Web Lectures and Web 2.0

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Abstract

At many universities, web lectures have become an integral part of the e-learning portfolio over the last few years. While many aspects of the technology involved, like automatic recording techniques or innovative interfaces for replay, have evolved at a rapid pace, web lecturing has been independent of other important developments such as Web 2.0.

Web 2.0 is an emerging trend that among other things aims at integrating user generated data from different systems in order to enhance the user experience. This paper discusses the benefits web lecturing could gain from a Web 2.0 perspective. It also introduces a prototypical interface for the virtPresenter lecture viewer that enriches web lectures by Web 2.0 features, such as a specialized player that can be integrated in blog or wiki sites and multi-medial links that can be used to reference arbitrary passages of a web lecture from an external blog, wiki or forum.

1. Introduction

During the last years web lectures have become more and more important for universities. Web lectures can be created at low cost by simply recording a lecture that is part of a curriculum anyway. Thus, the amount of recordings and exported media files out of the classroom recordings is constantly growing. The virtPresenter project at the university is just one of many examples. In the beginning of the projects at the University of Osnabrück in 2003 only two or three courses were recorded per term. By the end of 2008 the total number of automatically generated recordings representing a single course session in the university's publicly accessible multimedia repository (http://www.lernfunk.de) is expected to be around 1,000. Moreover, the recording system described in this paper is being used or field tested at the Universities of Paderborn, Bielefeld, Würzburg, Oldenburg, Lüneburg as well as at the University of Pittsburgh. With the growing number of available web lectures, more and more lecturers and universities want their lectures to be recorded and more and more students ask for lectures to be available online.

With the rising acceptance of the recordings, lecturers also use the recorded content in novel didactic scenarios more and more often. A discussion of four archetypical application scenarios for web lectures is given in [11].

Certainly, learning does not only occur in lecture rooms or using a web lecture interface. Nowadays, both students and teachers use several (web based) systems for exchanging information. Learn management systems, student blogs, group wikis and other systems are used more and more at universities and off-campus.

By 2008 there were about 500 university blogs in the *blogfarm* at the University of Osnabrück. These blogs are used by students as well as lecturers to discuss seminars or simply augment ongoing lectures. Unfortunately, most of the provided content in these blogs is static and text-based since web lectures could not be integrated in a proper fashion [4]. In a text based blog, users can cite text-based material on a word by word basis. In a blog integrated web lecture player, it must also be possible to link to specific passages of a recording. Another requirement is that the dual nature of slide based talks (i.e. a slide based web lecture consists of both slides and a video stream) must be supported. Considering a main aspect of Web 2.0 technology, sharing user and application data as a major aspect [2], it is necessary to integrate web lectures (or parts out of different web lectures) in a better way in other web based learning systems.

Otherwise web lectures remain isolated from this new rapidly changing user driven Web 2.0 landscape which plays an increasingly important role in e-Learning. This paper presents three approaches that aim at integrating ideas from Web 2.0 with web lectures and at making web lectures compatible with current Web 2.0 applications such as blogs and wikis. All these approaches have been realized in context of the virtPresenter web lecture system.

The remainder of the paper is organized as follows: In section 2, the paper gives a brief overview about ongoing application areas for web lectures. It also outlines difficulties and alternative content delivery channels. Section 3 presents related work in the field of combing web lectures and Web 2.0. Sections 4 through 6 describe three Web 2.0 features for web lectures; in detail these are social footprints, user created bookmarks and a special player based on the virtPresenter framework for blog integration. Section 7 discusses future trends that may affect the technology used. The paper concludes with section 8 that briefly summarizes the work presented in this article and presents some ideas for future work.

2. Web lecture application areas

The internet and is growing on a daily basis. Especially Web 2.0 applications are becoming increasingly popular. So-called mashup websites (websites that combine data from different sites), social websites (such as Facebook) or video internet repositories (e.g. YouTube) try to attract people to spend time online. Their strategy is successful and it seems that users want to have this kind of varied experience.

For universities it is not easy to decide whether such popular websites are an adequate place to include or present high quality learning content. Platforms like Apple's iTunes university project (iTunes U) or YouTube education serve, besides other aspects, as a good marketing place for universities to attract prospective students or research partners to projects or to the university itself.

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. It is often quite unclear, e.g. in the lecture recording field, what *open for the public* implies and which platforms (or how many potential users) are included. The situation at the University of Osnabrück for example is that only about 8% of the lecture recordings are open for public use. 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. Other universities appear to have similar problems concerning content use. User authentication and access control to a registered group, watermarks in lecture videos or additional university branding mechanisms can help to protect the content and limit the ways in which content can be used.

To identify application areas and problems for web lectures, the content produced is used in experimental settings within different platforms and varied settings at the university as well as outside. Currently, content produced with the virtPresenter lecture recording framework can be found in the following platforms:

■ Episodes (weekly lecture recordings in a course series) are available over public course websites.

■ Episodes are available as podcast versions in the Apple Music Store. [18]

■ Public and restricted material can be found within a public university audio and video content management system.

■ Recordings are only accessible to students who take the respective courses. Authorization is handled by the university's learning management system.

■ Selected virtPresenter recordings are available for users in the Facebook community.

■ Selected recordings are available in the Google YouTube education video platform.

3. Related Work

This paper presents the adaptation of three different Web 2.0 features to web lectures. The combination of such technologies and e-Learning systems is generally discussed in various projects like the KP-Lab project (http://www.kp-lab.org) for example. This section briefly describes the state of the art known to the authors in these fields. Only few web lecture systems have been developed that support blogs or blog-like features. In a study presented in [3], technology support for linking a student question to distinct slides is found as a requirement for web lecture systems. The system used in that study, however, does not support this feature. Mu [14] describes a browser for video learning objects with an integrated chat feature. Chat messages can be linked to arbitrary time indices in the video objects. However, it does seem as though the system only supports marking discrete time indices so that passages cannot be marked. Also, the feature can only be used in the application so it cannot be integrated with external blogs. In [1], a prototype of the iHelp Presentation multimedia video presenter is described. This system enables users to highlight important parts in the recorded lectures' slides and to add annotations and tags to a recording. Lauer et al. [8] present an interface for web lectures in which collaborative notes can be attached to passages of the lecture in a time-based fashion. These notes can also be positioned spatially on the screen. The notes can be exchanged among students in order to serve the purpose of electronic discussions. In [7] the concept is extended with speech based notes. While all these approaches feature excellent possibilities for working with web lectures collaboratively, they cannot be integrated into traditional blogs or other outside systems. Students do thus have to start yet another application. The idea of cutting out arbitrary parts of lecture videos and rearranging these parts in custom collections has been realized in an approach described in [13]. The approach does not feature a means of exporting these passages and exchanging them with other students. The idea of logging other users' interaction with a lecture video as social footprints has been proposed by Poerceleon and Dieberger [15] in the context of movieDNA. In that project, however, no such feature has been practically implemented.
Another approach that combines ideas of Web 2.0 with web lectures can be found in Knowledgebay [17]. In that project, the recording process does not deliver structured content overviews.
In order to produce indexed tables of content (TOC), students can produce a TOC in a wiki-like fashion when consuming the lectures.

4. Social footprints in web lectures

Most of the lecture recording episodes at the University of Osnabrück have a duration of 1.5 hours. It is not quite surprising that in such a long time period, certain parts of a lecture are more important for learners than other sections.

To identify relevant parts, information from other learners left in the interface can be used. Figure 1 depicts the virtPresenter web interface [6]. Besides the lecturer's video and the corresponding presentation slides one can find a list of available recordings (beneath the lecturer video) and a video slider for a time based navigation in the web interface. This video slider can also be used to visualize user activity over the lectures time period in the form of so-called user generated footprints (see [12] for detailed discussion of the footprint concept for individual users).
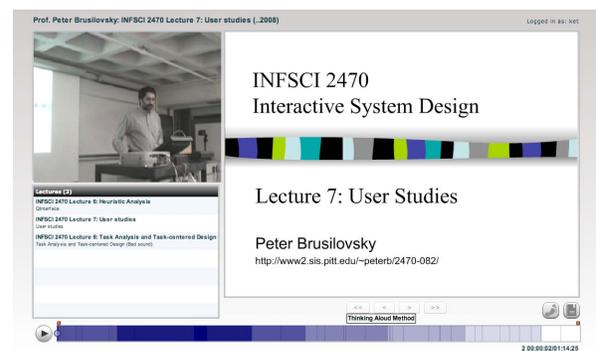
Figure 1: virtPresenter web interface with active user footprints

These footprints are displayed in the video slider and come in different colors and density shading corresponding to frequency of user visits per lecture part in the web interface (see figure 1 bottom respectively figure 2). Dark areas identify parts that have been watched more often. Aside a user can also compare own footprints with what other people have seen in the recording by dividing the interface footprint bar in two parts (figure 2).

Figure 2: Personal footprints (upper half) and social footprints (lower half) in the timeline

The upper half visualizes own personal footprints while the lower half shows footprints of others in a web lecture. Different colors for personal and respectively public footprints make it easier to compare own learning characteristics with others.

Certainly such navigation features can only be an indicator of what might be more important compared

to the rest of a lecture recording. Currently we use these interface features in combination with social navigation in selected user experiments. More information about social footprints in web lectures can be found in [4, 10].

5 Linking to user created web lecture bookmarks from external web 2.0 applications

Within the interface shown in figure 1, it is possible to cut out essential parts of the 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 (snippets) in their web lecture user profile or use the cut-outs externally in educational blogs, wikis or other web systems. The basics of the virtPresenter's bookmarks concept is described in more detail in [9].

Whenever users decide to bookmark a part of a recording for later use, they can cut out that passage online using two small markers in the interface and add it to the personal bookmark section (figure 3 section A). These selections can also be exported as hyperlinks to external systems, like a course wiki, a group blog, delicious or just the regular bookmark space of a web browser. The hyperlinks can be used like normal hyperlinks but encode a start and end point in the recording to reference exactly the passage selected by the user. Figure 3 illustrates how to take a lecture snippet and to put it directly to the users personal bookmark section.
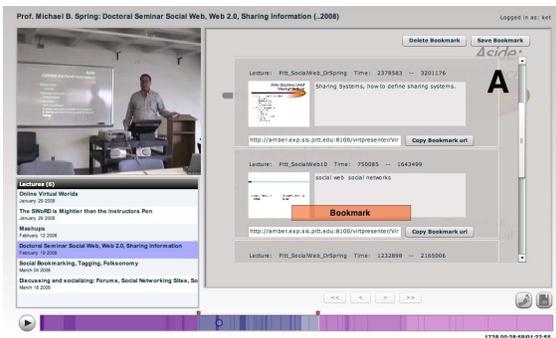

Figure 3: A passage of a web lecture is extracted. The selected snippet is marked blue in the video slider time scale.

In order to find and select more relevant parts for personal bookmarking or for further recording export, the social navigation features described in section 4 can be used as a guideline.

6. Web lecture parts in university blogs

The virtPresenter interface can be used for enriching educational blogs, wikis and other web based learning systems with fine-grained lecture recording snippets. Each of these lecture snippets has navigation functionality and user access control. Figure 4 depicts the virtPresenter blog player, which is just an alternative user web interface created with the virtPresenter framework. The player shows the lecture video or respectively corresponding slides (if available) of the cut out lecture part. 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).

The timeline based navigation features [5, 6] of the blogplayer are similar to those used in the normal web based player. The main difference is that users cannot edit the blog episodes within the blog player. This is only possible in the main application. When a user creates a lecture snippet, no new media files are created.
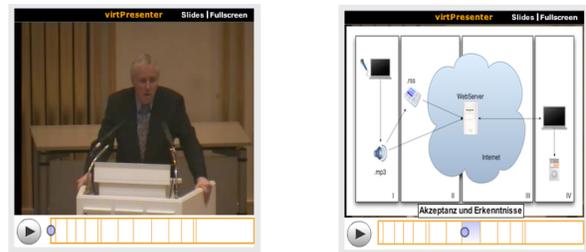
Figure 4: virtPresenter blog player in video mode (left) and slide mode (right)

The base material remains the same. The blog player uses only new time information for the cut-outs. The main benefit is that there is no need to convert videos, slides etc. again which can be very time-consuming and users would have to wait until the new (short) episodes are finished. Arbitrary lecture parts can be bookmarked, exported and used immediately in new scenarios.

To integrate a lecture snippet in a blog discussion, users only need to copy their bookmark hyperlink url into the blog editor (assuming that an additional free blog software plugin called *Kimili Flash Embed* [16] is installed). Like the normal virtPresenter web interface, the alternative blog player can also have full media access control to deal with copyright issues or restrict the recording to intern course students only.

An example of a blog discussion about an integrated web lecture part is shown in figure 5.
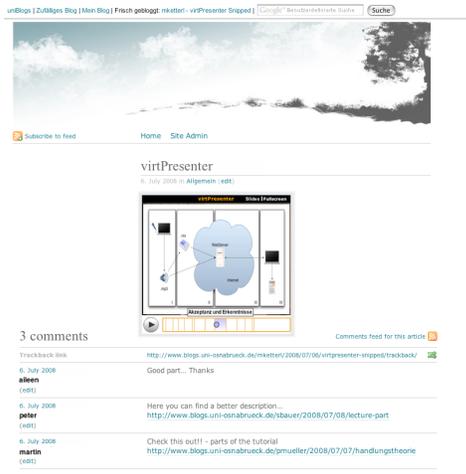
Figure 5: Web lecture snippet in a student blog

7. Web lecture snippets in extern systems

If the content is used in other scenarios and other platforms it seems important to gather statistics for the main application about ongoing discussion and annotations in these external systems. Examples for statistics gathered in external systems:

- number of exported snippets
- which parts are going to be discussed
- user comments about lecture parts
- further hyperlinks to additional material

These are only examples of what could be used from blogs, wiki pages or other external systems. Data mining strategies in combination with a database backend could also help to detect coherences. The bottom line is that if lecturers know that students use additional material for complex topics, for example to improve their lectures by using this external material as well to improve their own lectures.

Presently the virtPresenter system is not able to gather or collect different user generated data from outside systems like university blogs or wiki pages. We are planning to connect the virtPresenter framework to our university blog (blogfarm) and wiki backend to adopt information backflow features stepwise until the end of the year.

8. Conclusion

Web 2.0 is widely considered one of the most important contemporary developments in the context of the World Wide Web. This paper has briefly described current trends at the University of Osnabrück

that show the importance of Web 2.0 for universities in general and e-Learning in particular. Given the impact Web 2.0 has on every-day life and on modern learning styles, adopting Web 2.0 ideas to web lecturing and integrating web lectures with Web 2.0 will make web lectures more attractive to users and supposedly more effective for learners.

This paper has introduced three ideas that combine web lectures and Web 2.0 in order to show the feasibility of merging these two conceptually different realms. The basic bookmark feature has already been successfully employed in earlier versions of the virtPresenter interface. The extended bookmark features described in this paper have to be evaluated during the next month. Social navigation is currently being evaluated in a two-term study. Blog integration is a feature that has just left prototype status.

Time will tell whether the combination of web lectures and Web 2.0 really is a worthwhile endeavor. However, first experiences gathered with the virtPresenter user interface, as well as the success of Web 2.0 based video portals such as YouTube, indicate that it is.

The contribution of this paper is a demonstration of feasible approaches that make web lectures Web 2.0 enabled. An evaluation of some of these features is planned for publication in the near future.

9. References

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