

Podcasting at TU Graz

How to Implement Podcasting as a Didactical Method for Teaching and Learning Purposes at a University of Technology

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Abstract: In this paper a way is reflected how the didactical power of podcasting is used for teaching and learning purposes at “Graz University of Technology” (TU Graz) since more than one year. The variety of different didactical scenarios that are in practice is presented and argued as well as the workflow behind. Advantages and disadvantages of software, hardware and methods that are worked with are discussed. Examples and first evaluations give an overview of how far podcasting is welcomed by teachers and students and tops the paper off.

An introduction to podcasting at universities

Podcast is no hype – from audio-blogging to YouTube

Searched by Google™ the term “podcast” results in over 95.8 million hits (18.12.07); rapidly growing. Per definition a podcast is an audio- or video-file distributed and received over the internet via RSS which enables an automatic download. The term itself is a mash of Apple’s mp3 player “iPod” and the word “broadcast”. Before RSS feeds had been enhanced with enclosures (Louis & Winter 2000) a weblog contribution with an audio-file was called “audioblogging”. On 12th of February 2004 Ben Hammersley set the term “podcasting” into being. Since 2005 Apple is offering on its free platform iTunes (Version 4.9) to subscribe and manage podcasts. In winter 2005 YouTube was founded and (private) videos presented over the web began to boom. In times of multimedia mobile devices and iPhone audios and videos have become a part of the everyday life for many. It would be more than a carelessness to ignore these facts when thinking about modern education (Huann & Thong, 2007). First studies about the usage of mobile devices in education prognosticate a strong increase (Campell, 2006) especially in the field of lifelong learning (Ebner, Fickert, Nagler & Stöckler-Penz, 2007a) and higher education (Blaisdell, 2006; Dale, 2007; Towned, 2005).

Didactics on podcasts at universities

How can podcasts be used for teaching and learning purposes at universities

To answer this question it must be said that podcasting for the interest of higher education needs a complete didactical scenario (Edirisingha & Salmon, 2007) mainly according to the questions of what should be recorded, duration and time of recording as well as the target group whether it's the one who is recorded or the subscriber to the podcast. When these aims are defined the settings including the post processing methods can be fixed. Besides the question about hardware and software the following attempt of classification of recordings that are to be combined may help to find the ideal setting:

- Audio recording (headset, wireless microphone, ...)
- Video recording
- Screen capturing
- Recording of a whole lecture in classroom (live, live streaming, not live in the office)
- Recording of short sequences for different purposes (tutorial, instructions, summaries, definitions, ...)
- Recording for strictly archival scopes
- Recording as a part of students (collaborative) work and marking

What are the advantages and risks of podcasting at universities

The main problems due to the usage of podcasting can be summarized as:

- Recording: According to the hardware and software used the recording self comprises a pool of possible lapses. Nevertheless if the process of recording functioned well the recording might be defective because of bad audio or video quality. This can have several such as:
 - Using a wireless microphone interferences coming from other sources (e.g. mobile phone of the teacher or technical equipment of the lecture room) may disturb
 - The energy supply of one of the recording equipments shuts down during the recording
 - The lecturer becomes nervous and is doing some damage on the recording
- Post processing: If the recording of the audio was not very well, the post processing of the audio track can emerge to a very time-consuming job only a sound engineer is able to do fine.
- Sequences missing: In case of a screen capturing method recording all activities that are not taking place via laptop will not be recorded like drawing on the blackboard, using overhead slides. Although a video camera is used to catch all of a live lecture the quality of such recordings is often not very satisfying.
- Long time recording without search function: To break down the recording in several chapters or captioned parts according to the content does not solve this problem satisfactorily.

On the other side there are big advantages for education:

- Live character of lecture recorded: During the learning-process learners like to remember the live situations in classroom listening to the words between. An expansive "clean" studio recording cannot do this.
- Process capturing: Using a tablet pc, a smart board or any other device and software that are competent to take handwritten input the idea of reproducing learning steps and processes during the lecture becomes very easy to be realized. For understanding mathematic equations or constructions this is a great benefit.
- Repeatability: During the learning activities learners can repeat the recording as often as they need it.
- Catch missed lectures: But it is not the aim to replace the lecture in classroom in general.
- Manage lectures with a high number of students: In case of problems due to the capability of a classroom.
- Multiple learning materials: The learning material will be enhanced by audio and video files meeting the requirements of the different doors of senses.
- Learning on demand: Using multiple devices, for example by hearing MP3 files during a railway trip.
- Possibility for the teacher to reflect his/her way of teaching, words spoken, content explained.
- Easy to get: The RSS technology allows a very easy and effective distribution of media files produced.

Beside these arguments there are some psychological effects on the teacher preparing and taking the recording as well as on the learner listening to podcasts that should not be disregarded (Schiefner, 2004):

- Emotions and authenticity can be expressed more intensively than in written format and therefore may reach the learner closer also in the face of distance learning
- The human voice has a very strong impact factor on the meaning of content
- Advantages for visually handicapped people
- Being recorded may lead to more self-control because of the feeling being watched currently and in future

Podcasting at TU Graz

The software that is used

Camtasia and TeleTeachingTool

When the “Department for Social Learning” (Dept. SL) of the “Computer and Information Services” (CIS) of TU Graz has to decide which software will be used for producing podcasts a couple of considerations had to be balanced. Finally the commercial product Camtasia Studio (TechSmith) has been chosen and still is in use. Camtasia Studio is a screen capturing software including audio and video implementation on demand. Even videos played during the recording get captured. It can be started within a MS PowerPoint presentation (PPT) with the advantage of setting captions every PPT-slide automatically; otherwise the captions had to be added afterwards. The post processing options are more than sufficient. The “easy output for bloggers” allow an automatic publishing on a server of own choice. It is possible to add further codes to the program e.g. to produce AVI for Linux systems. The great minus over all is the missing search functionality.

Besides Camtasia Studio the TU Graz supports the further development of the free screen capturing software called “TeleTeachingTool” (TTT) that was developed at the University of Trier by Dipl. Inf. Peter Ziewer (Ziewer & Seidl, 2002). Although there are main disadvantages compared to Camtasia (no recording longer than 45 min, possible unsynchronised audio/video, problems with Flash converter) the advantages are remarkable:

- Platform independent (Java; but Java Media Framework has stopped its evolution)
- Multicast- and unicast-transmission
- Text search functionality on base of XML-file generated with OCR-software
- Automatic positioning of markers (captions)
- Outputs: TTT-format (requires TTT-Player), PDF, HTML, MP3, Flash (control buttons and thumbnails)

The post processing software tools

For the recording is done well due to the audio track there is no further post processing needed but to produce the different output formats with Camtasia Studio and publish them. In case of an audio track with less quality the track needs to be optimised. The reasons for an audio of less quality have been outlined before. There are a couple of freeware programs to minimise the problems that are in use at TU Graz listed as follows:

- “VirtualDub” and “Avidemux” (video post processing, synchronisation of audio and video)
- “Audacity” (audio post processing: High pass handling, normalising, compressor)
- “gnome_wave_cleaner” (audio post processing: noise removal, click and pop reduction)
- “postfish” (audio post processing: declipping)
- “mencoder” (conversional efforts: converts AVI-files to several formats; to be controlled by command-line)

The hardware that is used

The podcast-activities of the TU Graz (Ebner, Nagler & Saranti, 2007b) are mainly serviced by the Dept. SL of the CIS but not exclusively; there are several other recording and publishing activities taking place at TU Graz. The service lasts from simple lending technical equipment, to instructions up to coaching the complete recording. The hardware that can be lent or are in use for podcasting coordinated by Dept. SL is:

- Wireless microphones - Sennheiser EK 100 G2 receiver and SK 100 G2 transmitter
- Tablet pc (HP)
- Smart board (Symposium ID370) that is steady installed in two lecture room (by summer term 2008)

Workflow of podcasting

Before recording and ercording

Before a recording is started there are a couple of questions to be answered that can be understood as a guideline throughout the whole workflow additionally to the classification mentioned above:

- What is the primarily aim of the recording?
- How often will be recorded?
- Is an instruction needed before due to software and hardware used

- Is support needed for the recordings on location?
- What are the specifications of the recording computer according to its RAM etc?
- Which programs are assumed to be running during the recording?
- Which software which hardware shall be used?
- Which output formats are to be produced?
- Who will be recorded?
- Where will the recording take place?
- Is a lecture room check necessary according to interferences when using a wireless microphone?
- Where shall the formats being published?

The answering of these questions leads to an adequate setting. In most of the recordings done in the course of e-Learning at TU Graz whole lectures were recorded. Generally all the lectures of one course of one term are being recorded. Depending on the content of the lesson the effective benefit of the recording varies. The sensitivity and position of the microphone needs to be adjusted according to the speaker. In case of a wireless one the fixing on the clothes of the lecturer must be done carefully for to avoid interaction with clothes. If there is a beamer in use for the lecture it should be connected to the recording computer and switched on before the recording. A check of the settings of the capturing software finalizes the prerecording sequence.

After the recording has been started a quick check whether it is working or not has been proved advantageously. Be aware that there is the pop-protection always on the microphone. The finished recording gets finally stored at the servers of the Dept. SL.

Post processing and publishing

As mentioned before the post processing can take a lot of time if the audio quality is not that good as supposed. Additionally the marking of captions within a flash-file is a time-consuming task as well. The rendering of the different outputs usually takes little time and the publishing is done very quickly too by uploading the files to the corresponding course on the e-Learning platform of the TU Graz called "TU Graz TeachCenter" (TUGTC). TUGTC offers RSS feeds, so the uploaded media-files are real podcasts.

Usually the Dept. SL publishes a recording in the following formats:

- AVI XviD – for to be played on Linux systems too
- M4V – for the use on iPod, iTunes and Linux systems
- MP3 – for MP3 players and mobile devices
- FLV – Flash-version with caption for navigation
- HTML – for web based implementation
- PDF – for script based output

For an example it can be outlined that a 90 minute recording recorded with Camtasia Studio using Camtasia-codecs results in an AVI-file of not more than 30 MB. All recordings of an academic year are available for that year. Afterwards they are moved to a backup system.

Examples and evaluation of podcasting at TU Graz

Examples

Recording whole live lecture

This variant has been and still is the most common one exercised. Within the first year of podcasting at TU Graz more than hundred lectures have been recorded and published in that way. Examples published at TUGTC are the following courses representing the wide spread scope of practice:

- "Strength of Materials"
- "Electrical Power Systems"
- "History of architecture"
- "Structural Design"

- “Traffic psychology”

Short records and short introductions

Short records are taken unexceptionally not in classroom but in an office. The time for preparation can be adapted to the requirements. The recording can be repeated if needed. Disturbances can be eliminated nearly totally. The result of such recordings often is very pleasant and needs no further post processing. Examples published at TUGTC are the following projects:

- Introduction to the course “Gas Turbine Combustion”
- List of FAQs and Helpdesk functionality for TUGTC realised as podcasts
- Short explanations as part of learning content e.g. for the CD ROM “Visual Sorting of Coniferous Timber”

Recordings for storage purpose

In cooperation with the digital bibliotheca of the TU Graz there is a project to be announced meeting the capability of podcasting. Furthermore several institutes of the TU Graz requested for supporting their recording ambition of some internal data and content. Actually those are no podcasts in narrower sense.

Recordings with videos

There is an ongoing test whether a video added to a screen recording is helpful for the learners or not. The video in this case presents the teacher working during the lesson. The example published at TUGTC is the following course:

- “Foundations of Computer Science”

Formats with search functions

The implementation of search functionality within recordings opens completely new dimensions on podcasts for educational purposes. The learner can focus on the part of the recording of interest by typing keywords. The search can be enlarged to other recordings so the learner gets all the sequences according to a subject that have been recorded yet. Although the search functionality works fine but needs to be improved yet. It is only available if recorded and played with the TTT software. The example published at TUGTC is the following course:

- “Foundations of Computer Science”

Formats with captions

As described above all recordings regardless to the capturing software have at least one format with a navigation menu compiled automatically or edited afterwards. The advantages of a video with markers, captions or headlines are obvious. It can be seen as a primitive kind of search help but nevertheless does not substitute a real full text based search.

Other projects

With the office of Lifelong Learning (Ebner et al., 2007a) at the TU Graz there is a close cooperation according to the courses this office offers. A huge number of lectures are represented on TUGTC as podcasts and therefore can be drawn via RSS.

First evaluations have shown that ...

... podcasting is highly accepted by the students and even more requested! The average duration a student listened to a podcast is about one hour. The quality of the podcasts has been rated good or sufficient and the majority had no technical problems. For the opinion poll is still going on the final results are to be presented in future.

Conclusion

Without any doubt it can be pointed out that video and audio files can enhance the lecture (Almont & Gilroy, 2005). The effort of podcasting at universities is up to the didactical setting. A new didactical concept is maybe the combination between a Blended Learning scenario and the use of podcasts during the online phase. Students can

prepare for the next meeting by listening to some inputs, discuss or learn with it. The lecturer answers questions, accompanies the online process and is able to prepare new input by the result of the learning process. It can be summarized that podcasts will help to improve higher education. Didactical concepts for implementing podcasts into higher education are still in the fledgling stages. The technical support for a high number of podcasts is a challenge for the future. Search ability within podcast-files by OCR will be one of the next demands to be achieved. Furthermore the improvement of the usability for lecturers to minimize user errors during the recording is of most practical importance.

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