequate for an institution of higher education. In other words, the production quality of educational audio and video material has to meet a certain level of professionalism (Meng, 2005, p. 4). Most of these aspects can be analyzed by empirical investigation only (see Chapters 6-7).

4.3.3.2 Alternative Solutions

Regardless of the exact amount of resources that are required for the production and support of educational podcasts and video blogs, it is evident that a level of determination and additional work by the faculty members are required in order to produce and provide the multimedia learning material to the students.

It has to be pointed out that, unless the instructional content does not virtually change from semester to semester, the podcasts supporting each week's lecture have to be produced on a very tight schedule directly after the actual recording and be available for download within the same week as the lecture. Delayed material delivery could lead to

lower student interest in the long run and reduce the instructional effect of the podcast enterprise as a whole.

In order to achieve these tasks, a person or a group of persons have to be assigned to the production of the multimedia learning material. A certain proficiency in the area of audio and video production is the main requirement.

The experience at the University of Michigan, Ann Arbor in the USA (Brittain et al., 2006, p. 26) shows that most of the tasks can be delegated to interested students that are actually participating in the course itself. In this particular case, the students from the Dental department were the initiators of the idea to record the lectures and provide them as podcasts to their fellow students (Ascione, 2006). The professors agreed to participate and let the students themselves do the technical work of recording, encoding and publishing of podcasts. They were supported by a representative of the Dental Informatics department and the required equipment was provided by the university, but the main driving force behind the project were the students that were supposed to use the multimedia learning material in the first place.

Another classical and straightforward solution to this issue would be to assign a student assistant for the technical tasks of podcasts creation. A teaching assistant could provide the content for the podcasts that offer summary of the material and are not directly recorded in the lecture.

4.3.4 Chapters and File Format Issues

The prerequisite that podcasts and video blogs are supposed to be playable on portable multimedia devices creates some issues related to the quality and the navigation within the content that are not present in instructional multimedia designed for playback on a personal computer. These include the synchronization of an audio track with static slides of the corresponding presentation for audio or the limited video quality that is available on mobile players mainly due to small screen sizes and, in some cases, due to insufficient storage capacity. Navigation within a media file, be it audio or video, is also a still not satisfactory solved issue.

4.3.4.1 Audio Format

While listening to pure audio material allows a very high level of mobility due to not engaging the visual senses and thus allowing a multitude of parallel activities, a synchronized presentation of instructional slides on the display of a compatible portable media player like an *iPod* or a *Zune* could bring a different type of learning utility. Video, in terms of motion pictures is not always necessary and embedding only still pictures that are being shown along with the audio track require much less bandwidth and storage than typical video.

There are current technologies that offer so called “enhanced podcasts” (Ketterl et al., 2006, p. 2) with the above described functionality but, unfortunately, there are compatibility issues that hinder widespread adoption. The very popular compressed audio format Mpeg Audio Layer 3 (MP3) that is virtually the current industry standard does not support the embedding of synchronized images. Apple Inc.'s AAC audio format on the other hand offers a number of improvements over MP3 including image-embedding and chapter markers for easier navigation. Despite its advantages, the employment of the format is still not advisable because it and its superior functionalities are still not supported by a large number of portable multimedia players other than Apple's own *iPod* line, which leaves behind a large number of potential users.

Chapter markers (Apple Inc., 2005, p. 5), an additional feature of AAC but not the ubiquitous MP3, could provide a great level of utility for the users, especially in audio files of greater length where finding the relevant information could prove to be difficult. They allow the beginning of every important topic discussed in the episode to be marked by the creator and, consequently, directly accessed by the user without the need to skip manually and “blindly” forward and backward in search for the content of interest.

4.3.4.2 Video Format

Chapter markers could be a valuable tool in video files as well. There are implementations of the concept in a number of video compression formats but even the most advanced and common portable video players like the Apple *iPod* still do not support them (Ketterl et al., 2006, p. 4). Nevertheless, navigating through a video file by

scrolling forwards and backwards is generally easier and more intuitive than navigating within an audio file because of the visual cue that is provided while scrolling. Users are able to identify the context of the content by seeing the changing images. In case of slides inside the video along with footage of the presenter this task becomes even easier.

A more pressing problem of mobile video instruction material is the image resolution restriction imposed by current mobile video players. The current standard of the more popular devices like the *Microsoft Zune*, *Creative Zen Vision*, or the *Apple iPod* is 320x240 pixels which is much lower than even the minimal resolution of laptop or desktop computers - 800x600 pixels. Most of the devices can display videos with maximal resolution of 640x480 by interpolating them, but the final output is naturally of a lower quality. While showing classical video of moving objects or a presenting lecturer is not problematic, as this resolution is not much different than analogue TV, offering synchronized presentation slides could prove to be tricky. While they can be rendered readable, especially if larger font sizes are used, their readability and usability would be much inferior to printed material.

A third issue that could potentially hinder the successful mobile usage of video instruction material is the file size of the single offered episodes. In order to achieve acceptable image quality and readability of the included slide material bit rates lower than 350 kbps, which corresponds roughly to 150 Mb for an hour of video, are not recommendable. Current hard drive portable media players would not pose a problem in that area, as storage sizes of 30 to 80 GB are a commonplace, but storing a number of instructional videos on a flash memory based player, mobile phone or PDA could prove problematic because of shortage of available space.

5 Empirical Investigation of Benefits and Limitations of Podcasts and Video Blogs as Instructional Media

5.1 Overall Research Objectives

As seen from the theoretical analysis (Chapter 4) although highly successful, podcasts and video blogs still bear limitations and unresolved issues. Most of them still need a systematic marketing-type assessment of user preferences. For this reason an empirical analysis in a German university setting was initiated and conducted. The overall objectives of the empirical analysis were formulated as follows:

- To allow a reliable evaluation of of user experience and user preferences in the domain of instructional podcasts and video blogs;
- To identify strengths and areas for improvement, related to delivery technology, content and user friendliness of instructional podcasts and video blogs;
- To formulate realistic recommendations and suggestions in order to foster the development of instructional podcasts in German university settings;

The empirical investigation was designed to follow the high ethical standards of marketing and consumer research (Kimmel, 2007, pp. 180-211). The investigation was restricted to reflect the overall research aim and did not intend:

- To systematically benchmark or rank instructional podcasts with other multimedia systems, commercially available;
- To go outside the defined scope of the investigation; that is, podcasts and video blogs as instructional media (further going marketing aspects were deliberately not included in the investigation);
- To attribute any positive or negative results of the empirical investigation of instructional podcasts and video blogs to individuals, involved in the data gathering process. This presupposes a strict anonymity of reported user preferences and other responses.

5.2 Specific Research Questions

More specifically and considering the local conditions at the European University Viadrina in Frankfurt (Oder), a list of research questions was formulated. The research questions derive from the theoretical analysis of benefits and limitations of the podcasts as content and delivery technology. They guided the development of a questionnaire survey.

5.2.1 Research Questions on the Application of Podcasts as Instructional Media

Research Question 1.1.: Would instructional podcasts be generally accepted by the students as a new opportunity for self-structured learning?

Research Question 1.2.: Would instructional podcasts be accepted by the students as useful complementation or, in some cases, even replacement for paper-based study material?

Research Question 1.3.: Considering the subscription nature of podcasts, is providing operational information (about examination times, examination details etc.) through audio or video clips considered as substantial learning support by the students?

5.2.2 Research Questions on the Podcast Delivery Technology

Research Question 2.1.: What grades of acquaintance and understanding have feed technologies among young people in Germany?

Research Question 2.2.: What are the perceived benefits of the RSS technology over manual download of multimedia study material?

Research Question 2.3.: What is the importance of titles and short descriptions of the single episodes (metadata)? How detailed should they be?

5.2.3 Research Questions on the Enhanced Mobility Issue

Research Question 3.1.: What are the perceived mobility advantages of audio-presented instructional content, compared with video-presented instructional content? Do students make use of the option to listen to audio recorded lectures

while engaging in other activities (travel, sport, etc.)? Is video used in mobile settings at all?

Research Question 3.2.: Is video-presented instructional content being preferred over audio content, which might be interpreted as a sign that the "mobility dimension" of multimedia instructional content is less relevant for the sample of students, at least in German university settings?

5.2.4 Specific Research Questions on the Audio-presented Instructional Content

Research Question 4.1.: How interactive is the listening of instructional audio podcasts? Do students just listen to the whole content or actively search (skip forward and backward inside the sound file) for the information they deem important?

Research Question 4.2.: What is the optimal length of a single audio episode and is it better to divide a lecture in separate logical episodes?

Research Question 4.3.: What should take higher priority in the trade-off between file size and sound quality? Are file sizes considered important?

5.2.5 Specific Research Questions on the Video-presented Instructional Content

Research Question 5.1.: How interactive is the watching of instructional video podcasts? Do students watch it from beginning to end or skip to the parts they deem important?

Research Question 5.2.: What is the optimal length of a video lecture? Is it better to divide a video lecture into separate logical episodes?

Research Question 5.3.: Do download sizes of video clips play a role; despite the fact that most users have broadband Internet access (video files are usually much bigger in size)?

Research Question 5.4.: How important is picture quality? Is a 320x240 pixel resolution enough for presenting acceptable visual content (presentations)? Does sound quality play an important role in video-presented instructional content?

5.3 Production of the Empirical Stimulus Material (Instructional Podcasts)

5.3.1 Content Selection and Adaptation

The selected stimulus material deals with the English-speaking course "Business Informatics I", taught at the European University Viadrina in Frankfurt (Oder), Germany. The course is designed as an introduction to Information Technology and Management Information Systems to first-semester students of the International Business Administration (IBA) program. The IBA is a bachelor degree program that takes 3 years to complete and is profiled with its very internationally diverse student base. The number of students admitted each year is limited to 50 and, formally, 50% of the admitted students are Germans, whereas the other 50% constitute of students from around the world. Language of instruction in the first 2 years is exclusively English; the 3rd year courses are either in German or English language.

The structure of the examined course is based on the lecture-tutorials model. A weekly lecture of 90 min. held by the professor is followed by a practical tutorial in a computer laboratory that aims, through practical exercises by all of the participating students, to better clarify the theoretical topics presented in the lecture. The author held the tutorial for the lectures that were incorporated in audio and video podcasts. Additionally, students were offered personal tutorials by student assistants a few times a week, to which they could go and ask questions concerning the material.

The course „Business Informatics I" ran in the winter semester 2006/2007 and included 15 lectures and 14 tutorials. Topics with practical implementation were among others HTML and CSS, JavaScript and the DOM, as well as PHP. Theoretical topics included Software and Hardware basics, Content Management and Learning Management Systems, RSS, as well as introduction to Customer Reservations Systems and Enterprise Resource Planning systems.

The last two lectures of the course were chosen to be recorded and offered to the students as both audio and video coursecasts.

The contents of the first lecture dealt with the concepts of the Client/Server Architecture in computing, followed by practical examples presented by the professor showcasing

both the concept itself and its practical implementation using the PHP server-side scripting language. The lecture was not a classical presentation of study material provided with the help of a *PowerPoint* presentation but a more practical session where examples were created and demonstrated to the students.

The second lecture that was recorded and offered as a podcast was intentionally chosen to differ from the first one. It included the introduction to Customer Reservations Systems as a concept, as well as presentation of the leading ones. The second part presented the history of development of the Enterprise Resource Planning systems and details on the one with the largest market share – *SAP R/3*.

In this sense the two lectures provided different types of presentation style – the first one was revision and a hands-on practical exercise, the second one - typical presentation of new material.

5.3.2 Selection of Recording Techniques

The practices and equipment used in the recording of a podcast for educational purposes differs significantly depending on the material being recorded.

In order to follow the objectives of this Thesis, two different concepts were explored in terms of technical and organizational requirements: recording of an actual “live” lecture held by a professor and attended by the students, and recording of specially devised material in a separate session.

5.3.2.1 Recording During a Lecture

A straightforward method of recording audio and/or video of classical lectures would be to install recording equipment in the lecture hall where it is regularly taking place and to record it in its entire length. In the cases of courses with a high number of participants where microphone amplification is used the recording of the audio track is relatively uncomplicated.

Positive aspects of this method are that the students receive a full recording (or at least the most important parts of it) of the lecture that they have personally attended, helping to refresh the recollections from the lecture itself.

Potential problems in the output quality may be posed by insufficient lighting (for video) and too high environmental noise in case the microphone is not appropriately set for the particular setting.

On the other hand, reasonably good audio quality is required considering that the spoken word is the central carrier of information in podcasts and video blogs alike.

The test lectures in the first-semester course “Business Informatics” were recorded with a *MiniDV* video camera and an external wireless microphone. A long play cassette of 90 min. was exactly sufficient to capture the whole lecture without interruption.

The recorded raw footage was subsequently transferred to a personal computer with the help of the video capture and editing software program *Adobe Premiere 6.0*. It is important to note that a fairly up-to-date machine is needed to cope with the requirement of video capturing. A raw digital video file of 90 min. length could take sizes of more than 15 GB before being edited and compressed to an Internet-friendly size and format. Compressing and encoding a long video file requires high levels of processing power and could be excessively slow on a system with insufficient amount of RAM.

Some problems were encountered with the camera that was being used. Its reading and recording heads were not in particularly good condition which led to partly a sub-par quality of the audio signal that was captured from the cassette.

The fact that only two lectures were test-recorded led to the situation that improvements were not possible after the second recording session. A possible solution would have been to capture the live output of the camera directly on the hard drive of the operator's laptop, thus completely skipping the step of recording the video on a cassette and then capturing the replay from it.

5.3.2.2 Recording in a Separate Session

Recording audio or video in a separate session set up especially for the production of podcast or video blog material offers a number of advantages over “live” recording during an actual lecture.

Firstly, an adequate lighting and sound isolation could ensure better recording quality. Secondly, the contents of the instructional material could be recorded in a number of takes and so unwanted mistakes corrected.

The session recordings for the purposes of this Thesis were limited to basic and rather unprofessional microphone equipment. A standard PC microphone was used in a office setting where environmental noise was not completely excluded. The recorded material was captured directly as a raw file on a personal computer with the help of the open-source audio recording and editing software program *Audacity*.

The content of the recorded material in the sessions was limited to a short review of a previous lecture material that was not offered as a coursecast as well as information for the students on the question types and structure of the final exam in the course. Parts of the sound files were recorded in a number of takes and then edited together in order to avoid lapses in the speech.

5.3.3 Editing and Compression

Some of the shortcomings of the recorded material could be corrected with the help of editing and processing software. Especially the video quality of the recorded media is not necessary required to be very high considering the small size of the screens of contemporary portable multimedia player[10]. This is relevant to moving pictures only, as presentation slides and other written material shown in the video must be readable and intelligible. Strong compression aiming at smaller file sizes and lower download traffic leads to deterioration of quality as well.

10 e.g. iPod, Microsoft Zune: 320x240 pixels

5.3.3.1 Audio Episodes

The recorded sound files were edited and compressed into a MP3 format with the help of the open-source program *Audacity,* available for a free download on the Internet, which offers a wide variety of sound-editing options. The creation of a podcast is not technically demanding, as the sound quality does not necessary have to meet high-fidelity requirements as it predominantly includes spoken word. Nevertheless sample rates below 60 kbps (kilobits per second) could lead to a sound quality that is not pleasant to the ear and not sufficiently intelligible when listened to in a loud environment. The first two episodes were compressed in a 56 kbps bitrate, but the quality was deemed insufficient by the author and subsequent episodes were compressed in a 80 kbps bitrate with considerably better results.

The editing of the contents of a 90 minutes lecture is still a time consuming and demanding task. The pauses and moments of silence or irrelevant contents have to be edited out. While the former could be facilitated by the graphical representation of the sound file in the sound-editing software (Illustration 3), the latter requires a thorough and critical listening of the whole sound file. Additionally, questions from the audience in the lecture that are relevant to the content and to the understanding of the lecturer's answers were selectively amplified in order to increase their intelligibility.

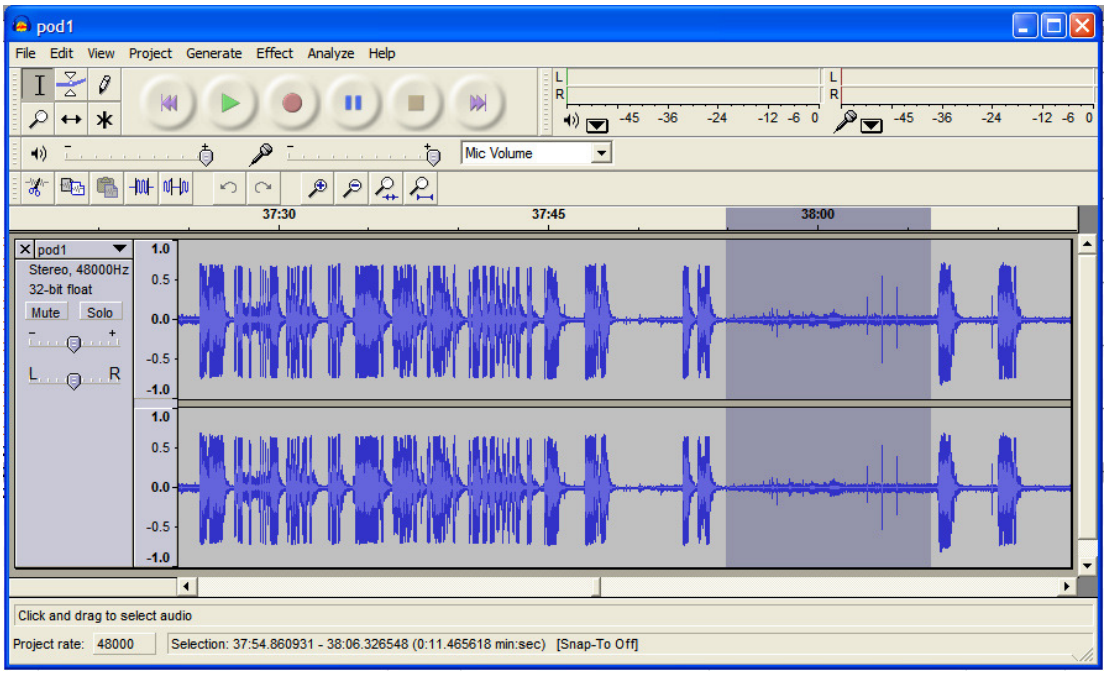

Illustration 3: Visual recognition of longer pauses in the speech

The raw file was additionally divided in a few shorter episodes that dealt with separate topics. The first recorded lecture was separated in six audio episodes with variable length – the shortest of 2:46 minutes and the longest, including the examples in PHP, of 45:12 minutes length. The second lecture was divided in four episodes with varying length between 4:48 minutes and 36:01 minutes, with the two main topics in the lecture: Computer Reservation Systems and Enterprise Resource Planning system, having an episode of about half an hour each.

The two episodes that were spoken and recorded by the author in a separate session were intentionally kept shorter than ten minutes.

After being successfully edited, the raw audio files of the separate episodes had to be encoded and compressed in MP3 format in order to be made available to the students. The MP3 file format provides some standard meta information fields mostly standardized for music files like “Artist”, “Title”, “Album” and “Style”, which nevertheless could be used to provide information about the author and contents of the instructional episodes.

The audio software used for the editing of the audio tracks provided sufficient capability to assign the meta tags to the separate files and compress and export them as MP3 files. The process is not demanding and the encoding requires a moderate amount of processing power and time.

5.3.3.2 Video Episodes

The editing and compressing of the video episodes was done mainly with the software program *Adobe Premiere 6.0*. The package offers very powerful tools for professional editing of video, but because the older version (released in 2000) some of the compression capabilities were outdated and an additional program (*Videora iPod Converter*) had to be used to compress the prepared raw file into a format (.mp4) that is compatible with most current portable video players, including the *iPod*. *Videora iPod Converter* is a freeware program that offers conversion and compression of a multitude of video formats into an acceptable portable video one.

The editing of a video track is a much more complex task than editing of a simple audio track, because of the visual content that has to be considered. Apart from the recorded video and audio of the presenting professor in the lectures, screen recording software was installed on the presentation laptop that was connected to the video projector in the actual lecture. This type of software records in real time the display picture of the computer and saves it as a raw video file. It was very useful especially in the first recorded lecture where PHP examples were written in real time on the screen by the assistant and explained by the presenting professor.

The resulting video file was subsequently mixed with the audio and video track from the video recorder showing the presenter. Due to the small, low resolution screens of the current mobile video players it is impossible to show parallel video of the presenter and the presentation simultaneously. Instead of this it was decided to provide the audio track as a basis and to interchange between the picture from the screen recorder and the picture of the presenter. The exact time periods for each of the two channels were chosen depending on the content of the presented material.

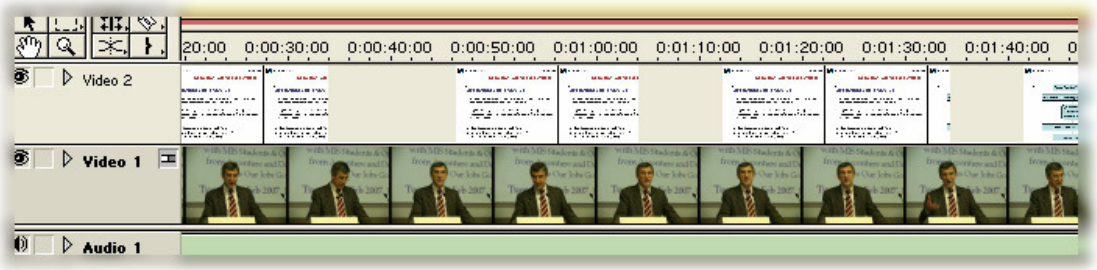

Illustration 4: Audio and video track editing in Adobe Premiere 6.0

Illustration 4 shows the editing window of *Adobe Premiere.* The tracks “Video 1” and “Audio 1” are captured from the video recorder, while the track “Video 2” is captured by the screen recording software on the presentation laptop. The latter is being cut and removed at few locations. During those gaps the final output is a video with the presenting professor. As Trier et al. (2003, p. 865) point out, the video of the speaker provides less information than the slide or the recording of the screen, so the former were limited to shorter periods of time mainly for the purpose of breaking the still presentation and making the video more dynamic.

After the final mix was achieved, the video was resized from the original 720x480 pixel resolution to the standard mobile video resolution of 320x240 pixels, compressed and exported. This step had to be repeated a few times with different presets in order to find a satisfactory trade-off between size and quality of the finished video file. The video files of the first lecture were exported with a low frame rate of 5 frames per second and a fairly low bit rate which led to not completely satisfactory video quality but smaller file sizes, while the second lecture was exported with 15 frames per second and higher frame rate and the readability of the slides was generally higher.

The audio compression capabilities of *Adobe Premiere 6.0* were insufficient, and in order to achieve the needed level of compatibility, the output file had to be once more converted by *Videora iPod Converter* which did not change the video quality.

5.3.4 Stimulus Delivery: Upload and Feed Enclosure

The completed audio and video files were uploaded to an Internet server as soon as they were ready, within the week of the actual recorded lecture. A standard FTP client (*FileZilla*) was used for the file upload.

For the research purposes, the files were supposed to be available for access by the students in to separate ways: through direct download from a web site or through subscription of a RSS feed. It is common practice, especially for video blogs to be offered through normal server-side blog software.

The software employed by the author is an open-source PHP server script developed especially for the publishing of podcasts called *Podcast Generator,* originally developed for the instructional needs of the University of Bergamo (Betella, 2007, p. 20). The software was installed and set up on the same server where the multimedia files were uploaded.

It offers a straightforward method with the help of a web form to enclose the media files and add meta information for their publishing. The program then automatically generates a website with download links and the short summary for every media file provided by the publisher like title and short description as well as automatically generated information like file size and file length.

Additionally, a standard-compliant RSS feed file was also automatically created and updated with a new item every time a new episode was added. This spared the step of manually creating and editing the XML feed file locally and then uploading it to the server. The following box presents an excerpt of the feed file showing a single enclosed item, in this case the video file with the name "ERP.mp4" and title "Video: Lecture 2, Part 2: Enterprise Resource Planning":

```
... <item>
<title>Video: Lecture 2, Part 2: Enterprise Resource Planning</title>
<description>The history of ERP and the major players in the industry
today. Details on SAP R/3.</description>
<link>http://www.e-stankov.com/bi-podcasts/p.php?file=ERP.mp4</link>
<enclosure url="http://www.e-stankov.com/bi-podcasts/media/ERP.mp4"
length="91502258" type="video/mp4"/>
<guid>http://www.e-stankov.com/bi-podcasts/p.php?file=ERP.mp4</guid>
<author>stankov@mmail.com</author>
<pubDate>Sun, 11 Feb 2007 17:25:52 +0100</pubDate>
</item> ...
```

The feed file had a fixed address (URI) that could be copied and inserted into various aggregators or podcatchers like *Apple iTunes* or the open-source *Juice* (previously known as *iPodder*).

The students were informed about the location of both the website with the links to the media files and the RSS feed on the news page of the "Business Informatics I" course site in the university learning management system *WebCT*.

5.4 Design and Development of the Questionnaire Survey

Complementary to the theoretical analysis of the benefits and limitations of podcasts as instructional media, it appeared necessary to assess the reception of the instructional media by the "customers" – in this case the students of Business Informatics at the European University Viadrina in Frankfurt (Oder), Germany. The method of questionnaire survey was chosen for the empirical assessment.

Two main benefits of applying questionnaires for the assessment of customer preferences were considered:

- A questionnaire on podcasts and video blogs can be administered to all students of Business Informatics at the European University Viadrina in Frankfurt (Oder);
- A questionnaire on podcasts and video blogs is an assessment tool which would ensure anonymity of response.

The issue of anonymity was important, because of the fact that attitudes and experiences of students participating in rated university courses were to be investigated. It was necessary that the survey makes it clear to the students that it is not an examination, but a feedback on how students see the usability of the offered multimedia study material.

5.4.1 Item Selection

In order to be able to contextualize the responses and feedback of the students the survey had to sample the general understanding and use of the technologies that constitute the general term "podcasting". Additionally, general information on the devices that were available to the students was needed. The possession of a portable multimedia player and/or a personal computer were important prerequisites for the utilizing the full potential of the examined technology.

The main purpose of the survey was to measure and evaluate the attitudes that the students developed towards instructional podcasts after being presented to them. As Fishbein and Ajzen (1975, p. 6) state: *"Attitude is an important concept that is often used to understand and predict people's reaction to an object or change and how their behaviour can be influenced"*.

The questionnaire on podcasts and video blogs was developed and structured to cover all research questions. In total, 57 items were developed. Each of the research questions is reflected in a number of items but there is no strict correspondence between the number of items and research questions.

The questionnaire items were of the following basic types:

- Assessing the individually available hardware, which might be used by the students to access the offered podcats and video blogs;
- Assessing the basic knowledge about the technology of podcasts and video blogs
- Assessing the perceived advantages/disadvantages of different types of presentation and handling of information with podcasts and video blogs
- Assessing attitudes, beliefs, and values, related to podacsts and video blogs.

5.4.2 Scaling

When assessing the individually available hardware, or knowledge issues, alternative or multiple choice items were used. In those cases, where perceived advantages/disadvantages or attitudes about podcasts were assessed, the questionnaire survey applied 5 point Likert-type scaling. The Likert scale is a psychometric response scale for ordinal data. When responding to a Likert-type questionnaire item, respondents are asked to indicate their degree of agreement with the statement or any kind of subjective evaluation of the statement (Likert, 1932, p. 55).

There are numerous versions of Likert-type scales used nowadays, but the original concept of Likert, and the one that is employed in the questionnaire at hand, uses the five point scale with labels ranging from “Strongly agree” to “Strongly disagree” (see Illustration 5).

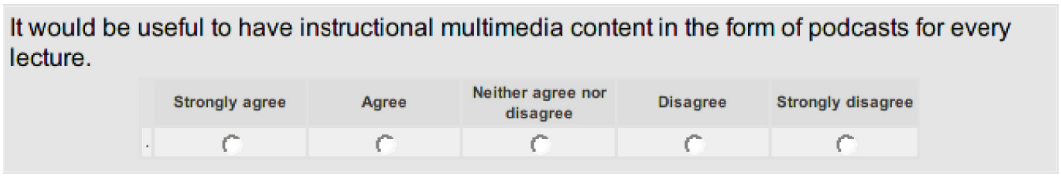

Illustration 5: A 5-point Likert-scale question from the online survey

The radio-button functionality of the HTML format is very well suited for this type of questions because the restriction of choosing only one of the options removes the possibility of invalid answers.

5.4.3 Technical Implementation

The survey items were developed independently to the decision what technical solution to be used for the dissemination of the questionnaire and the retrieval of the answers.

After a short evaluation of different server-side programs that automate the creation and management of on-line questionnaires and surveys the solution *PHPsurveyor* was chosen. It is an open-source *PHP* script that uses an *MySQL* database connection to store both questions and retrieved answers. It is at a fairly mature stage of development and offers a powerful administration section and a number of preset question types, design options and result export capabilities.

The 5 point Likert-type statements (items) had to be manually set, additionally the style-sheets for the visual design of the on-line questionnaire was customized to improve the contrast and the readability of the text.

5.4.4 Survey Structure

The 57 items were divided into 8 separate sections that were presented consequently to the respondent, similar to paper pages. Navigation between the sections was possible through "Next" and "Back" buttons at the bottom of each section. The respondents were allowed to go back and change answers to any item before submitting their feedback at the end of the questionnaire. A bar indicator at the head of the page provides information on the progress inside the questionnaire (see Illustration 6).

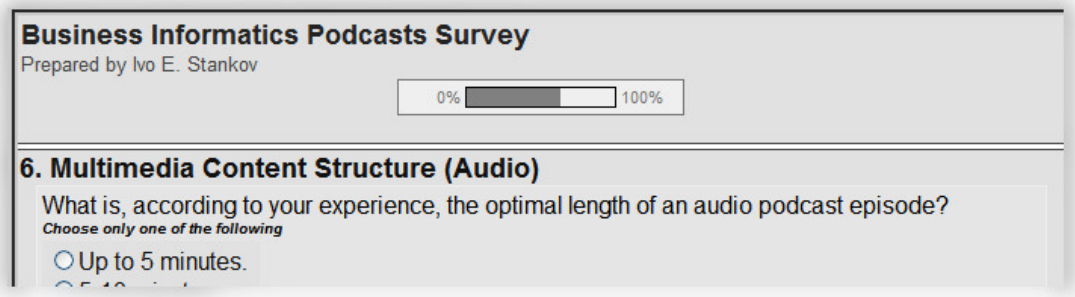

Illustration 6: A progress bar provides navigation information

The following sections were included in the questionnaire:

(1) General Information on Devices and Podcasts (11 items)

(2) RSS Issues (8 items)

(3) Content Issues in General (6 items)

(4) Content Issues, Specific for Audio Podcasts (4 items)

(5) Content Issues, Specific for Video Podcasts (4 items)

(6) Multimedia Content Structure (Audio) (11 items)

(7) Multimedia Content Structure (Video) (12 items)

(8) Final Comments (1 item)

5.5 Application and Evaluation of the Questionnaire Survey

5.5.1 Survey Instruction

The instruction for the questionnaire survey was as follows:

"*Dear participant,*
You have decided to participate in an online questionnaire survey, which is part of my master Thesis "Benefits and Limitations of Podcasts and Video Blogs as Instructional Media". Most of you are acquainted with interactive technologies and are aware that there are many unresolved issues in this quickly expanding area.
The questionnaire survey is aimed at gathering and analyzing observations, preferences and attitudes that students might have about their experience with the offered instructional multimedia content.
You will be asked to indicate the degree of your agreement or disagreement with each statement by checking one of the five alternatives (from "Strongly agree" to "Strongly disagree") below each statement.
The survey is not intended to differentiate between groups of respondents so that no personal information will be collected and your responses will remain completely anonymous. The survey has by no means the intention of evaluating your knowledge of podcasts and other included information technologies. The collected data will be aggregated to yield a picture of the students' attitudes and preferences towards the technology and its future successful use in university settings.
The results of the survey will be evaluated and discussed in my master Thesis. The conclusions of this study might be considered in the planning and preparation for future courses offered by the Chair of Business Informatics.

Please respond to all statements, even if some of them might appear irrelevant to you. In order to obtain a complete picture of the reception of educational podcasts among students I need your response to each and every item.
Please do not forget to save your answers by clicking on the "Submit" button at the end of the survey!
Thank you very much for your cooperation!
Ivo"

5.5.2 Survey Sample

The questionnaire was made available on-line in winter semester 2007. The target group for the survey – students registered for the course "Business Informatics I" and potential users of the experimental multimedia course content, were informed and invited to participate through a number of channels:

- A news item with the link to the questionnaire was posted on the "Business Informatics I" course page on the university learning management system *WebCT*.
- An e-mail message invitation sent through the IBA program officer.
- A text invitation in the form of a PDF file provided as a new item in the instructional podcast RSS feed itself.

A total of 28 out of 43 students registered for the course (65%) participated as respondents in the survey. After a screening, all submitted questionnaires were considered completely answered and were included in the statistical analysis.

5.5.3 Statistical Evaluation

After the questionnaire on podcasts and video blogs is completed on-line by the student, the answers are saved onto the server in a SQL table. Only the respondent's answers are stored and no identifying information is being connected to the separate submission. A client cookie is used to prevent the same user from filling the questionnaire twice.

Each questionnaire item is analyzed separately. Item responses are not summed to create a score for a group of items.

The final responses were exported from the SQL database on the server in the form of a comma-separated Microsoft Excel file. The file was then imported into the statistical program SPSS that was employed for the evaluation of the survey results. The responses to the Likert-type items were treated statistically as ordinal data, because one cannot assume that respondents perceive the difference between adjacent levels as equidistant.

6 Results and Interpretation of the Empirical Investigation

6.1 Results for Research Questions on the Application of Podcasts as Instructional Media

6.1.1 Results for Research Question 1.1.

The benefits of the additional channel of learning provided by podcasts and video blogs seem to be clearly seen by the students. Cumulative 96.2% of the respondents in the survey state that they either "agree" or "strongly agree" (53.8%) with the statement that providing an instructional multimedia content in the form of podcasts for every lecture would be useful for their studies.

Most of the respondent comments from the survey show an explicitly positive attitude towards podcasts and video blogs as instructional delivery technology. Some acknowledge that their acquaintance with the technology leaves to be desired, but strongly support the offer of podcasts: "*Although till now I never used the RSS service because of time limitations, I strongly think it can be a strong and beneficial media for learning and communication.*" Another student sees the future potential for the use of podcasts and video blogs as instructional media but also concludes that they are "*...useful but still kind of too unpopular. [Will] get better and of more use within the next few years*".

The benefits to self-structured learning were also mentioned in the comments. A student writes in his/her comments: "*The fact, that one is able to either listen to the whole Podcast or just to some parts that might be more difficult to understand (or both, as a combination) is definitely positive*". The revision of more complex material through the coursecasts seem to be popular as well, because the original comments of the professor could be heard again. A simple text-script might prove too abstract in comparison.

Another student's comment summarizes the general opinion: "*That's a good move and I again stress that it would be great if a podcast would be made available for every lecture as to make the learning environment more flexible.*"

6.1.2 Results for Research Question 1.2.

The central role of paper-based text content in the form of readers or scripts as supporting instruction material in university settings is hard to deny. The results from the analysis of Research question 1.1. lead to the conclusion that audio and video instructional content is welcomed by the participating students as a complementary channel of learning.

A further possibility was also examined in the questionnaire, namely the attitude of the respondents toward audio and video content as a complete replacement for text material.

The results reveal a rather conservative attitude toward this notion. The answers are more definitive concerning the audio-based instructional content. If the students have to choose between only audio-based or only text-based material 40.7% of the respondents would prefer the former one, with the majority of 59.3% opting for the latter, more traditional medium. In a related questionnaire item 63% claim that text-based content "is easier to follow and understand" than audio-based one.

The results for video-based content are a bit more favorable when put to the same comparison. Close to half of the respondents (46.2%) state that they would prefer video over text as an exclusive instructional material. Nevertheless the latter is still preferred by the majority (53.8%). The participating students are divided into two groups of the same size (50%) in their opinion on which of the two media is easier to understand and follow. These results are in accordance with the findings in section 6.3.2. which reveal the video format as more popular medium for instructional content than audio.

It could be concluded from the empirical investigation that multimedia-based instructional material is well accepted by the students, but still is not seen as a possible substitute to the more traditional text in the form of scripts and other reading materials.

6.1.3 Results for Research Question 1.3.

The podcasting and video blog technology could be used not only to provide strictly educational material like coursecasts, but also short information on current organizational issues within a course. This option was experimentally tested. Comments

from the professor in the lecture concerning organizational information were offered as separate episodes and clearly identified as such in their titles and short descriptions. Additionally one episode was specially recorded in a separate session to better explain the structure of the upcoming final exam.

The participating students show an explicitly positive attitude towards these specific episodes. 83.3% of the respondents agree or strongly agree that the "*episodes that offered non-learning material (exam details etc.) were useful.*" While the rest decides to show no preference, there are no negative answers concerning this feature. A student comments: "*...in fact, the only podcast I listened to from beginning to end was the one with the clues about the exam...*".

6.2 Research Questions on the Technology Behind Podcasts and Video Blogs

6.2.1 Results for Research Question 2.1.

Technologies based on the news feed concept still struggle to gain a significant level of popularity and the majority of Internet users, particularly in Germany, are still to get acquainted with the technology. The survey results reveal that even the young, educated and active segment of the Internet-using population, that the survey sample represents, have not completely embraced web feeds and partly have no knowledge of the medium.

Out of the 28 respondents more than 60% (n=17) state that they have never been subscribed to any feed, and have not used the technology to access blogs (Fig. 1). Roughly the same number of students (n=16, 57.1%) answer negatively to the particular question if they have ever been subscribed to and listened to podcasts. It is interesting to note that not exactly the same respondents answer negatively to both questions which might be interpreted with the fact that student do not necessarily associate the use of podcasts with a subscription to a relevant feed. Realistically, episodes could be downloaded manually as well, which is to degree a discrepancy between the strict definition of podcasts as subscription type media.

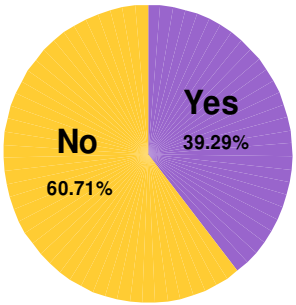

Figure 1: Item "Have you ever been subscribed to blogs or other feeds that interest you?"

Additionally, it could be concluded that the majority of the respondents do not feel that they fully understand the functioning of news feeds and the concept behind the technology. This assumption is being confirmed by the measured attitude towards the statement "*The RSS feed technology (for blogs etc.) is a technology I understand well.*" Ten respondents have decided not to fill in this question, because they have never used an RSS feed. From the rest, students which have had past experience with the feed technology, exactly 50% either agree or strongly agree with the above statement, while the other half does not show positive attitude towards it. Only 16.7% of the valid answers (or 10.7% of all 28 respondents) strongly agree that they understand the RSS feed technology well.

An even more interesting picture is presented by the responses to statement "*I freely use RSS feeds (for blogs etc.).*" It is clearly visible from the graphical representation in Figure 2 that the attitudes of the respondents of this particular item form two different groups. While the segment of positive answers is comparable to and only slightly lower than the previously discussed item (41.2% of the valid responses), there is the same number of respondents that state that they do not freely make use of RSS technologies (41.2% of the valid responses). It has to be taken into account, that this group constitutes only of respondents that have previously stated that they have used or use the technology. It could be concluded that only few of the target users feel really comfortable with using RSS feeds.

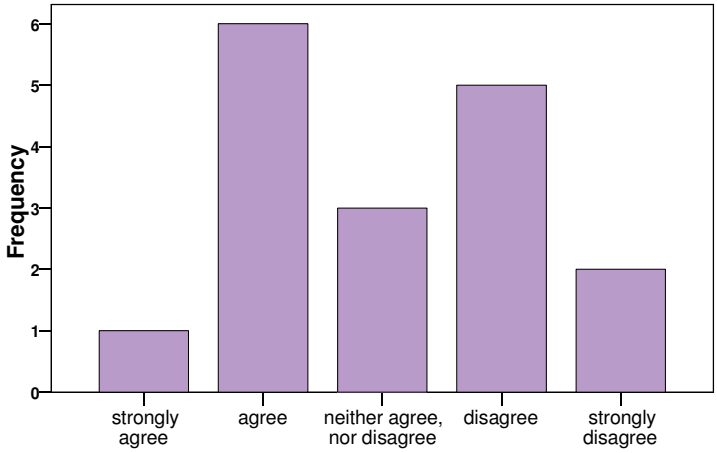

Figure 2: Item "I freely use RSS feeds (for blogs etc.)."

The notion that feeds are still not widely embraced by the target group for instructional podcasts and video blogs is being further confirmed by the fact that only 26,9% of the respondents have accessed and downloaded the offered multimedia material through the available RSS feed and the rest has opted for manual download of the separate episodes from the podcast web site. This result is partially backed by the access statistics from the web server where both the media files and the RSS feed were stored. Roughly 20% of the traffic in the time period of the podcast offer was attributed to special HTTP requests, not generated by clicks in a web browser but presumably by automatic download requests from software like podcatchers or feed aggregators.

The cumulative picture gathered from the above discussed questionnaire results leads to the clear conclusion that one of the defining features of instructional podcasts and video blogs has still not reached a mature stage of acceptance in Germany even among young, dynamic Internet users. This is a potential limitation for the success of podcasts as instructional medium. Although, the separate episodes are typically offered as manual downloads from classical web sites, this type of access qualifies the media files rather as a more classical media-based e-learning material and do not provide a significant breakthrough in that area.

Nevertheless, it has to be noted that the survey was not able to examine the temporal developments in the spread of the technology among young Internet users. It is a relatively young technology even for the dynamic standards of the Internet age and, judging from the American realities, it is expected that its acceptance will increase rapidly in a short period of time.

6.2.2 Results for Research Question 2.2.

Despite the relatively low numbers of respondents that freely make use of feed technologies on the Internet, they have shown generally positive attitude towards the offered feed for the instructional audio and video podcasts. A number of Likert-scale items in the questionnaire addressed these questions. The exact statements and mean and standard deviation values of the results are listed in the following Table 1 ('1' corresponds to “strongly agree”, '5' to “strongly disagree”).

Items	Mean	Std. Deviation
The offered RSS feed helped in finding the offered podcasts.	2.69	1.078
The offered RSS feed facilitated the access to the podcast episodes.	2.50	1.033
The offered RSS feed made the downloading of the podcasts easier.	2.80	1.146
The offered RSS feed improved the handling of the downloaded podcasts.	2.69	1.138
The offered RSS feed allowed a better overview of the offered podcasts.	2.38	1.258
Being subscribed to the RSS feed was preferable over manually downloading the podcasts from the website.	2.50	0.966

Table 1: Questionnaire items concerning the perceived benefits of feeds

It could be concluded that the offered feed was generally evaluated as beneficial by the respondents that have used it.

The item asking if feeds help in finding the podcasts did not provide very definite picture as 37.5% of the respondents decided to neither agree nor disagree with the statement and the rest of the responses build a fairly normal curve of distribution around the central answer. This result is understandable from the viewpoint that a feed has to be found “manually” first and then subscribed to in order to access the episodes. In this sense finding the feed or the website with the links to the episodes could be viewed as similar activities.

A comparable result was achieved in the item considering the benefits in downloading the episodes (33.3% neutral answers and normal distribution). The question was probably not understood in the context of the download automation that the podcast feed technology offers. An indicator for this conclusion is the clearly positive attitude

(68.8%) towards the statement "*The offered RSS feed facilitated the access to the podcast episodes.*" It seems that the respondents considered automated access to the new episodes as beneficial, but did not feel the feed improved the download process, which could be associated with download speed and time, variables that are not dependent on the channel of access to the episodes.

The items considering the handling and overview of the downloaded episodes could be viewed together as they have provided similar results. Unlike manually downloading a file to a location on the client's hard drive, being subscribed to a podcast or video blog feed with an aggregator or podcatcher is generally more straightforward. These are programs specifically developed for automating and streamlining the downloading but also the management and handling of the downloaded episodes.

Although all the items in this section show positive attitude towards the benefits of using a RSS feed over manual download, the fairly high values of standard deviation have to be considered as well. In every of the items there were at least a few statements that strongly disagreed with the beneficial factors of the offered feed which might be interpreted as a more conservative view.

6.2.3 Results for Research Question 2.3.

The items in the questionnaire considering the meta information attached to the separate episodes do not necessarily concern only the tags inside the RSS feed file that are being presented by the aggregators and podcatchers. The used PHP publishing and content management script *Podcast Generator* displays the same information on the download website as well.

The importance of the short description and title of the offered podcast episodes for selecting which ones to download is made clear by the positive attitude of the respondents. A cumulative 88% either strongly agree (32%) or agree with the statement that the meta information is an important factor. None of the respondents disagree with it.

It is to be concluded that special attention has to be given to this aspect of the offered information so that the contents of the media files are precisely formulated and

communicated to the students. The main fields, title and short description are limited to 255 characters in the strict specifications, so short clear language is required. The particular meta information in the experimental feed offered to the test students was well accepted by the respondents: cumulative 79.2% agreed that they were intuitively informative and 88% agreed that the language was easily understandable.

6.3 Research Questions on the Enhanced Mobility Issue

6.3.1 Results for Research Question 3.1.

Podcasts are considered in general to be a mobile medium, which is implied even in their name. The survey results, however, show a different picture considering the mobile use of the offered instructional audio and video podcasts.

The results were very straightforward in terms of the mobile use of the video episodes. None of the respondents has stated, that he/she has watched the offered instructional videos in a mobile setting ("*train, tram, bus, etc.*") and none of the respondents has watched the videos on a mobile player or a video-capable mobile phone. It has to be noted too, that a fairly low number people in the sample group owns a portable video player (n=4, or 14.3%). The sample group could be identified as a relatively conservative in terms of adoption and use of mobile multimedia devices.

The results from the stated use of the offered audio episodes show a bit different picture. Mobile use is reported, but still the predominant setting is not typically mobile. The respondents were offered to specify more than one device in this particular question, though the answers concerning mobile phones and media players did not overlap. A total of 13 respondents (46.5%) state that they have listened to the audio episodes on a portable media player (n=8; 28.6%) or a mobile phone (n=5; 17.9%). Although MP3-capable mobile phones are quite common on the market in Germany, it seems that specialized portable players are still a preferred medium. Considering the "less" mobile devices - 85,7% have used a laptop for the task and 28.6% a desktop personal computer.

While this result leads to the possible conclusion that mobile use of audio instructional podcasts is fairly popular, another question sheds different light on the subject. On the question "*Where did you listen to the offered podcasts?*" the overwhelming majority

answers with "*At home*" (80.8%). Only 5 respondents answer with either "*On the move (train, tram, while jogging etc.)*" (n=1, 3.8%), or "*During leisure activities (while exercising, jogging, etc.)*" (n=4, 15.4%). Figure 3 provides an overview:

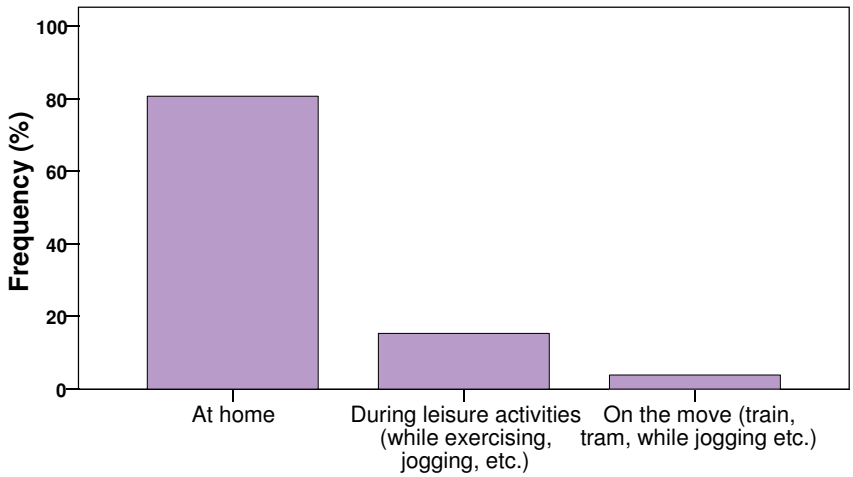

Figure 3: Item "Where did you listen to the offered podcasts?"

It is evident that even listening to an audio podcast is still not a predominantly mobile activity. The answer "*During leisure activities*" does qualify as a mobile setting, because access to the instructional content during this type of activities is not possible with means that are considered stationary like a desktop computer, or even a laptop. The sample of students that have chosen the two mobile options is too small to be able to draw statistically significant conclusions on the preferences between the two.

An interesting conclusion could be drawn, however, from the fact that more respondents have indicated that they have listened to the audio podcasts on mobile phones or portable multimedia players than have used the instructional podcasts in mobile settings. It seems that the mobile players are not exclusively used in strictly mobile situations like jogging or traveling, but also in the comfort of the own home.

6.3.2 Results for Research Question 3.2.

The findings from the previous research question lead to the general conclusion that the mobility options are not the central benefit that students draw from the use of instructional audio podcasts. Considering that their utilization takes place mostly on a personal computer, similarly to the utilization of instructional videos, it is possible to

assume that the video material, offering richer visual information, would be preferred over pure audio.

This assumption is being confirmed by the questionnaire responses to the alternatively formulated question "*If you have to choose between only audio, or only video format, what format will you choose?*" (Figure 4). Almost 70% of the respondents stated that they prefer video.

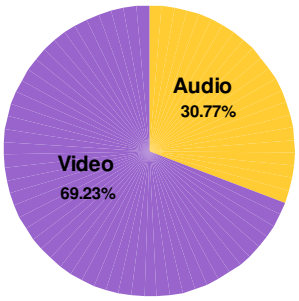

Figure 4: Item"If you have to choose between only audio, or only video format, what format will you choose?"

It is evident that video delivery brings a higher level of utility for learners despite the low resolution of the images and bigger download sizes. This finding is being confirmed also by the significantly higher scores of video-based study material when contrasted with the classic text medium (see Section 6.1.2.).

Considering the reported lack of mobile use of instructional videos, the option to offer instructional material in a higher resolution that is not necessary supported by the current mobile multimedia players but brings much better readability and intelligibility of the lecture slides has to be taken into consideration.

6.4 Specific Research Questions on the Audio-presented Instructional Content

6.4.1 Results for Research Question 4.1.

The issues discussed in Section 4.3.4. of the Thesis consider the navigation within the sound files and the lack of chapter marker functionality. They have been partly

addressed in the questionnaire items dealing specifically with audio-presented instructional content.

The instructional podcasts were offered in MP3 format, so no automatic selection of chapters within the episodes was possible; the students had the possibility only to scroll manually back and forward in search of the material of interest within the episode. The results of the survey show, however, that most of the students (78.3%) preferred to passively listen through the whole length of the episodes and did not skip parts in order to find only the contents of interest.

It could be concluded that the students either preferred not to try to manually search for the parts of the coursecast that interest them, or that they felt it was ineffective to try in the first place, considering the lack of orientation points within the audio track.

6.4.2 Results for Research Question 4.2.

The considerations from the previous research questions are directly connected with the issue of the optimal length of a single audio podcast. It has been deemed as important by a number of the respondents, who have included it in their free comments in the questionnaire. The comments stress the notion that the shorter the episodes, the easier it is to find the relevant information:

"The podcasts shouldn't be too long , it is better to split them into parts with exact titles so you can find the certain information you are looking for immediately."

"...I would pledge for a division of the lectures into smaller sections. It is easier to find the wanted topic and one listens from beginning till end."

The answers of the item "*What is, according to your experience, the optimal length of an audio podcast episode?*" support these statements. The experimental podcasts were intentionally offered with different lengths ranging from less than 3 minutes to more than 45 minutes in order to provide the potential respondents with a perspective on this issue. The answers show a tendency towards shorter episodes (Figure 5).

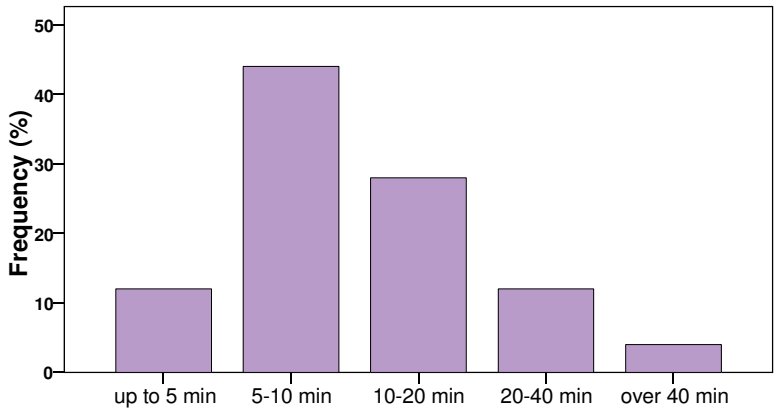

Figure 5: Item "What is, according to your experience, the optimal length of an audio podcast episode?"

A large majority of the respondents (84%) prefer an audio episode shorter than 20 minutes, while the most popular length with 44% of the responses is between 5 and 10 minutes. A clip of such length could convey a single topic item.

It is evident that while the students generally do not wish to actively search inside a single sound file for the relevant information, they would prefer to have the instructional topics in separate episodes so that a higher level of flexibility in choosing the content of interest is achieved. The optimal length of an instructional audio clip could be suggested at around 10 minutes.

6.4.3 Results for Research Question 4.3.

Having in mind that broadband Internet connections are becoming a commonplace and the assumption that most of the participating students had access to the fast university Internet connection it is expectable that the download size, especially of the audio podcasts, is not a central issue.

The respondents were asked to evaluate the adequacy of the download sizes for the sound episodes. While the majority (54.2%) agree or strongly agree that the download size was “exactly as it should be”, it is informative to observe that about half of the respondents (45.8%) decide not to report a negative or positive preference towards this item. This could be interpreted as a lack of opinion, because of the low priority that this issue has had among the test group.

An indicator that the sound quality, on the other hand, was considered an important issue is the fact that only 12.5%, or 3 respondents, decided not to provide a preference. The 80 kbps audio quality offered in the experimental audio episodes was considered "good" by a cumulative 79.2% of the respondents; two (8.3%) decided to disagree. A comment from one student ("*It would be better you speak loud and clearly next time. Some parts were pretty low and one could hardly understand what you wanted to say.*") concerning the two episodes recorded with a standard unprofessional microphone shows that quality equipment is an important requirement for instructional podcasts.

6.5 Specific Research Questions on the Video-presented Instructional Content

6.5.1 Results for Research Question 5.1.

Similar to the MP3 audio file format, the most popular video formats do not support chapter markers within a single file, so navigation has to be achieved by manually scrolling forward and backwards in order to find the relevant spot within the video clip.

The average length of the experimental instructional video episodes was longer than that of the audio ones. The shortest video clip ran a total time of 14 minutes and the longest 33 minutes. Nevertheless, the respondents showed a preference to watch the clips passively from beginning until end (73.7%) instead of actively scrolling through the content to find the specific topic of interest (26.3%). While the relative share of respondents that have interacted with the video clips is slightly higher than that of audio files (21.7%) it could be concluded that the general preference is to consume an instructional episode as a whole.

It seems that the division of the two recorded lectures in a number of separate episodes with distinct topics was generally sufficient to not have to search within them. The first recorded lecture was divided into three separate episodes which is approved by a cumulative 71.4% of the respondents, while the division of the second lecture into two episodes concerning the two central themes – ERP and CRS – is positively seen by 76.2%. It has to be stated that while there are only two episodes from the second lecture, their total length is much shorter then of the episodes from the first one.

6.5.2 Results for Research Question 5.2

Consistent with the assumptions above are the responses to the question concerning the perceived optimal length of the instructional video episodes (Figure 6).

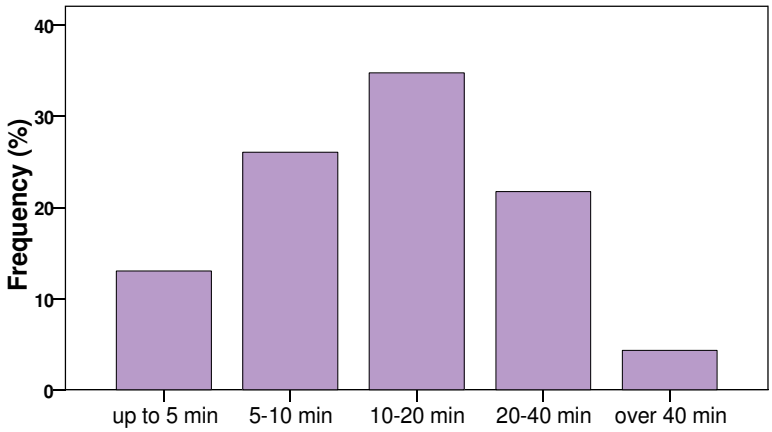

Figure 6: Item "What is, according to your experience, the optimal length of a video podcast episode?"

Compared to the similar question concerning the audio episodes it is clearly noticeable that the respondents tend to prefer a bit longer clips with the most popular time frame between 10 and 20 minutes (34.8%). Nevertheless, the achieved results point to the conclusion that a typical lecture of 90 minutes should definitely be divided into at least a few separate episodes: only 4.3% of the respondents would prefer a video clip longer than 40 minutes, which is roughly a half of a lecture.

The preference of almost 40% of the respondents towards clips shorter than 10 minutes has to be put forward as well. Although the shortest offered clip was 14 minutes long, still a sizable portion of the students would like to have even shorter clips that are more concentrated on a specific topic.

6.5.3 Results for Research Question 5.3.

The download sizes of video clips are normally bigger than audio files almost by an order of magnitude. Despite the widely used broadband connections it is expected that the size of a separate video episode could play a role in the decision to download it. It is

hypothesized that a size up to 100 MB would be the acceptable limit for a single file. The five offered episodes are between 29 and 89 MB in size.

The questionnaire survey respondents show a predominantly positive attitude towards the statement "*The download size of the video clips was exactly as it should be.*" with a relative majority of exactly 50% either to agree or strongly agree. 9.1% disagree with the statement, presumably considering the files to be too large. The fact that a sizable portion of the respondents of just over 40% decide not to state an opinion might be interpreted, again, as an indicator for the low priority of this issue among the participating students.

6.5.4 Results for Research Question 5.4.

The video quality of the experimental episodes was intentionally significantly different for the two recorded lectures. The first one was offered in 6 frames per second and a data rate of 26 kilobytes per second, while the second in 15 frames per second and double the data rate, or 52 kilobytes per second leading to a perceived clearer picture quality. The responses from the relevant items in the questionnaire confirm that the quality of the clips in the second lecture is better accepted. Table 2 shows the evaluated results ('1' corresponds to "strongly agree", '5' to strongly disagree.):

Item	Mean	Std. Deviation
The picture quality of the video clips from the first lecture (PHP examples) was exactly as it should be.	2.68	0.894
The picture quality of the video clips from the second lecture (CRS and ERP) was exactly as it should be.	2.45	0.912

Table 2: Items concerning the video quality of the offered episodes

It is interesting to note that a fairly large proportion of the respondents (cumulative 50%) consider even the first lecture episodes to be of acceptable quality. This leads to the conclusion that while low bit rate and the constricted video resolution of 320x240 pixels are not completely optimal, they are generally not considered to be problematic by a large proportion of the participating students. A student comments: "*with the additional video-podcasts it was a lot easier to follow the script (at home) again - underlined by some comments (lecture) it was easier to remember the facts (script)*". It

could be concluded that the representations of the script in the videos were used as visual cues to navigate through a printed version of the presentation slides.

The sound component of the video clips has to be taken into account as well, because along with the visuals it is a major carrier of information. The sound on the video clips was compressed in a slightly lower quality (48 kilobits per second compared to 80 kilobits per second) than the audio episodes. 68% agree or strongly agree that the sound quality in the video clips "*was good*". The result is slightly lower than the 79% that approve the quality of the audio episodes. It could be concluded, that while video offers a powerful additional medium in the face of visuals, the students are aware of the sound quality and its level should be considered carefully in the creation of instructional video-presented material.

7 Conclusions and Suggestions

Podcast and video blogs are a fairly recent conceptual and technological development even to the standards of the very dynamic new Internet age. Within a very short period of time they have created an enthusiastic and active following among the young, and flexible Internet community members and are considered to be a factor in the changing landscape of entertainment and information media.

This Master Thesis attempts to evaluate the potential advantages but also limitations of such new exciting media within the context of university instruction. Compared to an extensive marketing research, relatively few aspects in this area have been examined in the United States of America where the technology originated and arguably has the largest following. The realities both in terms of education practices and spread of mobile technologies in Germany are considerably different and even more lagging behind. This perception made the case for a separate, both theoretical and empirical examination necessary and was the general research aim of the present Thesis.

The main distinctive feature of instructional podcasts and video blogs, compared to earlier channels of media-based learning, is the subscription mechanism provided by the recently developed news feed technologies like RSS and Atom. The straightforward delivery options they provide are considered to have a promising future. Nevertheless, these technologies are still in the stages of early adoption, even among young, open people like university students. A large proportion of the target group is not aware of instructional podcasts and video blogs or is still not comfortable with using them.

Similarly, the notion that podcasts are a predominantly mobile media is found to be unconfirmed, especially in German university settings. The majority of the participating students have shown a preference of using the offered multimedia predominantly at home and on stationary devices. Video is hardly used on mobile players, partly due to the devices' low market share among potential users, but even audio does not show the level of mobility that was originally implied.

These findings lead to the consideration that due to the relative lack of mobile consumption of both media, audio and video, the latter is generally better accepted by

students and brings a higher level of utility in learning because of the additional visual aspect that it offers over audio. Additionally, the restrictions that are posed by current mobile video players, mostly in terms of picture resolution should be reconsidered and it is suggested that the instructional videos are provided with a higher image quality that dramatically improves the readability of the text material in the form of presentation slides.

The issues concerning the perceived optimal length of single episodes and the logical separation of individual topics from a recorded lecture material have been examined as well. It is suggested, that due to the current lack of possibility to navigate logical points within a particular audio or video clip it is advisable to offer each unique instructional topic as a separate episode. The meta information concerning each offered file has been found to play an important role in the orientation of the students within the multimedia instructional offer and it is suggested that it has to be given special attention by the author and creator of the instructional content. Lengthwise, the optimal running time of an audio podcast was found to be shorter than that of a video one.

A general conclusion from the empirical survey is that instructional podcasts and video blogs may become well accepted as an additional channel for learning by the wide majority of students. They are perceived more as an optional learning media and not as a substitute for the traditional text-based course material like a script or a reader.

This widespread acceptance for podcasts and video blogs as auxiliary learning channels leaves the decision for action in this direction in the hands of the faculty. The creation and management of an attractive and informative instructional podcast is associated with an additional investment in dedication, time, effort, and equipment. These factors have to be weighed against the perceived extra utility that such an enterprise brings in terms of student learning, motivation and interest.

The broad conclusion drawn from the experiences connected with the conceptualization and practical creation of the experimental instructional material, as well as the feedback from the participating students, is that instructional podcasting is an achievable and worthwhile task.

References

Acohido, B.: Radio to the MP3 degree: Podcasting; 2005; URL: http://www.usatoday.com/tech/news/2005-02-09-podcasting-usat-money-cover_x.htm, (Accessed: 05.02.2007).

Apple Inc.: Podcast Creation Guide; Apple Inc., 2005; URL: http://images.apple.com/education/solutions/podcasting/pdf/PodcastCreationGuide.pdf, (Accessed: 15.03.2007).

Arthur, C., Schofield, J.: What does 'podcast' actually stand for?; in: The Guardian Online, 2006; URL: http://technology.guardian.co.uk/weekly/story/0,16376,1683937,00.html, (Accessed: 08.03.2007).

Ascione, L.: Students Plug In, Enroll In ‘iTunes U’--Schools Post Lectures Online For Use On Students’ MP3 Players; in: eSchool News online, 2006; URL: http://www.eschoolnews.com/news/showStory.cfm?ArticleID=6071, (Accessed: 17.03.2007).

Bersin, J.: The Blended Learning Book; Pfeiffer, San Francisco 2004.

Betella, A.: Podcast Generator: An Open-Source Slution for Publishing a Podcast; in: Podcaster Magazine, 2007.

Bridge Ratings LLC: Podcasting to Hit Critical Mass in 2010; 2005; URL: http://www.bridgeratings.com/press_11.12.05.PodProj.htm, (Accessed: 02.03.2007).

Brittain, S., Glowacki, P., Van Ittersum, J., Johnson, L.: Podcasting Lectures: Formative evaluation strategies helped identfy a solution to a learning dilemma; in: Educause Quarterly, 2006.

BusinessWeek.com: Podcasting Explosion; 2005; URL: http://www.businessweek.com/technology/tech_stats/podcast050523.htm, (Accessed: 10.03.2007).

Campbell, G.: There's Something in the Air: Podcasting in Education; in: Educause Review, 6; 2005.

Cano, F.: Epistemological beliefs and approaches to learning: Their change through secondary school and their influence on academic performance; in: British Journal of Educational Psychology, 75, 2005.

Carusi, A.: Textual Practitioners: hypertext, annotation and the phenomenology and online reading; in: Remenyi, D. (Ed.), Proceedings of the 3rd European Conference on E-Learning; Paris 2004.

Clément, D., Viéville, C., Vilers, P.: An Experiment of Cooperative Learning with Hypercard; in: Tomek, I. (Ed.), Proceedings of the 4th International Conference on Computer Assisted Learning; Springer, London 1992.

Coenen, O.: E-Learning-Architektur für universitäre Lehr- und Lernprozesse, 2nd Edition; Josef Eul Verlag, Lohmar 2002.

Crofts, S., Dilley, J., Fox, M., Retsema, A., Williams, B.: Podcasting: A new technology in search of viable business models; in: First Monday, 2005; URL: http://www.firstmonday.org/issues/issue10_9/crofts/index.html, (Accessed: 20.09.2006).

Devito, J.A.: The Communication Handbook: A Dictionary; Harper & Row, New York 1986.

Dickson, C., Greeson, M.: Recasting the Concept of Podcasting: Part I; 2006; URL: http://news.digitaltrends.com/talkback109.html, (Accessed: 10.03.2007).

Dow, M.J.: Cognitive Consequences of Internet-Based Teaching and Learning and Distance Education; Emporia State University, 2002; URL: http://slim.emporia.edu/research/cognitive.pdf, (Accessed: 15.03.2007).

Farivar, C.: New Food for IPods: Audio by Subscription; in: The New York Times, 28.10.2004; 2004; URL: http://query.nytimes.com/gst/fullpage.html?res=990CE3D6153DF93BA15753C1A9629C8B63&sec=&spon=&pagewanted=2, (Accessed: 24.02.2007).

Fishbein, M., Ajzen, I.: Belief, Attitude, Intention and Behaviour: An Introduction to Theory and Research; Addison-Wesley Publishing Company, London 1975.

Fuller, R.M., Vician, C., Brown, S.A.: E-Learning and Individual Characteristics: The Role of Computer Anxiety and CommunicationApprehension; in: Journal of ComputerInformation Systems, Summer 2006; 2006.

Graham, C. R.: Blended Learning Systems: Definition, Current Trends, and Future Directions; in: Bonk, C. J. & Graham, C. R. (Ed.), Handbook of blended learning: Global Perspectives, local designs; Pfeiffer Publishing, San Francisco 2004.

Graham, P.: Web 2.0; 2005; URL: http://www.paulgraham.com/web20.html, (Accessed: 10.03.2007).

Greenlee, R.: Podcast: Time-shifted radio listening gets a new name; 2004; URL: http://www.webtalkguys.com/102304.shtml, (Accessed: 20.01.2007).

Guillemin, C., Labousset, P., Shim, R.: Sony to support MP3; in: CNET News, 2004; URL: http://news.com.com/Sony+to+support+MP3/2100-1027_3-5377625.html, (Accessed: 17.03.2007).

Haas, C., Ahlemann, F., Hoppe, U.: Organisationale Integration von E-Learning in Unternehmen – ein Referenz-Informationsmodell; in: Uhr, W., Esswein, W., Schoop, E. (Ed.), Wirtschaftsinformatik 2003. Medien – Märkte – Mobilität; Physica-Verlag, Heidelberg 2003.

Haines, L.: Podcast named 'Word of the Year'; in: The Register, 2005; URL: http://www.theregister.co.uk/2005/12/07/podcast_honour/, (Accessed: 02.03.2007).

Hall, R.S.: The Blog Ahead: How Citizen-Generated Media Is Radically Tilting the Communications Balance; Morgan James Publishing, New York 2006.

Hallett, V.: Teaching With Tech; in: U.S.News and World Report, 139(14); 2005.

Handwerker, C.: New Technologies and Higher Education in Germany: a field study and comparison ; Tectum Verlag, Marburg 2000.

Heath, R.L., Bryant, J.: Human Communication Theory and Research: Concepts, Contexts, and Challenges; Lawrence Erlbaum Associates, Publishers, Mahwah, New Jersey 2000.

Kelleher, T., Miller, B.M.: Organizational blogs and the human voice: Relational strategies and relational outcomes; in: Journal of Computer-Mediated Communication, 11 (2); 2006; URL: http://jcmc.indiana.edu/vol11/issue2/kelleher.html, (Accessed: 30.08.2006).

Ketterl, M., Mertens, R., Morisse, C.: Alternative content distribution channels for mobile devices ; in: microlearning 2006, Innsbruck 2006.

Kiley, D.: Mad Ave.'s Rush to Podcasts; in: Business Week Online, 2005; URL: http://www.businessweek.com/technology/content/may2005/tc20050525_8984_tc_211.htm, (Accessed: 06.03.2007).

Kimmel, A.J.: Ethical Issues in Behavioral Research: Basic and Applied Perspectives 2nd Edition; Blackwell Publishing Limited, Oxford 2007.

Li, C.: Podcasting Hits The Charts; Forrester Research, 2006; URL: http://www.forrester.com/Research/Document/Excerpt/0,7211,38761,00.html, (Accessed: 12.03.2007).

Likert, R.: A Technique for the Measurement of Attitudes; in: Archives of Psychology, 140; 1932.

Lowe, C., Williams, T.: Moving to the Public: Weblogs in the Writing Classroom; in: Into the Blogosphere: Rhetoric, Community, and Culture of Weblogs, 2004; URL: http://blog.lib.umn.edu/blogosphere/, (Accessed: 30.08.2006).

Macklin, S.: Educational Technology; in: Dupius, E.A. (Ed.), Developing Web-based Instruction; Facet Publishing, London 2003.

Martell, D.: Zune has shot at iPod market share, survey says; in: Reuters, 2006; URL: http://today.reuters.com/news/articlenews.aspx?type=technologyNews&storyid=2006-11-29T230317Z_01_N28278432_RTRUKOC_0_US-MICROSOFT-ZUNE-IPOD.xml, (Accessed: 08.12.2006).

Matthews R.,: Marshall and the Labour Market; in: Whitaker, J. K. (Ed.), Centenary Essays on Alfred Marshall; Cambridge University Press, Cambridge 1990.

McCarthy, C.: Carmakers race to accommodate iPods; 2006; URL: http://news.com.com/Carmakers+race+to+accommodate+iPods/2100-11389_3-6101744.html, (Accessed: 10.03.2007).

Meng, P.: Podcasting and VODcasting: A White Paper; University of Missouri, 2005.

Merz, M.: Blogs: Innovative Kommunikationsform mit Möglichkeit zur kontrollierten Partizipation; in: Merz, M., Rhein, S., Vetter, J. (Ed.), Wahlkampf im Internet – Public Affairs und Politikmanagement; Lit Verlag, Münster 2006.

Moore, M.: Theory of transactional distance; in: Keegan, D. (Ed.), Theoretical principles of distance education; Routledge, London 1993.

Moore, M.G., Kearsley, G.: Distance Education: A Systems View, 2nd Edition; Wadsworth, Belmont 2005.

Mortensen, T., Walker, J.: Blogging thoughts: Personal publication as an online research tool; in: Morrison, A. (Ed.), In Researching ICTs in Context; InterMedia; Oslo 2002; URL: http://www.intermedia.uio.no/konferanser/skikt-02/docs/Researching_ICTs_in_context.pdf, (Accessed: 02.03.2007).

Nesbitt, A.: The Podcast Value Chain Report – An Overview of the Emerging Podcasting Marketplace; in: Digital Podcast, 2005; URL: http://www.digitalpodcast.com/podcastvaluechain.pdf, (Accessed: 20.02.2007).

O'Reilly, T.: What is Web 2.0?; 2005; URL: http://www.oreilly.de/artikel/web20.html, (Accessed: 12.03.2007).

Oblinger, D.: Introduction to Multimedia in Instruction. An IAT Technology Primer; Caper Hill, NC 1993.

Pittinsky, M.: The Wired Tower: Perspectives on the Impact of the Internet on Higher Education; Prentice Hall, New Jersey 2002.

Postman, N.: Die zweite Aufklärung, Deutsch von H. Jochen Bußmann; Büchergilde Gutenberg, Frankfurt am Main 2000.

Read, B.: Lectures on the go: As more colleges use 'coursecasting,' professors are split on its place in teaching; in: The Chronicle of Higher Education., 2005; URL: http://chronicle.com/free/v52/i10/10a03901.htm, (Accessed: 20.02.2007).

Sabau, I.: E-Learning and Learning Objects; in: Harman, K., Koohang, A. (Ed.), Learning objects: applications, implications & future directions; Informing Science Press, Santa Rosa 2007.

Schiefner, M.: Podcasts in der universitären Lehre - wie, warum und warum nicht?; Universitaet Zuerich, 2006; URL: http://www.unipublic.unizh.ch/campus/uni-news/2006/2261.html, (Accessed: 16.03.2007).

Schulin, K.M., McCully, M.S.: Learning on the Go: Can and Will Leaders Learn by Listening; in: Proceedings of the International Association for Development of the Information Society: Mobile Learning 2006; Dublin, Ireland 2006.

Trammell, K.D., Keshelashvili, A.: Examining the new influencers: A self-presentation study of A-List blogs; in: Journalism & Mass Communication Quarterly, 82; 2005.

Trier, M., Herzog, M., Krallmann, H.: Der 'Short-Clip' als Ansatz zur Produktion von video-basiertem E-Learning Content bei der VGU; in: Proceedings Wirtschaftsinformatik WI 2003; Physica-Verlag, Heidelberg 2003.

Wallenstein, A.: Study: iPod video yet to play big; 2006; URL: http://www.hollywoodreporter.com/hr/content_display/news/e3i61fccc799efa3cb769017fad91ec0209, (Accessed: 17.03.2007).

Wittenbrink, H.: RSS and Atom: Understanding and Implementing Content Feeds and Syndication; Packt Publishing, Birmingham 2005.

Appendix A: Questionnaire

Business Informatics Podcasts Survey

General Information on Devices and Podcasts:

Do you own a PC (desktop or laptop)?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	28	100.0	100.0	100.0

Do you own a portable MP3 or multimedia player?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes, iPod	1	3.6	3.6	3.6
	Yes, other portable player	16	57.1	57.1	60.7
	No	11	39.3	39.3	100.0
	Total	28	100.0	100.0	

Does your portable player support video playback?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		11	39.3	39.3	39.3
	Yes	4	14.3	14.3	53.6
	No	13	46.4	46.4	100.0
	Total	28	100.0	100.0	

How big is your portable player's storage capacity (in MB)?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	128	1	3.6	6.3	6.3
	256	1	3.6	6.3	12.5
	512	6	21.4	37.5	50.0
	1000	4	14.3	25.0	75.0
	1024	1	3.6	6.3	81.3
	2048	2	7.1	12.5	93.8
	6000	1	3.6	6.3	100.0
	Total	16	57.1	100.0	
Missing	System	12	42.9		
Total		28	100.0		

On what devices did you listen to the audio files?

Desktop:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	8	28.6	28.6	28.6
	No	20	71.4	71.4	100.0
	Total	28	100.0	100.0	

Laptop:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	24	85.7	85.7	85.7
	No	4	14.3	14.3	100.0
	Total	28	100.0	100.0	

Mobile Phone:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	5	17.9	17.9	17.9
	No	23	82.1	82.1	100.0
	Total	28	100.0	100.0	

MP3 Player:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	8	28.6	28.6	28.6
	No	20	71.4	71.4	100.0
	Total	28	100.0	100.0	

On what devices did you watch the recorded lectures?

Desktop:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	5	17.9	17.9	17.9
	No	23	82.1	82.1	100.0
	Total	28	100.0	100.0	

Laptop:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	25	89.3	89.3	89.3
	No	3	10.7	10.7	100.0
	Total	28	100.0	100.0	

Mobile phone:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	28	100.0	100.0	100.0

Portable player:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	28	100.0	100.0	100.0

Do you use Apple iTunes as a multimedia player on your computer?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	2	7.1	7.1	7.1
	No	26	92.9	92.9	100.0
	Total	28	100.0	100.0	

Have you ever been subscribed to and listened to podcasts?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	12	42.9	42.9	42.9
	No	16	57.1	57.1	100.0
	Total	28	100.0	100.0	

Have you made any use of the offered podcasts in the course?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	18	64.3	64.3	64.3
	No	10	35.7	35.7	100.0
	Total	28	100.0	100.0	

Have you ever beeen subscribed to blogs or other feeds that interest you?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	11	39.3	39.3	39.3
	No	17	60.7	60.7	100.0
	Total	28	100.0	100.0	

Through which channels did you access the podcast episodes?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	RSS	7	25.0	26.9	26.9
	Direct download	19	67.9	73.1	100.0
	Total	26	92.9	100.0	
Missing	System	2	7.1		
Total		28	100.0		

RSS Issues

The following questions applly only if you have used the RSS feed technology! If you have not, please scroll down and press "Next >>" at the bottom of the page to skip these questions.

The RSS feed technology (for blogs etc.) is a technology I understand well.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	3	10.7	16.7	16.7
	agree	6	21.4	33.3	50.0
	neither agree, nor disagree	4	14.3	22.2	72.2
	disagree	3	10.7	16.7	88.9
	strongly disagree	2	7.1	11.1	100.0
	Total	18	64.3	100.0	
Missing	System	10	35.7		
Total		28	100.0		

I freely use RSS feeds (for blogs etc.).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	1	3.6	5.9	5.9
	agree	6	21.4	35.3	41.2
	neither agree, nor disagree	3	10.7	17.6	58.8
	disagree	5	17.9	29.4	88.2
	strongly disagree	2	7.1	11.8	100.0
	Total	17	60.7	100.0	
Missing	System	11	39.3		
Total		28	100.0		

The offered RSS feed helped in finding the offered podcasts.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	2	7.1	12.5	12.5
	agree	5	17.9	31.3	43.8
	neither agree, nor disagree	6	21.4	37.5	81.3
	disagree	2	7.1	12.5	93.8
	strongly disagree	1	3.6	6.3	100.0
	Total	16	57.1	100.0	
Missing	System	12	42.9		
Total		28	100.0		

The offered RSS feed facilitated the access to the podcast episodes.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	1	3.6	6.3	6.3
	agree	10	35.7	62.5	68.8
	neither agree, nor disagree	2	7.1	12.5	81.3
	disagree	2	7.1	12.5	93.8
	strongly disagree	1	3.6	6.3	100.0
	Total	16	57.1	100.0	
Missing	System	12	42.9		
Total		28	100.0		

The offered RSS feed made the downloading of the podcasts easier.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	2	7.1	13.3	13.3
	agree	4	14.3	26.7	40.0
	neither agree, nor disagree	5	17.9	33.3	73.3
	disagree	3	10.7	20.0	93.3
	strongly disagree	1	3.6	6.7	100.0
	Total	15	53.6	100.0	
Missing	System	13	46.4		
Total		28	100.0		

The offered RSS feed improved the handling of the downloaded podcasts.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	2	7.1	12.5	12.5
	agree	6	21.4	37.5	50.0
	neither agree, nor disagree	4	14.3	25.0	75.0
	disagree	3	10.7	18.8	93.8
	strongly disagree	1	3.6	6.3	100.0
	Total	16	57.1	100.0	
Missing	System	12	42.9		
Total		28	100.0		

The offered RSS feed allowed a better overview of the offered podcasts.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	5	17.9	31.3	31.3
	agree	4	14.3	25.0	56.3
	neither agree, nor disagree	4	14.3	25.0	81.3
	disagree	2	7.1	12.5	93.8
	strongly disagree	1	3.6	6.3	100.0
	Total	16	57.1	100.0	
Missing	System	12	42.9		
Total		28	100.0		

Being subscribed to the RSS feed was preferable over manually downloading the podcasts from the website.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	2	7.1	12.5	12.5
	agree	6	21.4	37.5	50.0
	neither agree, nor disagree	7	25.0	43.8	93.8
	strongly disagree	1	3.6	6.3	100.0
	Total	16	57.1	100.0	
Missing	System	12	42.9		
Total		28	100.0		

Content Issues in General

The titles and the short descriptions of the episodes were intuitively informative.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	4	14.3	16.7	16.7
	agree	15	53.6	62.5	79.2
	neither agree, nor disagree	4	14.3	16.7	95.8
	disagree	1	3.6	4.2	100.0
	Total	24	85.7	100.0	
Missing	System	4	14.3		
Total		28	100.0		

The language, used in the titles and the short descriptions of the episodes was easily understandable.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	7	25.0	28.0	28.0
	agree	15	53.6	60.0	88.0
	neither agree, nor disagree	3	10.7	12.0	100.0
	Total	25	89.3	100.0	
Missing	System	3	10.7		
Total		28	100.0		

The titles and the short descriptions of the episodes were important for selecting the episodes.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	8	28.6	32.0	32.0
	agree	14	50.0	56.0	88.0
	neither agree, nor disagree	3	10.7	12.0	100.0
	Total	25	89.3	100.0	
Missing	System	3	10.7		
Total		28	100.0		

It was helpful that the lecture has been offered in both audio and video formats.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	9	32.1	36.0	36.0
	agree	9	32.1	36.0	72.0
	neither agree, nor disagree	4	14.3	16.0	88.0
	disagree	3	10.7	12.0	100.0
	Total	25	89.3	100.0	
Missing	System	3	10.7		
Total		28	100.0		

If you have to choose between only audio, or only video format, what format will you choose?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Audio	8	28.6	30.8	30.8
	Video	18	64.3	69.2	100.0
	Total	26	92.9	100.0	
Missing	System	2	7.1		
Total		28	100.0		

It would be useful to have instructional multimedia content in the form of podcasts for every lecture.*

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	14	50.0	53.8	53.8
	agree	11	39.3	42.3	96.2
	disagree	1	3.6	3.8	100.0
	Total	26	92.9	100.0	
Missing	System	2	7.1		
Total		28	100.0		

Content Issues, Specific for Audio Podcasts

The offered audio podcasts enabled me to learn in a more mobile and flexible way.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	7	25.0	28.0	28.0
	agree	6	21.4	24.0	52.0
	neither agree, nor disagree	8	28.6	32.0	84.0
	disagree	4	14.3	16.0	100.0
	Total	25	89.3	100.0	
Missing	System	3	10.7		
Total		28	100.0		

The offered audio podcasts were easy to access and use.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	10	35.7	40.0	40.0
	agree	11	39.3	44.0	84.0
	neither agree, nor disagree	4	14.3	16.0	100.0
	Total	25	89.3	100.0	
Missing	System	3	10.7		
Total		28	100.0		

If you have to choose between audio-presented and text-based content (script, etc), what format will you choose?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	audio-presented content	11	39.3	40.7	40.7
	text-based content (script, etc.)	16	57.1	59.3	100.0
	Total	27	96.4	100.0	
Missing	System	1	3.6		
Total		28	100.0		

If you have to evaluate what is easier to follow and understand: audio-presented content or text-based content (script, etc), what will you prefer?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	audio-presented content	10	35.7	37.0	37.0
	text-based content (script, etc.)	17	60.7	63.0	100.0
	Total	27	96.4	100.0	
Missing	System	1	3.6		
Total		28	100.0		

Content Issues, Specific for Video Podcasts

The offered video podcasts enabled me to learn in a more mobile and flexible way.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	5	17.9	20.8	20.8
	agree	10	35.7	41.7	62.5
	neither agree, nor disagree	6	21.4	25.0	87.5
	disagree	3	10.7	12.5	100.0
	Total	24	85.7	100.0	
Missing	System	4	14.3		
Total		28	100.0		

The offered video podcasts were easy to access and use.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	8	28.6	33.3	33.3
	agree	10	35.7	41.7	75.0
	neither agree, nor disagree	6	21.4	25.0	100.0
	Total	24	85.7	100.0	
Missing	System	4	14.3		
Total		28	100.0		

If you have to choose between video-presented and text-based content (script, etc), what format will you choose?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	video-presented content	12	42.9	46.2	46.2
	text-based content (script, etc.)	14	50.0	53.8	100.0
	Total	26	92.9	100.0	
Missing	System	2	7.1		
Total		28	100.0		

If you have to evaluate what is easier to follow and understand: video-presented content or text-based content (script, etc), what will you prefer?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	video-presented content	13	46.4	50.0	50.0
	text-based content (script, etc.)	13	46.4	50.0	100.0
	Total	26	92.9	100.0	
Missing	System	2	7.1		
Total		28	100.0		

Multimedia Content Structure (Audio)

What is, according to your experience, the optimal length of an audio podcast episode?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	up to 5 min	3	10.7	12.0	12.0
	5-10 min	11	39.3	44.0	56.0
	10-20 min	7	25.0	28.0	84.0
	20-40 min	3	10.7	12.0	96.0
	over 40 min	1	3.6	4.0	100.0
	Total	25	89.3	100.0	
Missing	System	3	10.7		
Total		28	100.0		

Where did you listen to the course podcasts?

At home:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	22	78.6	78.6	78.6
	No	6	21.4	21.4	100.0
	Total	28	100.0	100.0	

On the move (train, tram, while jogging etc.):

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	1	3.6	3.6	3.6
	No	27	96.4	96.4	100.0
	Total	28	100.0	100.0	

During leisure activities (while exercising, jogging, etc.):

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	4	14.3	14.3	14.3
	No	24	85.7	85.7	100.0
	Total	28	100.0	100.0	

How did you listen to the clips?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Mostly frombeginning till end.	18	64.3	78.3	78.3
	Only parts that interest me.	5	17.9	21.7	100.0
	Total	23	82.1	100.0	
Missing	System	5	17.9		
Total		28	100.0		

The division of the topics in the first lecture (PHP-Examples) into different sound files (podcast episodes) was well structured in terms of length.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	1	3.6	4.3	4.3
	agree	11	39.3	47.8	52.2
	neither agree, nor disagree	11	39.3	47.8	100.0
	Total	23	82.1	100.0	
Missing	System	5	17.9		
Total		28	100.0		

The audio content was well suited for following and understanding the first lecture (PHP-Examples).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	2	7.1	8.7	8.7
	agree	13	46.4	56.5	65.2
	neither agree, nor disagree	7	25.0	30.4	95.7
	disagree	1	3.6	4.3	100.0
	Total	23	82.1	100.0	
Missing	System	5	17.9		
Total		28	100.0		

The division of the topics in the second lecture (CRS and ERP) into separate sound files (podcast episodes) was well structured in terms of length.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	2	7.1	8.7	8.7
	agree	14	50.0	60.9	69.6
	neither agree, nor disagree	6	21.4	26.1	95.7
	disagree	1	3.6	4.3	100.0
	Total	23	82.1	100.0	
Missing	System	5	17.9		
Total		28	100.0		

The audio content was well suited for following the context and understanding the second lecture (CRS and ERP).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	2	7.1	9.1	9.1
	agree	13	46.4	59.1	68.2
	neither agree, nor disagree	7	25.0	31.8	100.0
	Total	22	78.6	100.0	
Missing	System	6	21.4		
Total		28	100.0		

The download size of the sound clips was exactly as it should be.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	2	7.1	8.3	8.3
	agree	11	39.3	45.8	54.2
	neither agree, nor disagree	11	39.3	45.8	100.0
	Total	24	85.7	100.0	
Missing	System	4	14.3		
Total		28	100.0		

The sound quality of the audio files was good.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	8	28.6	33.3	33.3
	agree	11	39.3	45.8	79.2
	neither agree, nor disagree	3	10.7	12.5	91.7
	disagree	2	7.1	8.3	100.0
	Total	24	85.7	100.0	
Missing	System	4	14.3		
Total		28	100.0		

The episodes that offered non-learning material (exam details etc.) were useful.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	12	42.9	50.0	50.0
	agree	8	28.6	33.3	83.3
	neither agree, nor disagree	4	14.3	16.7	100.0
	Total	24	85.7	100.0	
Missing	System	4	14.3		
Total		28	100.0		

Multimedia Content Structure (Video)

What is, according to your experience, the optimal length of a video podcast episode?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	up to 5 min	3	10.7	13.0	13.0
	5-10 min	6	21.4	26.1	39.1
	10-20 min	8	28.6	34.8	73.9
	20-40 min	5	17.9	21.7	95.7
	over 40 min	1	3.6	4.3	100.0
	Total	23	82.1	100.0	
Missing	System	5	17.9		
Total		28	100.0		

Where did you watch the course podcasts?

At home:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	20	71.4	71.4	71.4
	No	8	28.6	28.6	100.0
	Total	28	100.0	100.0	

On the move (train, tram, bus etc.):

		Frequency	Percent
Missing	System	28	100.0

How did you watch the video clips?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Mostly frombeginning till end.	14	50.0	73.7	73.7
	Only parts that interest me.	5	17.9	26.3	100.0
	Total	19	67.9	100.0	
Missing	System	9	32.1		
Total		28	100.0		

The division of the topics in the first lecture (PHP-Examples) into different video clips (podcast episodes) was well structured in terms of length.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	3	10.7	14.3	14.3
	agree	12	42.9	57.1	71.4
	neither agree, nor disagree	5	17.9	23.8	95.2
	disagree	1	3.6	4.8	100.0
	Total	21	75.0	100.0	
Missing	System	7	25.0		
Total		28	100.0		

The video content was well suited for following and understanding the first lecture (PHP-Examples).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	3	10.7	14.3	14.3
	agree	13	46.4	61.9	76.2
	neither agree, nor disagree	5	17.9	23.8	100.0
	Total	21	75.0	100.0	
Missing	System	7	25.0		
Total		28	100.0		

The division of the topics in the second lecture (CRS and ERP) into separate video clips was well structured in terms of length.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	2	7.1	9.5	9.5
	agree	14	50.0	66.7	76.2
	neither agree, nor disagree	5	17.9	23.8	100.0
	Total	21	75.0	100.0	
Missing	System	7	25.0		
Total		28	100.0		

The video content was well suited for following the context and understanding the second lecture (CRS and ERP).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	2	7.1	9.5	9.5
	agree	14	50.0	66.7	76.2
	neither agree, nor disagree	5	17.9	23.8	100.0
	Total	21	75.0	100.0	
Missing	System	7	25.0		
Total		28	100.0		

The download size of the video clips was exactly as it should be.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	1	3.6	4.5	4.5
	agree	10	35.7	45.5	50.0
	neither agree, nor disagree	9	32.1	40.9	90.9
	disagree	2	7.1	9.1	100.0
	Total	22	78.6	100.0	
Missing	System	6	21.4		
Total		28	100.0		

The picture quality of the video clips from the first lecture (PHP examples) was exactly as it should be.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	1	3.6	4.5	4.5
	agree	10	35.7	45.5	50.0
	neither agree, nor disagree	6	21.4	27.3	77.3
	disagree	5	17.9	22.7	100.0
	Total	22	78.6	100.0	
Missing	System	6	21.4		
Total		28	100.0		

The picture quality of the video clips from the second lecture (CRS and ERP) was exactly as it should be.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	3	10.7	13.6	13.6
	agree	9	32.1	40.9	54.5
	neither agree, nor disagree	7	25.0	31.8	86.4
	disagree	3	10.7	13.6	100.0
	Total	22	78.6	100.0	
Missing	System	6	21.4		
Total		28	100.0		

The sound quality of the video clips was good.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly agree	3	10.7	13.6	13.6
	agree	12	42.9	54.5	68.2
	neither agree, nor disagree	4	14.3	18.2	86.4
	disagree	3	10.7	13.6	100.0
	Total	22	78.6	100.0	
Missing	System	6	21.4		
Total		28	100.0		

Appendix B: Media CD-ROM

The attached CD-ROM contains all audio and video instructional episodes created as stimulus material and offered to the students as a podcast.

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I wish to thank all those involved for their support during the preparation and writing of this Master Thesis.

Declaration

Hereby I declare that I wrote this Thesis with the topic:

Benefits and Limitations of Podcasts and Video Blogs as Instructional Media
Vorteile und Grenzen von Podcasts und Video-Blogs als Unterrichtsmedien

myself with the help of no more than the mentioned literature and auxiliary means.

Up to now, this thesis was not published or presented to another examinations office in the same or similar shape.

Ehrenwörtliche Erklärung

Ich versichere hiermit, dass ich die vorliegende Masterarbeit mit dem Thema:

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Vorteile und Grenzen von Podcasts und Video-Blogs als Unterrichtsmedien

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