

# Massive "Multiplayer" E-Learning

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## Abstract

*At the Vienna University of Technology, I regularly have to give courses with up to 1000 participants. In such cases, maintaining a meaningful communication with and between students can be quite cumbersome or even impossible. This article describes an approach to change that situation for the better by designing and implementing system that blends social software with E-Learning approaches. Such a system would transform the burden of the large number of participants into an asset, since it would benefit from a large number of users.*

## Introduction

Mass teaching - lectures for several hundreds of students - is an Austrian reality, particularly at the large Viennese Universities. The project described in this paper aims to improve the situation in mass lectures. The problems that can be observed in such courses - above all anonymity, lacking opportunities for discourse and feedback as well as the little room for interaction with the teachers and/or content - are to be countered by the use of new media using an approach that is commonly known as *web 2.0*. In the project described here, we don't aim for the transformation of traditional forms of lecturing through technology, but the enhancement of the course through the addition of a *structured* and *self-organized* dialog in virtual space.

The use of Web 2.0 approaches in e-Learning is a much discussed topic at the moment. Stephen Downes is said to have coined the term *E-learning 2.0* in 2005 (Downes 2005). Since then, the ideas have spread wide and far in the E-learning community. The EU is financing a number of large projects centered around the concepts of E-learning and Web 2.0, e.g. OLCOS [1], BAZAR [2], or iCamp [3]. There is a revolution imminent in E-learning 2.0 that is often ignored. It is best characterized by Antonio Fumero: *It's not about matching traditional models with existing tools anymore; It's about developing a brand-new pedagogical model and implementing the Next generation Web environment upon it.* (Fumero 2006).

In recent years we conducted a number of projects to change the situation in mass teaching (eg. (Baumann, Purgathofer 2003) (Pohl, Purgathofer 1994) (Pohl et al. 2005) (Purgathofer 2005) (Purgathofer 2004)). We learned a lot from these projects, and partially the results are still in use. As an example, since more than ten terms we use weblogs as the primary communication infrastructure in mass teaching (Purgathofer 2005). While this works well for administrative and organisational details of a course, so far it failed to become a platform for meaningful discourse about the content of the courses, given the high number of participants. All our attempts to use the aforementioned infrastructure to discuss aspects of the content have failed.

The project described in this article builds on the findings of the projects mentioned above. Our main focus is to understand how the techno-social trend subsumed under the term *web 2.0* could be exploited to change learning. The term *web 2.0*, coined and shaped by Tim O'Reilly (O'Reilly 2005), designates a class of internet applications developed in the last couple of years. Such applications often offer participative, collaborative, open and emergent services. Their virtues frequently only take effect when a very large number of people participate. Also designated the *read/write web*, *web 2.0* enables and asks participation from its users in an intensity that was unusual before.

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[1] OLCOS, <http://www.olcos.org/english/about/>

[2] BAZAAR, <http://project.bazaar.org/about/>

[3] iCamp, <http://www.icamp-project.org/>

The typical examples of the web 2.0 phenomenon are del.icio.us, flickr.com and digg.com. With all these applications, the large number of people using it produces a *massive on-line collaboration* effect that makes possible new forms of use, interaction and communication. This is one of the reasons why such applications are also called *social software*. Tim O'Reilly describes this effect as *Software that gets better the more people use it* (O'Reilly 2005).

It is easy to see – and central to the project described here – that coming generations of students will have unprecedented literacy in these new forms of communication. For them, internet is more or less constantly present, and e-mail, chat and internet telephony as well as social software and weblogs are natural elements of their daily life, their self-realization and their communication. In our project, we try to incorporate the expected – and already noticeable – media literacy of new students to overcome the problems of mass teaching. The name of the project - *SlideCasting 2.0* - comes from a combination of the technology of *SlideCasting*, coined by Matthew Langham [12], and the massively collaborative approach of *web 2.0*.

## Project Description

Starting point for SlideCasting 2.0 is the difficult situation in mass lectures, where a teacher speaks in front of a large number of students, using a notebook and a projector. Often the slides are not available for the students in a format that permits electronic annotations during the lecture. This is partially a problem of technology; there are no suitable formats that allow synchronous commenting with the required ease of use. Also, it is often an organizational problem, because the slides are not ready to be offered for download long enough before the lecture. Finally, some speakers can explain with good reason why they don't want their slides to be available before the talk.

As a consequence, lecture notes are often done in a way which introduces a number of problems. Such lecture notes are quite personal, and thus cannot be shared in a meaningful way. Quite frequently they are organized badly, they cannot be searched electronically, and they are detached from the actual slides. Finally, while these notes would be an interesting feedback, teachers seldom have access to them.

The goal of this project is to radically change the situation described. With the help of the system we plan to design and implement, it would be possible to

- write lecture notes jointly,
- organize the notes by tying them to the slides in real time,
- work on these notes collaboratively after the lecture and thus intensify the collective interaction with the course content,
- enhance and structure collaborative learning with the help and along the structure of the shared lecture notes,
- facilitate a structured communication with the teacher about the content of the course,
- give the students a possibility to add to the content of the course in the form of up-to-date findings, examples or targeted questions.

It is important to note that we do not plan to change the, often well-executed, form of the lecture itself. The live presentation of content by the teacher will still be the center of the mass lecture, and all existing forms of communication - questions asked by students during the lecture, discussions after the lecture, etc. - will remain untouched. While it is unfortunate that the context of mass teaching makes other more efficient forms of teaching impossible, we can try to change the way students can interact with the content of the course. The suggested platform tries to induce new forms of communication that were hitherto more or less impossible in mass teaching.

The organizational core of the system is formed by *SlideCasts* - recorded sequences of presentation slides from the lecture. SlideCasts are organized by time and events (every slide change is marked in the time stream) and form organizational structure for all further content added during or after the lecture.

The SlideCast is produced live during the lecture, while the teacher is talking, so that unforeseen changes (eg. a slide is shown twice) will be part of it. A dedicated software on the computer of the speaker records the succession of slides used in the presentation and enriches this recording with meta-information (e.g. time and duration). It is to be possible for the speaker to define further structuring information in the preparation, e.g. chapter and section beginnings, grouping of several slides into atomic content structures like a train of thought, an argument, an example, a fact. This enriched stream is then pushed to a client software on the notebooks of students who are present and online during the lecture (see Fig. 1)

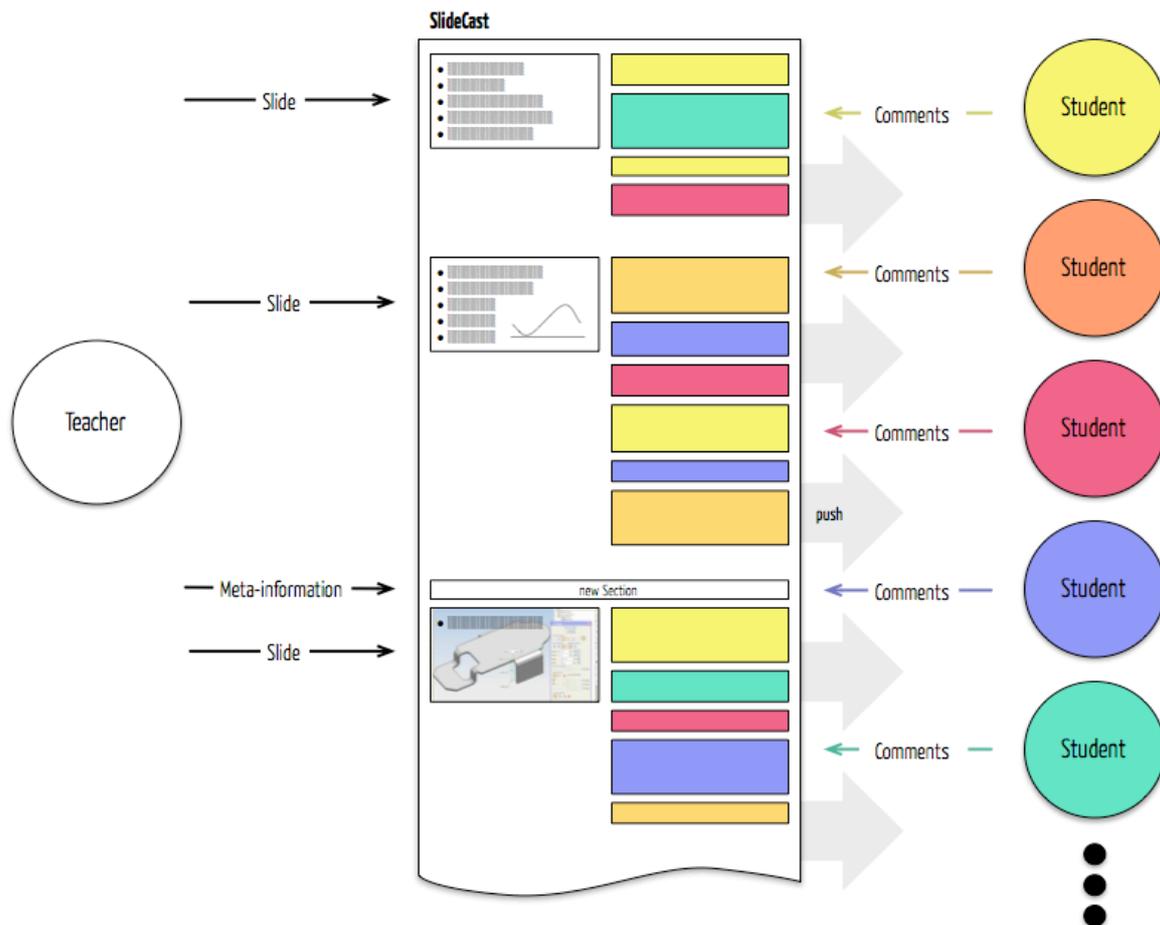


Fig. 1: SlideCast during a lecture. Slides and Meta-information (*new section* in this example) are generated on the computer of the teacher. The students add comments.

During the lecture, these students can add comments to the Slidecast. Such annotations are associated with a specific point in time in the SlideCast. All students can see the comments made by other students in real time, i.e. in the moment they are submitted. Obviously, this only works for students that have notebooks which are online, and that have the SlideCasting software installed. But the annotating of SlideCasts shall not replace the communication between speaker and students; it only lays the foundation for an enhanced discourse beyond the lecture itself.

This possibility for live annotations gives the students a chance to adopt the SlideCast and make it their own. Enriched by annotations, the SlideCast is more than just a download of the slides; it is a stream of information, partially from the teacher, partially from colleagues. To read through a SlideCast means to confront yourself not only with the Visuals you already saw, but also with the notes you or your colleagues have added to these visuals.

After the lecture is over, the SlideCast with all the added annotations becomes accessible to every student via internet. The SlideCast can then be structured in chapters, sections and content-*atoms* by the teacher(s) and/or the students. Students can read, edit, add and delete annotations. The principal character of this system is that of a Wiki, where everyone can change or delete everything (limited by a couple of necessary punctual restraints), knowing that every change is recorded and every back-version is accessible.

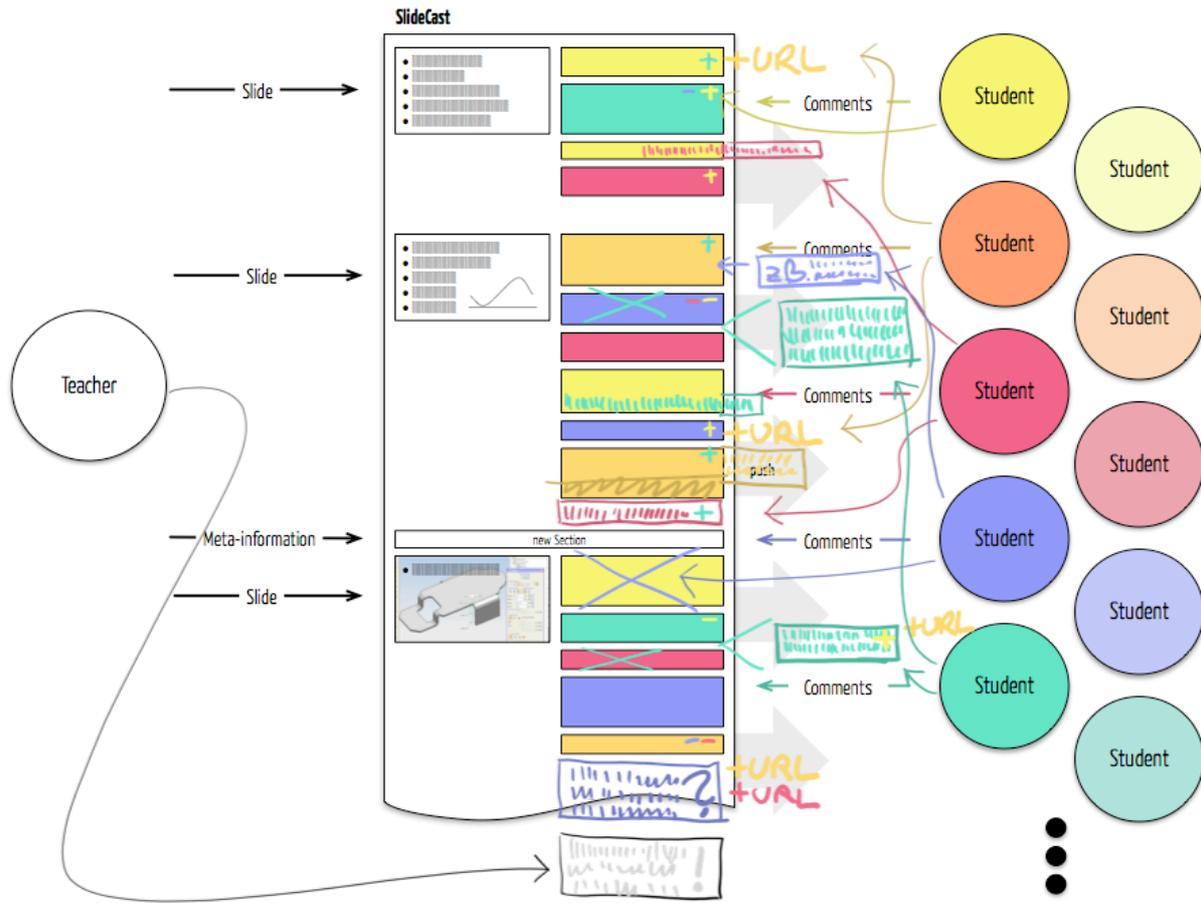


Fig. 2: Enhanced SlideCast. Students use the structured SlideCast with annotation defined during the lecture as the foundation for a debate centered around the content of the course. Also, more students have access to the SlideCast than during the lecture.

Once the SlideCast is available after the lecture, it is possible to add different types of annotations, e.g. internet links, questions, notes, case examples, tags and/or keywords, discussion forums, commentated cross connections pointing into this or other SlideCasts, exercises, change proposals etc. (see Figure 2). Thus, the SlideCast becomes the backbone of a structured and, depending on the needs, self-organized or moderated discourse over the content of the course. Additionally, possibilities to rank or highlight annotations can be offered, so that the large number of participants would generate meaningful meta-information.

To support the communication among students while working with the offline SlideCast system, it is planned to integrate a web-based chat client. This form of online communication is taken for granted by students (at least for our students), just like internet telephony. We have found instances where protocols of chat sessions from students learning in distributed groups are published for other students as a means of learning. Such protocols typically contain a large number of practical information regarding the content of the course, such as (more or less) good answers to common questions that arise while studying the supplied material. By the purposeful restriction of the supplied chat to within "earshot" of the respective work context (e.g. visibility of chat contributions only within the range of the respective content atom) the otherwise very arbitrary communication can be focused. Such constraints are of course critical to focus the discourse, but also dangerous since the students can easily use their usual chat clients to circumvent such limits.

Beyond the access through the dedicated Slidecast 2.0 platform, other communication channels will be offered. Tomorrows students, media literate as they are, will naturally assume access to information via RSS-feeds and even XML-RPC interfaces (in the case of informatics students, at least). By offering such possibilities, a multitude of usage scenarios can be supported.

## Effect of SlideCasting 2.0 in the Mass University

One core property of the system is that it will become more valuable the more students participate. That means that we can transcend the main source of problems in mass teachings - the number of participants - and turn it into an asset. It then would represent a platform for *massive collaborative learning*. The system does not focus on individually supporting each student, but helps them organize into a *community of learners* acting in concert because of their shared interests and shared goals. This would also constitute the core motivation for students to take part in this mostly self-organized process.

Teachers will have the possibility to selectively engage, according to their conceptions and needs. As an example, all new annotations of type *question* can be listed and answered, without further need to dig through the whole bulk of annotations. Through suitable filter mechanisms, it will be possible to pick e.g. intensive discussions, particularly high rated contributions, commented internet links or proposals for change from the large mass of annotations and react without becoming too involved. The necessity to economize attention and time in online communication by the teacher is all too well understood by the author. The system will help the teacher communicate efficiently.

The described system opens a new space for discourse about the content in mass lectures. The open, collaborative nature of this platform helps reducing redundancy; communicating with the system is also communicating with every student. Thus, the system refrains from competing with existing and established channels of communication.

The system described will also become a new source of feedback for the teacher about her lectures, since she can will be able to read the collective understanding of her lecture by monitoring the collaborative process of SlideCast enhancing. Comprehension problems will be immediately visible and can be acted on immediately. Also, the material added to the SlideCast (internet links, comments, change requests) can be considered and integrated into the course.

The project described in this article does not try to change the situation of the mass lecture itself. It opens a space that can generate new forms of discourse adjusted to the literacies and needs of a new generation of students. The system is in its very core more about communication than about the transfer of knowledge, and it let's the student use their existing media and communication competencies in a new process of collaborative learning.

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