

# User Generated Web Lecture Snippets to Support a Blended Learning Approach

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## **Abstract:**

**Lecture recordings have been used for teaching purposes for several years and different ways of distribution have been investigated at the universities in Osnabrueck. A blended learning approach based on lecture recordings has been developed in which the recordings substitute the classroom lectures. Building blocks of that concept are podcasts, web lectures, electronic examinations and coaching sessions. In an intensive evaluation, drawbacks of the concept could be identified. New technological possibilities like easy-to-use video extraction in combination with blog and wiki integration offer ways to overcome these drawbacks. This article describes an improved didactical approach of lecture-recording based learning.**

## **Introduction**

Video based web lectures are getting more and more important. Several authors have reported about usage and pros and cons of that type of learning material, e.g. (Lauer & Ottmann, 2002), (Hermann, Lauer & Trahasch, 2006), (Krüger, 2005). This type of media content becomes an increasingly important part of the e-learning content portfolio of universities and they are an important step to learn anytime and anywhere, i.e. to reach remote learners in different regions, countries, time zones or to support students in their tight time schedule. Along with open educational resources they can be a valuable and even enjoyable addition to text-based lecture material provided by the lecturer. Providing learners with the most suitable contents at any time and in any context is still one of the most critical and expensive aspects in technology enhanced learning. Derived from the promising university interest in a community driven project called *Opencast* (<http://www.opencastproject.org>) it appears that there is a great demand from universities for this kind of media services. The opencast community will encourage and elaborate on best practices for deployment, maintenance and usage of audiovisual learning material with the perspective of enabling rich engagement between the user and the content. Opencast plans to provide a comprehensive and long-term solution for the handling of audiovisual objects in academia. In December 2008, 255 international universities have stated that they will support this project.

Today it is possible to access web video clips addressing almost every topic, from funny home videos all the way to Hollywood made movies or just music clips. Web 2.0 technologies and popular video Internet repositories make it possible for everybody to upload and share videos with the community. The variety of this multimedia content is nearly impossible to review. But on the other hand when it comes to scientific multimedia one can hardly find exemplifying video material that illustrates exactly a certain topic. Oftentimes users are only interested in small parts of a video, whereas the provided materials are documentation reports or lecture recordings that are around 30

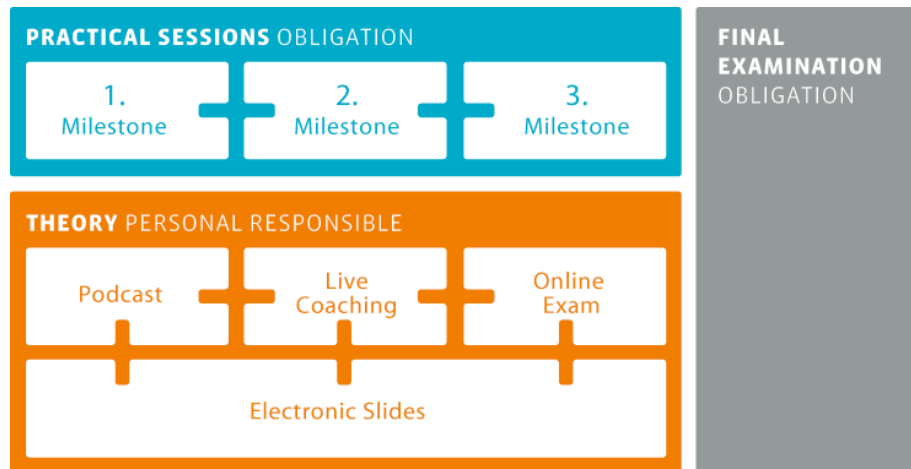
minutes for documentations or 90 minutes for a typical lecture recording. This kind of multimedia objects is much harder to analyze than simple text based material, like websites. This makes it even more complicated to distinguish between important and unimportant parts.

However, it is also noticeable that more and more universities are trying to use web lectures in combination with popular video platforms to share lecture recordings in form of video, audio or simple podcast versions with university students as well as interested people outside the university. For universities it might be a problem that it is not easy to decide whether such popular websites are an adequate place to present high quality (and often also costly to create) learning content as multimedia documents. Platforms like Apple's iTunes university project (iTunes U) or YouTube serve, besides other aspects, as a good marketing instrument for universities to attract prospective students, research partners or university members. However, for many universities going public with educational content is presently disputed and a challenging process. Besides legal grounds concerning copyright issues and other points there are great fears on the lecturers' side how (their) content will be used outside. Quite often it is not clear, e.g. in the lecture recording field, what "open for the public" really implies and which platforms (or how many potential users) are included. Other recordings have to be kept hidden from the public in the university's learning management system and can be accessed by internal students only (Ketterl, Mertens & Vornberger, 2008). If web lectures are used, these augment the normal ongoing presentation-style lectures most of the time. Zupanic and Horz (2002) have shown that students who attend the live lectures make extensive use of lecture recordings when recalling the content and preparing for examinations. On the other hand, investigations done at the University of Osnabrueck have shown that if students can use the video lectures additionally to the real lecture that good students are getting better results in the final exams whereas weak students got worse results compared to the average students over the years. Nevertheless web lecturers are a frequently asked enhancement to the university e-learning portfolio and if used in the right way they also offer a valuable additional benefit for the students and not for marketing purposes only.

The remainder of this paper is organized as follows: section 2 of this paper presents an evaluated blended learning approach which uses lecture recordings as a regular service and in which the video lectures substitute the real lecture. Problems that occur when students work with this type of multimedia content are also addressed. Section 3 adapts these problems and presents a state of the art possibility to use lecture recordings produced with the open source based virtPresenter lecture recording framework to solve some of the identified issues. Section 4 shows how small clips of lecture recordings can be extracted, edited online, re-used and discussed in web 2.0 systems like (university) blogs & wikis or how they can be used to enrich static Wikipedia pages. Section 5 combines the blended learning approach with the techniques described and gives some directions to consolidate and improve users' knowledge based on short video lecture snippets. The paper closes with a conclusion and some final remarks.

## **A blended learning approach based on lecture recordings**

The second author has been using a blended learning approach based on video lectures for several years. The development of that concept and an evaluation of it are published in a series of ED-Media papers. Within this section, we summarize the building blocks of that concept, which is used in the lecture "Audio- and Videotechnology" in a computer science study program. The course provides insight in the technical basics of the media types audio and video in the context of computer science. Concurrently to the theoretical part there is a practical part in which the students have to do some practical work with audio and video, e.g. production of a short movie. For several years, the lecturer has been using different technologies for lecture recordings e.g. live- and on-demand video streaming, synchronized on-demand presentation and podcasting (Ketterl, Mertens, Morisse & Vornberger, 2006). In the beginning, lecture recordings have been provided supplementarily to the classical classroom lecture. Since 2007 the podcasts have completely substituted the classroom lectures. At present, the didactical structure of the current concept combines podcast lectures with live-coaching, online-exam and practical sessions to support the students learning process (see (Morisse & Ramm, 2007)). The podcast episodes are published in Apple iTunes Music Store and are publically available for everybody. Therefore the students can access them easily. By means of portable player hardware the learning content can be accessed anytime and anywhere. Additionally, electronically annotated slides are available to each of the podcast episodes. They are linked together by integrating the URL of the slide in the corresponding podcast episode. In more detail, the didactical structure is based on the following building blocks (see figure1). A detailed evaluation of the didactical concept can be found in (Wichelhaus, Schueler, Ramm & Morisse, 2008).



**Figure 1: Blended learning concept map**

### **Podcast**

There are more than 40 podcast episodes out of this class publicly available in Apple’s iTunes Music Store. The content of these podcasts had been recorded during preceding semesters. However, each recorded lecture has been undergone an intensive postproduction process (chapter marks, dividing into small episodes, integration of animations). They are available anytime and, by using the podcast-format, also available anywhere. When using this technology, the learning-process can be self-organized to a high degree.

Each episode of the podcast offers a very fine-granulated access to the content by offering chapter-marks and can be used platform-independent. Each episode includes a reference to a PDF-document with a more detailed explanation of the content. There is a defined time schedule how to use the podcast episodes.

### **Live Coaching**

Live coaching is a weekly meeting of students and lecturer. These meetings are organized not as pure content presentation sessions, but are used by means of live coaching to support the student’s learning process. Certain aspects of the content are discussed, misunderstandings are clarified and practical issues are introduced. Herein, the students have the possibility to ask content-specific questions to the corresponding episodes of the podcast. If there are too many questions, the content is presented in more detail by the lecturer. The coaching session also links to the practical part of the lecture.

### **Online-Examination**

To support a continuous learning process of the students, the electronic online examination system VIPS is used (see (Hügelmeier, Mertens, Schröder & Gust, 2005)). Within this system, there are about 10 - 20 questions about the content of each podcast episode or logical block of episodes. During every week the students have to work on one set of questions corresponding to the specific content of that week. This online examination is an essential part of the didactical concept and an important motivation for the students to work continuously with the recordings during the semester. It is up to their choice, if they process the online exams every week or if they just work on a few of them. However, a bonus system offers a motivation for the students to work continuously with the exams. If they reach more than 50% of the points overall, they can collect bonus points for the final written examination.

### **Practical Work**

Weekly lab hours accompany the theoretical part of the lecture. Within this part, the students have to work on a media project, e.g. production of a short movie or the production of a podcast. This active learning or learning-by-doing approach strengthens the theoretical facts of the lecture. Usually, this work is done in small groups of up to three or four students and the result of their work has to be presented at three milestones (storyboard, rough cut as a first version, final version of the movie). These lab hours take half of the overall work load and are used to gain practical experience in video and audio production.

## **Final Examination**

To get the credit points for the module, the final examination, which is usually a written examination, must be passed successfully.

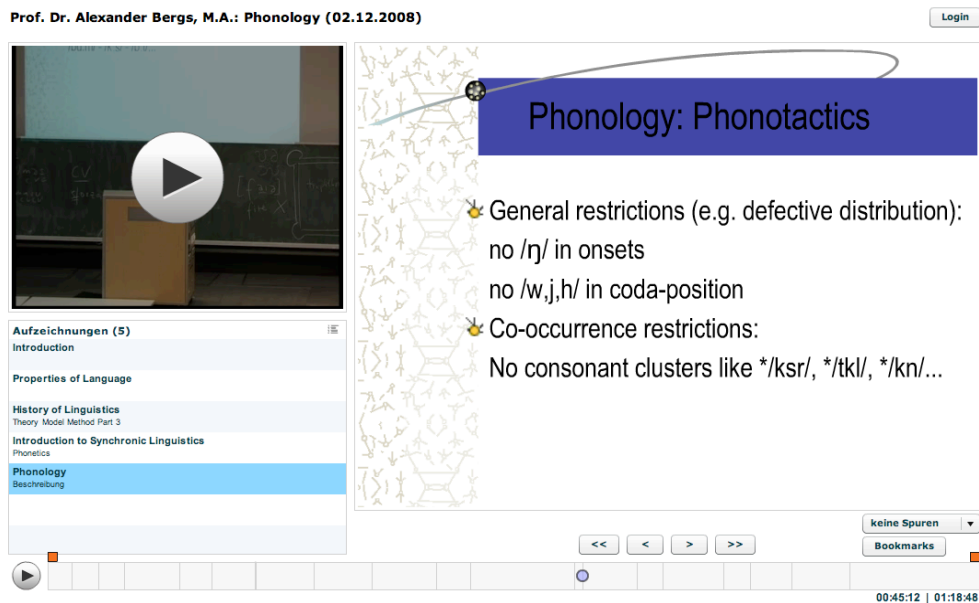
## **Web Lecture Production Process**

If lecture recordings are used as a regular service in a university context, the production process must be cost efficient, automated to a high degree and several aspects like system integration, user authentication must be considered. Therefore a system is required that can be scaled and adopted according to the specific requirements. A system that was designed for this purpose is the virtPresenter recording framework that establishes a fully automated web lecture production chain that is provided to the community as open source. virtPresenter can be used to create PowerPoint or screen capture based class recordings in a fully automated process. The system is able to produce different podcast versions (audio, video & enhanced podcast versions) and web versions based on Flash 9 (Flex) technology that could be used in other learning scenarios in a flexible way.

virtPresenter collects all the necessary information for indexing and synchronizing slides to the video. The software also starts and stops camera and audio equipment in the lecture halls without any additional technical support. At the end of the production chain is a scalable set of encoding servers that generates fine granulated web lectures in Adobe Flash 9 or in different podcast media formats. A more detailed description of virtPresenter's production chain, system architecture and navigation features can be found in (Ketterl, Mertens, Morisse & Vornberger, 2006), (Mertens, Ketterl & Vornberger, 2007) or also online on the project home page (<http://www.virtpresenter.org>).

The user interface comes with hypermedia navigation features that allow the direct selection of single slides and provide search functions inside the recordings. Additionally, the online interface offers timeline-based editing of the recorded lectures, export of video snippets, creation of social bookmarks in combination with social navigation features in form of so-called user generated footprints (see (Ketterl, Mertens & Vornberger, 2008)). These user generated footprints, usually a way to identify and separate important parts from less important ones, can be used in different systems like blogs, wikis, course websites, etc. or even as a social network application inside the Facebook platform. virtPresenter can also be integrated within the university infrastructure and the university LMS (StudIP). Several universities are using virtPresenter in different didactical settings, e.g. the recordings can then be used as additional eLearning material with the course's presence in the university LMS or as a substitute of the lecture. Students' comments and experiences with the technology have constantly been integrated into the development of the system.

For the lecturer the production of a lecture recording starts with activating the recording tool which runs in the background during the lecture. This component also gives full control over the recording process in the lecture hall. It is possible for the lecturer to stop/pause the recording during one session. The process of automatically producing a recorded lecture can be regarded as consisting of four significant phases described in (Hürst, Müller & Ottmann, 2004). These phases are preparation, live event & recording, post-processing and usage. The virtPresenter lecture recording framework assists the lecturer in these phases and handles the corresponding processes in the background systems (more information and a technical report on how to integrate web lectures in university systems can be found in (Mertens, Birnbaum, Ketterl, Rolf, 2008). Figure 2 depicts a typical student user web lecture interface created with the virtPresenter.



**Figure 2: virtPresenter webinterface**

## Using web lecture snippets in external systems

The virtPresenter interface can be used for enriching educational blogs, wikis, Wikipedia and other web based learning systems with fine-grained lecture recording snippets. Each of these lecture snippets has navigation functionality and user access control. Within the interface shown in figure 2, it is possible to cut out essential or important parts of the lecture recording and use these snippets in other web systems. Users as well as lecturers can edit public web lectures online in the virtPresenter interface and can bookmark the edited parts (lecture snippets) in their user profile or use the extracts externally in educational blogs, wikis or other web systems. These selections can also be exported as hyperlinks to external systems or just the regular bookmark space of a web browser. The hyperlinks can be used like usual hyperlinks but encode a start point and end point in the lecture recording to reference exactly the passage selected by the user. Figure 3 depicts the virtPresenter player integrated in a university discussion blog. This blog player is just an alternative user interface created with the virtPresenter framework. The player shows the lecture video or the corresponding slides (if available) of the extracted part of the lecture. The user can switch between slide and video by pressing the video/slide button in the interface. If the information in the video snippet is not sufficient, the user can change to the full version of the lecture episode (by pressing the virtPresenter home button).

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**WHO WE ARE**

Hello, I am Prof. Dr. Alexander Bergs here at the University of Osnabrück. I am the founding father of a new Project called ELLO. We guide you through the quite mysterious field of English Language and Linguistics.

Further Participants  
Prof. Dr. Hero Janßen (BS)  
Prof. Dr. Rainer Schulze (H)  
Dr. Manfred Sailer (GÖ)

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Figure 3 virtPresenter lecture snippet in an university blog (<http://blogs.uni-osnabrueck.de/ello>)

## Coaching sessions based on video snippets

In this section we describe the next step in lecture recording based blended learning. The didactical concept described in the former sections reveals some dangers concerning the student's media literacy (see (Morisse, Ramm, Schüler & Wichelhaus, 2009)). To overcome with these drawbacks, we combine our blended learning approach and the new possibilities of video bookmarking functionality to a new blended learning approach. As described before, students as well as lecturers can extract parts of the lecture recordings online in the web interface. These short lecture snippets can then be imported in blogs or wikis or any other website.

One experience from our blended learning approach is that the students' preparation of coaching sessions could be more elaborated. Sometimes the students come to the sessions without any treatment of the learning material. This contradicts the aim of the lecturer to support a continuous learning process. A second drawback is the lack of a direct feedback if additional questions arise when working with the lecture recordings. Deficits of the self-organized learning behavior could also be observed.

The virtPresenter framework and the bookmarking functionality are good candidates to overcome with these problems. Based on video snippets the students have to work on their own individual learning diary, in which they document their individual learning progress. As a documentation platform a blog system or a wiki system can be used, in which the students capture especially their problems and questions concerning with the learning material. These kinds of systems have the advantage that additional materials can be integrated in an easy way. These individual learning portfolios of the students are then the basis for the coaching session. Beside the direct discussion between students and lecturer, the learning diaries can form the discussion structure of these sessions.

Using video snippets in this way provides several advantages for the learning process:

- The documentation of the learning process enables the students to do a self-reflection of their individual learning progress. This might be a good way to overcome with the weaknesses in the students' self-literacy and self-organized learning.
- The documentation of the alteration with the learning material enforces the students to work with the material.
- The lecturer itself can also use the video snippets to accentuate certain part of the learning material and to accompany some group discussions in a convenient way.

- This offers also an easy way to give alternative learning paths to the students. These learning paths can be given by the lecturer or by students themselves. Used in this way, an intensive discussion process under the students might be started.

An important design issue was that the video snippets are not isolated but always offer the context of the complete material. For example, users are always able to return to the complete main web lecture when accessing a video snippet. Pressing the home-button (above the slide) returns to the complete recording. With it, small video references become possible without losing the context of the base material (comparable to cite an author of a book or paper chapter). Therefore it offers also a certain kind of multimedia referencing.

## Conclusion and Future Work

Within this paper we combined a blended learning approach based on lecture recordings with some new functionality of a lecture-recording framework that offers video snippets and the referencing of these snippets into other technical systems. This offers the possibility to an in-depth learning process and supports the self-organized learning in an university context. We are convinced that self-organized learning is a basic skill for being successful in business life and to survive intellectually in the modern world. Academic learning in the described manner can provide the students with these abilities when emphasizing their responsibilities. Regarding this we observed which issues seem to be most important when introducing a new type of lecture concept. It is necessary to explain the usage and the inherent benefits of the selectable course options. Within the next semester we will investigate and evaluate the proposed didactical concept in our courses.

The virtPresenter framework has been developed since 2003 and it is used or field tested at several universities in Germany and the United States of America. The system will be an essential part in the core system of the community created lecture-recording framework provided by the Opencast project (<http://www.opencastproject.org>).

## References

Birnbaum, N., Rolf, R. & Wulf, B. (2008). Integration von Vorlesungsaufzeichnungen in die vorhandene IT-Infrastruktur einer Universität. In: Andersson et al. (Hrsg.): eCampus-Symposium logOS2008 "Lernen, Organisation, Gesellschaft", EPOS-Verlag Osnabrück, Oktober 2008.

Denoue, L., Hilbert, D. M., Adcock, J., Billsus, D. & Cooper, M. (2005). ProjectorBox: Seamless presentation capture for classrooms. In Proceedings of E-Learn 2005. Vancouver, Canada. S. 1986-1991.

Hermann, C. & Lauer, T. & Trahasch, S. (2006). Eine lernerzentrierte Evaluation des Einsatzes von Vorlesungsaufzeichnungen zur Unterstützung der Präsenzlehre. In: Tagungsband der 4. E-Learning Fachtagung Informatik (DeLFI 2006), Seiten 39–50.

Hügelmeier, P., Mertens, R., Schröder, M. & Gust, H. (2005). "Integration des Virtuellen Prüfungssystems ViPS in die Lehr-/Lernplattform Stud.IP," Proceedings of the Workshop on e-Learning 2005, HTWK Leipzig, 11.-12. pp. 187-196.

Hürst, W., Mueller, R. & Ottmann, T. (2004). The AOF Method for Production, Use, and Management of Instructional Media. In Proceedings of ICCE 2004, International Conference on Computers in Education. Melbourne, Australia. December 2004. <http://citeseer.ist.psu.edu/729098.html>

Ketterl, M., Mertens, R., Morisse, K. & Vornberger, O. (2006). Studying with Mobile Devices: Workflow and Tools for Automatic Content Distribution. World Conference on Educational Multimedia, Hypermedia & Telecommunications (ED-Media 2006), Orlando, FL, USA, Juni 2006. S. 2082-2088.

Ketterl, M., Mertens, R. & Vornberger, O. (2007). Vector Graphics for Web Lectures: Experiences with Adobe Flash 9 and SVG, International Journal of Interactive Technology and Smart Education (ITSE); 4(4), Troubador publishing, UK., December 2007, pp. 181-191.

Ketterl, M., Mertens, R. & Vornberger, O. (2008). Web Lectures and Web 2.0. IEEE International Symposium on Multimedia 2008, Workshop on Multimedia Technologies for E-Learning (MTEL), Berkeley, California, USA from December 15 to 17, 2008, (to appear)

Knight, L. V., Steinbach, T. A. & White, J. D. (2002). An Alternative Approach to Web-based Education: Technology-intensive, Not Labor- Intensive. In Proceedings of ISECON 2002. San Antonio.

Krüger, M (2005). Vortragsaufzeichnungen - Ein Querschnitt über die pädagogischen Forschungsergebnisse. In Workshop Proceedings, DeLFI 2005 und GMW05. Logos Verlag.

Lauer, T. & Ottmann, T. (2002). Means and Methods in Automatic Courseware Production: Experience and Technical Challenges. World Conference on E-Learning in Corp., Govt., Health., & Higher Ed. 2002(1), 553-560.

Mertens, R., Ketterl, M. & Vornberger, O. (2007). The virtPresenter lecture recording system: Automated production of web lectures with interactive content overviews. International Journal of Interactive Technology and Smart Education (ITSE), 4 (1). February 2007. Troubador publishing, UK. S. 55-66.

Mertens, R., Birnbaum, N., Ketterl, M. & Rolf, R. (2008). Integrating Lecture Recording with an LMS: An Implementation Report. World Conference on E Learning, in Corporate, Government, Healthcare & Higher Education (E-Learn 2008), Las Vegas, Nevada, USA, 17.-21. November 2008, (to appear)

Morisse, K. & Ramm. R. (2007). Teaching via Podcasting: One year of Experience with Workflows, Tools and Usage in Higher Education, Proceedings of ED-MEDIA World Conference on Educational Multimedia, Hypermedia & Telecommunications 2007 (pp. 2081 - 2088). Chesapeake, VA: AACE.

Müller, R., Ottmann, T. & Zhang, H. (2002). Presentation Recording as a means to go Virtual for Campus-Based Universities. In Issues and Trends of IT Management in Contemporary Organizations: 2002 Information Resources Management Association International Conference. Mai 2002, Seattle, WA, USA. S. 567-570.

Wichelhaus, S., Schüler, T., Ramm, R. & Morisse, K. (2008). More than Podcasting: An evaluation of an integrated blended learning scenario. Proceedings of ED-Media - World Conference on Educational Multimedia, Hypermedia & Telecommunications, 2008 (pp. 4468 - 4475). Chesapeake, VA: AACE.

Zupancic, B., & Horz, H. (2002). Lecture recording and its use in a traditional university course. ACM SIGCSE Bulletin (Proceedings of the 7th Annual Conference on Innovation and Technology in Computer Science Education), 34(3), 24-28.