Pragmatic Podcasting:
How to Easily Facilitate Podcasting

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1.   EXECUTIVE SUMMARY

In this paper we describe our pragmatic way to easily facilitate podcasting at the University of Aarhus – both technically and pedagogically. The technical setup and our experiences with accommodating podcasting by means of open source technologies and easy-to-use authoring tools are described. Further, the paper presents our preliminary experiences with integrating podcasts in teaching practice using a constructivist approach.

Finally, on basis of our technical and pedagogical experiences, the paper provides pointers to how podcasting can be done easily and at a low cost using the appropriate technologies and software, implementation strategy, and a constructivist approach.

1.1. Background and Alternatives

The interest in podcasting has increased dramatically during the last years and universities struggle with accommodating the wishes and demands. In some cases exhaustive and expensive podcast solutions are established using heavy servers, expensive software, complex AV-hardware setups, and/or a relatively large staff. However, developing, publishing, and integrating podcasts in teaching practice do not necessarily have to be an exhaustive or complex task.

Producing a "perfect" podcast with high audio-visual quality, well-structured, and well-communicated content is unquestionably an exhaustive, expensive, and complex task. Nevertheless, there is only little evidence that podcasts need to meet such high standards to accommodate effective learning. In other words; the audio-visual quality should not have the first priority. Instead, the effort is better spent on developing simple podcasts that are motivated, have the appropriate content, and are well incorporated in teaching practice. Implementing such a strategy requires an active role of the instructors and thus an easy way (for them) to author, publish, and integrate podcasts.

1.2. Conclusions

At the University of Aarhus we have implemented podcasting by installing an open source podcasting system, Podcast Generator, which provides an easy way to publish both audio and video podcasts. The authoring of the podcasts is done by the instructors themselves typically using easy-to-use authoring tools and the integration in teaching practice is done using a few constructivist principles. The paper concludes that there is a pedagogical potential in short demonstration and presentation podcasts (of approximately 5 minutes) that are provided to the students as resources in their problem-oriented work. Furthermore, our experiences indicate that easy-to-use authoring tools and a simple technical setup may offer both a useful and low cost podcast solution.

2. PRAGMATIC PODCASTING

Producing and publishing a podcast oftentimes involves a series of people and/or technical skills such as access and technical skills to operate a video camera (in case of video podcasts – *"vodcasts"*), to record sound, to edit recorded material, to encode material to a podcast format, to develop XML feeds, and to publish material on a web server. Only a very limited amount of instructors have all these technical skills and access to the required equipment, and thus this way of podcasting is unrealistic, too time-consuming, or too expensive. However, by supporting the instructors in developing the podcasts by themselves using a few, but easy-to-use, authoring tools, basic PC peripherals, and providing easy access to publication of the podcasts, it is possible to establish a pragmatic – easy and low cost - podcast solution. In this paper we describe your pragmatic podcasting solution, exemplifies how a podcast can be authored using an easy-to-use and low-tech setup, and discuss the integration in teaching practice.

3. TECHNICAL SETUP

The technical setup is based on an open source podcasting system, Podcast Generator 0.92 (2008), which provides an easy way to publish both audio and video podcasts with RSS-feeds. The system automatically generates the XML data and structures the metadata, and thus the publisher only requires basic internet browsing skills. The system is based on standard open source and free technologies such as Apache, Linux, and PHP, and we are currently using Apache 2.0.53, SuSe Linux 9.3 (i586) (but soon migrating to Red Hat), and PHP 4.3.10 - but basically the Podcast Generator system only requires a web server running PHP. Application data is stored in XML files and thus no database is used nor currently supported.

The system runs on a Dell PowerEdge 1850 server with Dual 2.8 GHz Xeon, 1 gigabyte memory, and 2 U320 SCSI drives (Raid1). Besides this server, a similar second host is allocated for migration and test of new versions of the software.

Installing the system is straightforward and done by downloading and unpacking the software in a web server readable directory and pointing to a configuration web page. Some post-customizations were later done to integrate an online flash player for some of the media files. These customizations have proven to cause some minor problems when trying to migrate to never versions. Our current production environment uses Podcast Generator 0.92, but we are moving to 1.0 as soon as it leaves the beta phase. Podcast generator 1.0 will include features such as categories, FTP uploads, theme support, support for HTML-pages, new administration interface, and new setup script (Podcast Generator, 2008).

Our current podcast server hosts more than 20, primarily, video podcasts with an file size up to 350 MB and a duration of up to 2 hours (May 2008). The number of podcasts and hits per podcast are increasing day by day. The system and its performance are monitored using Monitorix 1.1.1 (2008), Nagios 2.10 (2008), and SuSe native Webalizer. The average usage of the system yields 400 hits and 1400 MB per day, and the maximum usage yields 900 hits and 5000 MB per hour (May 2008). System load during these access rates was very low, and we expect the current system to be able to handle much larger access rates given sufficient allocated network bandwidth. Due to the simplicity of Podcast Generator tuning the system for higher usage would be done by simply configuring the web server, where the number of concurrent sessions is limited by the configuration and memory available for handling requests. In its current design, the system is not easy to scale to a multi host configuration with a central repository.

The podcast host is placed in a DMZ zone behind a border firewall and also protected by the native Iptables firewall. Bandwidth is allocated on a gigabyte Ethernet connection to the National Research Network for Danish universities and research institutions and this has been more than sufficient for our installation.

4. AUTHORING

Traditionally, podcasts have been produced by AV-technicians, with expensive and complex AV-equipment, and requiring an exhaustive post-production. This results in optimal AV-quality but may compromise the control that the instructor has of the shape of his/her instruction, teaching style,

etc. In our pragmatic approach, the authoring of the podcasts is done by the instructors themselves typically using Microsoft PowerPoint (2008), a headset and webcam, and easy-to-use authoring tools such as TechSmith Camtasia Studio (2008), Adobe Captivate (2008), and/or various easy-to-use and low-cost audio or video editors and converters such as Videora iPod Converter (2008), Squared 5 (2008), Windows Movie Maker (2008), and Audacity (2008). If required, additional support from an ICT pedagogical laboratory (ICTlab) and/or access to commercial software such as Adobe Audition (2008), Final Cut Pro (2008), and Adobe Premiere (2008) is provided.

The authoring of a podcast, when done by the instructors themselves, takes its starting point in the material of an existing presentation or lecture. Most instructors prepare digital slideshows like PowerPoint presentations as an integral part of their lectures. One of the problems with traditional methods of producing podcasts is that PowerPoint (or similar presentation software) is poorly integrated with the existing video editing software. This usually means that each slide has to be added to the video manually, which is time consuming and oftentimes results in lost animation effects and loss of the authenticity of the lecturing. Authoring tools like Camtasia or Captivate integrates directly with applications like PowerPoint and thus makes it possible to author the podcasts directly from the original presentation.

Our experience is that for authoring of most podcasts a very basic and low cost setup is sufficient. An external microphone, preferably from a headset, is needed to record the voice of the lecturer. As the voice is a central part of the podcast, it is important to make sure, that the quality of this recording is high. A simple USB headset has been used with satisfying results. For some video podcasts a camera can also be added to the setup, and since the final podcast typically is distributed as a relatively low resolution and high compressed video file, a webcam is usually sufficient. At the ICTlab the instructors have access to all necessary hard- and software – either directly in the lab or in mobile boxes with all necessary equipment and manuals included. Many instructors prefer to author the podcasts at their office or at home and in such cases a simple setup with a webcam and a headset is ideal. If the instructors need any help with the setup or the authoring, the ICTlab provides support by phone, email, or in person by visiting the lab.

4.1. Recording and Editing a Podcast Using Camtasia and PowerPoint

Recording a podcast using Camtasia takes its starting point from within PowerPoint and is thereby linked directly to the practice of preparing a lecture and the environment that the instructor is used to. Camtasia functions both as a plug-in for PowerPoint and as a self-contained application whereas other solutions generally function only as self-contained applications. Software like Captivate records the users actions on the screen to a combined video and data file. The recording can be started directly from PowerPoint by simply pressing the Record button.
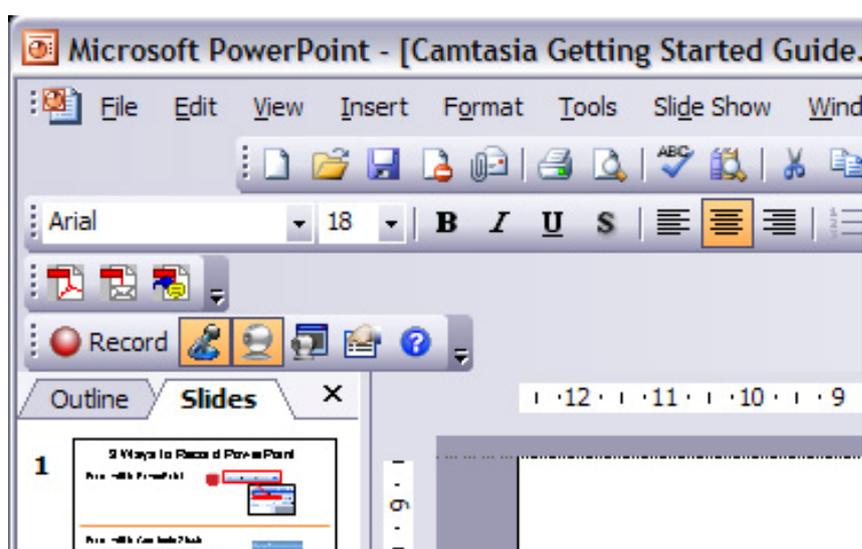

Figure 1: With Camtasia Studio installed recording a podcast can be done directly from PowerPoint.

When the recording is started Camtasia records the user's actions, voice, and video in the background in real-time, allowing the instructor to focus on giving the presentation. When the lecture is ended, the instructor stops the recording by pressing another button in an automatic dialogue labeled "stop recording". This exports a file containing all the slides, recorded actions, voice, and video to Camtasia for further editing. In a few cases the recorded presentation can be used as it is recorded. However, in most cases basic editing is required. This can be done directly in Camtasia. When the recorded .camrec-file is loaded, the recording is automatically placed on a timeline with video, screen capture of the PowerPoint, and audio placed on individual tracks. From this part of the interface the instructor can edit each track and correct mistakes or bad timings.
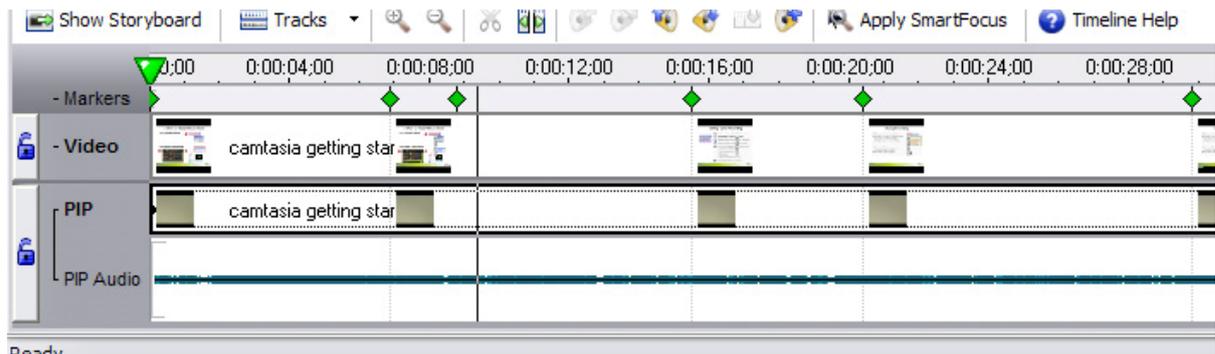

Figure 2: In Camtasia Studio the user can edit the recorded presentation using a timeline with audio, video, and screen captures on different tracks.

The editing process is usually completed by the instructor adding titles and credits to the podcast. These are added directly into a track in the timeline. Finally, the whole project is exported to a single video file. Camtasia exports to a variety of formats – e.g. a high quality format suitable for post-production or directly to the compressed iPod format MP4.

How to Author Podcasts in 5 Steps

1. Set up the equipment: headset and webcam
2. Prepare the presentation in PowerPoint
3. Record the lecture using Camtasia directly in PowerPoint
4. Edit the recording in Camtasia: adjust timing, adjust picture-in-picture, and add material and information (e.g. images, titles, and credits)
5. Produce the material by exporting to a podcast format using Camtasia

4.2. Publishing with Podcast Generator

The steps for publishing a podcast depend on the available material. If the material has not directly been exported to a podcast format, it is necessary to perform a subsequent conversion. This is because an uncompressed original file is typically too big for a reasonable download time and because the file must be compatible with a range of different mobile devices and software players. There is a lot of different software available for doing this and at the ICTlab the free video converters such as Videora (2008) or Squared 5 (2008) are mostly used. Usually the ICTlab performs the file conversion to ensure maximum playability and homogeneity of the podcasts, but also well-pre-encoded podcast are accepted. The quality, audio and video bit rate, resolution etc. of the file is adjusted with regards to the final file size, readability, and other special wishes and demands. Usually the iPod standards are followed by converting video files into MPEG 4 (MP4) with a resolution of 320x240 or 640x480 and a total bit rate around 400-600 kbps and audio files into MP3 with a bit rate around 128 kbps. For lengthy podcasts lower bit rates or resolutions are used to keep the total file size down.

A podcast is distributed through our own website running Podcast Generator (2008). Here a podcast is paired with an XML file allowing users to subscribe to the feed via iTunes or other podcast software like Juice. The actual upload of a podcast is done easily by simply logging in to the back-end of Podcast Generator, clicking "upload podcast", and filling out a form where the podcast file is selected and the content is described (see Figure 3).
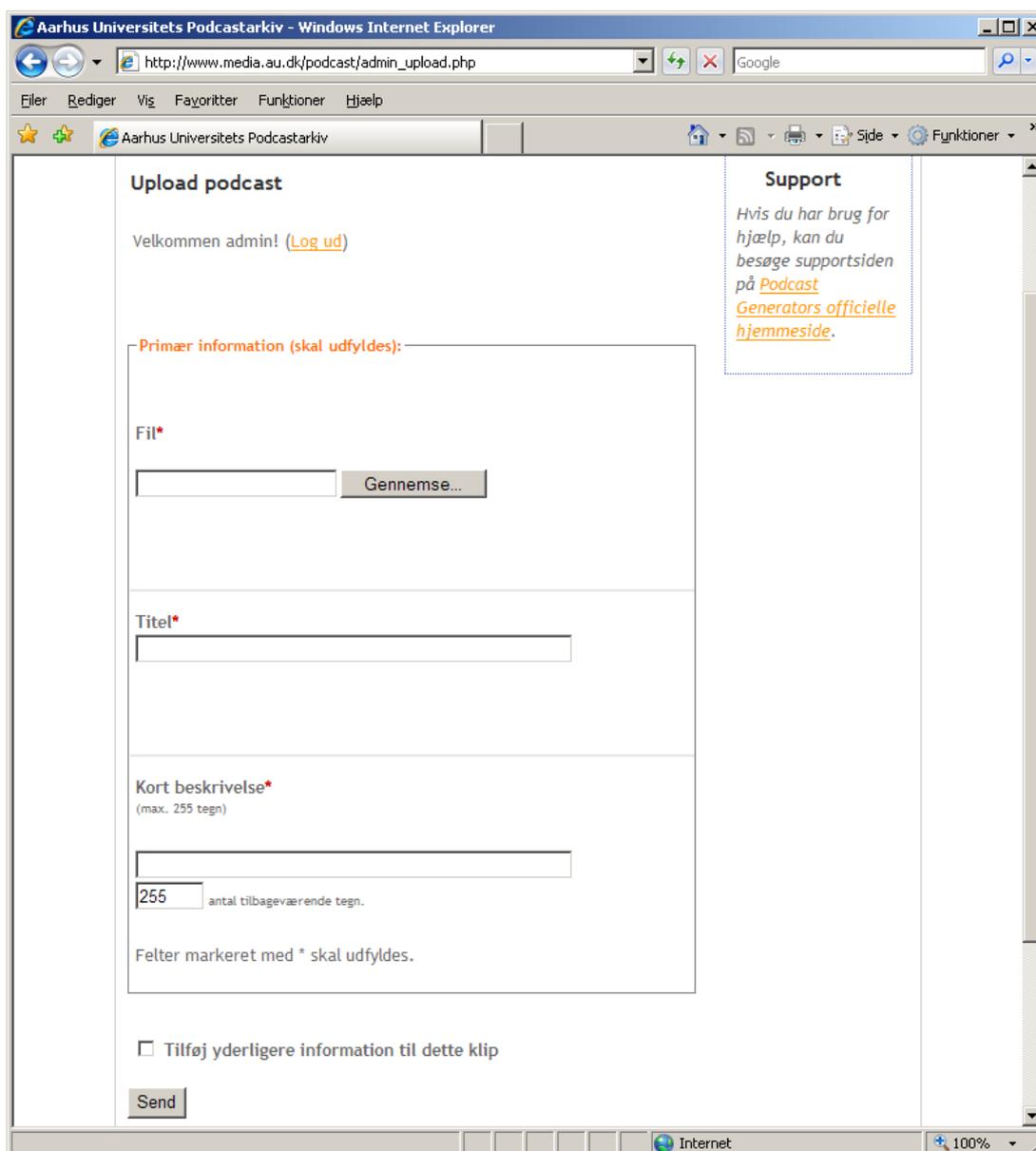

Figure 3: Upload form in Podcast Generator. The only required fields are the media file, the title, and the short description. The remaining fields are optional and hidden as default.

However, before a podcast is published, an authorization in terms of a signed publishing contract from the author of the material is required. This contract ensures the rights of the university to make the podcast available on the Internet though the podcast website. In some cases the contract is extended to allow other means of distribution as well. Apart from the permission, the author provides a few notes about the content of the podcast - usually a title and a short description of the podcast along with some basic contact information. This information is entered into the system as metadata by the staff at ICTlab as a part of the publishing process.

Figure 4: Homepage of our podcast archive. The homepage shows the 10 latest podcasts.

5.   INTEGRATING PODCASTS

Integrating video podcasts in a teaching practice is oftentimes a more complex matter and has to take a number of subject specific and contextual factors into consideration. From a constructivist approach and based on our initial experiments with video podcasts, we wish to discuss what kinds of podcasts are relevant, and what the role of the podcasts should be. Our initial experiments indicate that a constructivist approach may provide useful pointers to how podcasts can be integrated in teaching practice.

From a constructivist approach learning is an active process in which the individual constructs knowledge (Brown et al., 1989; Glasersfeld, 1983). Consequently, learning necessitates active and self-governed work of students, and knowledge cannot be transferred from an instructor or a learning resource to a student. Instead, the student must be engaged in problem-oriented activities (Dalsgaard & Godsk, 2007). This means that the starting point for a learning process is the intentions, aims, and goals of the student. According to the constructivist approach, students should

be directed at solving a problem, answering questions, etc. Further, students should direct the process themselves.

The constructivist approach has consequences for the role and use of resources such as literature and podcasts. Since students should direct their activities themselves, they should also decide how to use resources. In other words, the resources should not determine how they are supposed to be used. Instead, students should take resources into use based on their problem-oriented activities. The role of resources is to help students solve problems, answer questions, etc. – and not to teach them directly. This means that podcasts are not seen as substitutes for lectures; they are not seen as resources that *teach* students. Instead, they are seen as resources to solve problems.

This view on learning resources means that the task is to provide a learning environment with a range of resources for self-governed activities of the students. Hill & Hannafin (2001) term such a learning environment a "resource-based learning environment", and Dalsgaard (2005) uses the term "learning framework" to describe learning environments that structure thematically related learning resources. Videos, and thus podcasts, can be used to this effect.

Often, video podcasts from universities are recorded lectures or more professional lecture-like recordings. In other words, they are seen as replacements for lectures, and the videos are, in effect, teaching. Seeing podcasts as resources for students' problem-oriented activities insists on a different approach to creation of podcasts. For a university course at Institute of Information and Media Studies, University of Aarhus, three different kinds of videos were produced in the fall of 2007:

- 7 short demonstrations of software tools (between 1 and 6 minutes)
- 2 short presentations (4 and 5 minutes)
- 2 recordings of lectures (45 minutes)

The purpose of these different videos was to experiment with different kinds of videos being used as resources by students. The students in the course were engaged in analysing and evaluating different software tools. Thus, the videos should support these activities. The video medium was chosen because of its potentials to show, demonstrate, and illustrate.

The idea behind the demonstration videos was not to develop exhaustive demonstrations, and the videos were not intended to teach the students how to use the tools. Instead, the idea was to develop short demonstrations that introduced to different software tools. The objective of the demonstration videos was to support students' exploration of and experimentation with different kinds of software tools. Thus, students should use the videos in relation to their work on analysis and evaluation of the different software tools – and they were encouraged to experiment with certain software tools themselves.

Further, two short presentation videos were produced. The objective of the presentation videos was to introduce to the concepts behind different kinds of software tools.

Finally, recordings of two 45-minute lectures were made. Unfortunately, these podcasts were not used as intended due to a delay in clearing and publication. The idea was that the students should have used the podcasts – along with literature – as preparation for a discussion in class.

The demonstration and presentation videos were made available to the students as resources to be used in relation to analysis and evaluation of software tools. Students were not obligated to see all the videos, and there was no specific order, in which they should view the videos. They were provided for individual exploration.

Our experiences with this experiment indicate that there is a pedagogical potential using podcasts from a constructivist approach. The students used the videos to give them a brief introduction to a range of software tools. The potential lies within developing a range of short videos – such as demonstration and presentation podcasts - that are provided to students as resources to be used in their problem-oriented work.

6. CONCLUSIONS

Our preliminary experiences with podcasting show that it is possible and fruitful to employ a pragmatic approach to podcasting at a university. Using easy-to-use software tools for authoring, it was possible for instructors to develop podcasts themselves. The approach was not to develop "professionally" produced recordings, but rather short presentation and demonstration videos.

From the employed constructivist perspective, focus was not directed towards recorded lectures or other forms of lengthy presentations. Instead, there is a potential of short videos – such as demonstrations, presentations, or illustrations – that briefly introduce to topics that call for visual representation. The pedagogical idea behind short introductory videos is to provide them as resources for students' problem-oriented work. The short introductory videos are in many cases easy to author using our pragmatic solution. Camtasia, Captivate, and other easy-to-use tools with simple technical setups give the instructors the opportunity to author by themselves with own preferences, teaching style, and curriculum in mind. The technical solution, both with regards to authoring tools, AV-hardware, server hardware, and server software, is in every way cheap and easy to administrate and support.

The described solution meets many of the podcast needs of the university. However, there is still room for refinements. Our current focus areas are to improve the procedure of filling out the publishing contract by making it possible for the instructors to fill out the form online and/or to make it possible for the instructors to publish their podcasts by themselves – ideally directly from the university VLE. By finding solutions to these challenges, many instructors would be capable of doing the entire podcasting – the preparation, recording, editing, encoding, publishing, and the integration in teaching practice - by themselves.

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