High- vs. Low-Quality Video Lectures – Don't Worry, Just Put Them Online!

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Abstract: This position paper claims that a major obstacle of offering video lectures for public universities appears to be the fact that they intend to compete with prestigious private universities regarding quality of the videos and complexity of the installed platform without being able to provide the additional resources required to do so. We argue that in other areas of teaching this issue has been acknowledged for a long time, and lacking resources are usually compensated for by primarily two means: individually offering provisory course material (manuscripts), and active participation of the student body in administering those. Based on this, a simple system is proposed that mostly draws on existing platforms and tools, and refrains from extensive video editing prior to publishing. We discuss technical and non-technical requirements and possible research directions that result from establishing such low-fidelity video lectures.

1   MOTIVATION

More and more private universities provide video recordings of their courses, and some even specialize on online lectures targeting a huge audience, therefore called *massive open online courses (MOOC)*. Examples are Udacity, Coursera, edX. The format switches from 90 minute lecture recordings to short clips enriched with visualisations or augmented reality to attract a worldwide audience beyond the campus.

Public universities try to copy this approach and will thus have to compete with these offers, while at the same time frequently lacking comparable resources, e.g. time of already employed lecturers, dedicated technical staff etc. Exemplary recordings in prestigious private universities are achieved with the help of a large group of dedicated experts – the MIT Open Courseware team for example includes more than 20 people[1], while at many public German universities the basic idea appears to be that the lecturers accomplish recording, editing, and publishing themselves. Supplying additional staff is usually limited to pilot projects which are then difficult to maintain once funding ends. Of course there are

exceptions, but the aforementioned statement summarizes the situation we were confronted with when we started to inquire ways to provide video recordings ourselves. Our experience motivated us to consider alternative ways to tackle this issue, which we will describe in the following.

1.1   General Rationale

The first step was to bring to mind the assets many public German universities have in this case:

- A large audience that will be attending the lectures in any case as it is required by their study regulations, i.e. the predominance of on-site learning with supplementary online material over mere online classes.
- a long tradition of providing students sometimes ill-formatted, still highly informative provisory course material, i.e. manuscripts of the basic course content, which cannot compete with published books in terms of layout, but are at least as valuable with regard to content, partly due to the fact that they do not have to consider copyright issues to the same extent as an 'official' publication. Unlike in universities with high tuition fees, students expect much less professionally edited material as long as it is free or inexpensive, e.g. the

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[1] http://ocw.mit.edu/about/ocw-team

master copy template residing in a library for duplication. Concomitant with that, there is usually no centralized supervision of these manuscripts, but they are rather issued single-handedly by the lecturer.

- A mentality of active participation in the courseware preparation process among the student body, manifested in student associations (in German: 'Fachschaft'), and less the expectation of being treated as paying educational customers. It is common that these student associations offer access to self-written summaries of textbooks or exams, usually under the premise that the borrower contributes to the available corpus e.g. by writing examination minutes him/herself.

Web 2.0 communities also rely to a large extent on user-generated content. Instead of having a centralized professional editorial team, quality control is usually achieved by letting other users rate and comment the contributions, which appears to work stunningly well (Giles, 2005). A key aspect is that user involvement in the preparation of the material is quite high, which might be desirable also for the preparation of course material.

Combining these two approaches, offering educational 'raw material', e.g. mostly un-edited film footage via existing platforms like YouTube plus a couple of low-fidelity tools to annotate and extend this material might be a feasible and perhaps even desirable way to proceed for public universities with too little resources for preparing online material with high technical quality.

In the following, we will first describe a couple of such desired functionalities and outline their possible implementation to provide the reader with a more specific idea of what we have in mind, and also make clear where it extends previous similar proposals, e.g. Copley (2007). Subsequently, we will discuss non-technical requirements which will also clarify what makes us favour such a system, and mention research questions that might arise. Finally we will summarize the idea and our motivation in the conclusion.

2 EXEMPLARY SYSTEM

A combination of a couple of basic functionalities that are in part already available on popular web sites might suffice to allow for simple processing of lecture recordings. By processing we do not refer to video-editing as it is done with software like Adobe Premiere®, Camtasia® and the like, but the attempt to enrich the content of a lecture recording in order to facilitate understanding of it. In particular, these functionalities might be:

- A simple way to make videos available online for a larger audience, i.e. upload them somewhere.
- The possibility to add text comments including links to slides or other web documents at certain points of time in the video. We will call these *annotations*, and as far as they are done subsequent to the lecture, *subsequent annotations*.
- A listing of these annotations that can serve as a rough table of content or index for the video.
- The possibility to give simple ratings via a 5-star or thumbs up/down scale of added comments to indicate their usefulness
- A way to perform annotations during the lecture, e.g. to mark important or less understood parts. We will call this *real-time annotations*.

Most of these functionalities are included in professional video editing software, however, next to their price, they also require considerable training and a deeper understanding of the underlying data organization in terms of projects, audio- vs. video track, codecs, and so on. Similarly, the most prominent open-source platform to manage audio- and video lectures, *Opencast Matterhorn*, at least requires the setup of a server prior to working with it, a task that is envisaged for a dedicated campus administrator[2]. Evidently, the complexity of these programs is due to the fact that editing and publishing videos on a professional level is complex. We would like to keep all this to a minimum as it might scare off the user. To specify our proposal, a possible implementation is drafted below.

2.1 Possible Realization

For the case of simplicity, we will restrict this description to the most popular web site to publish videos, YouTube. So let's assume a simple camcorder recording of a lecture has been uploaded to this platform. The first task would be to add simple comments to certain moments in the video once it is recorded, and to make these annotations available in a way that they can be searched and serve as a simple table of contents.

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[2] http://opencast.org/matterhorn/feature-tour

2.1.1 Subsequent Annotations

YouTube already offers the possibility to add comments in the video that then appear at the defined point of time inside the video once the video is played back. However, for using them as an index, it would be desirable to have access to them as a permanent text outside of the video, which also persists once the video has stopped playing. Apparently, the added notes are stored as an XML file by YouTube that can be downloaded and added to other clips[3]. In a similar way, this XML-file could be parsed and the notes including their time stamp (with regards to video clip time) extracted as text.

2.1.2 Index / TOC

The aforementioned XML comments are then used on a new web page with the video embedded, where all available annotations from the XML-file are listed in the order of their appearance in the video, desirably with the possibility to jump to the moment in the video by clicking on the corresponding time stamp. To illustrate the layout, we refer to the appearance of comments on SoundCloud[4] (see Figure 1), a popular web site to listen to uploaded music, predominately DJ sets. The search function of the web browser allows finding keywords in the comments.

2.1.3 Review

It is likely that, if done anonymously, not all annotations made by users are on the same level of appropriateness. Therefore, a simple rating system would be helpful to indicate valuable annotations. These systems are widely available as open source software (e.g. MooTools MooStarRating[5], for a discussion of various rating interfaces see (Nobarany et al., 2012), and comments with low rating can later be filtered out or deleted at all.

2.1.4 Real-time Annotations

So far, the described elements were all adopted from other sites that present user-generated content. How-
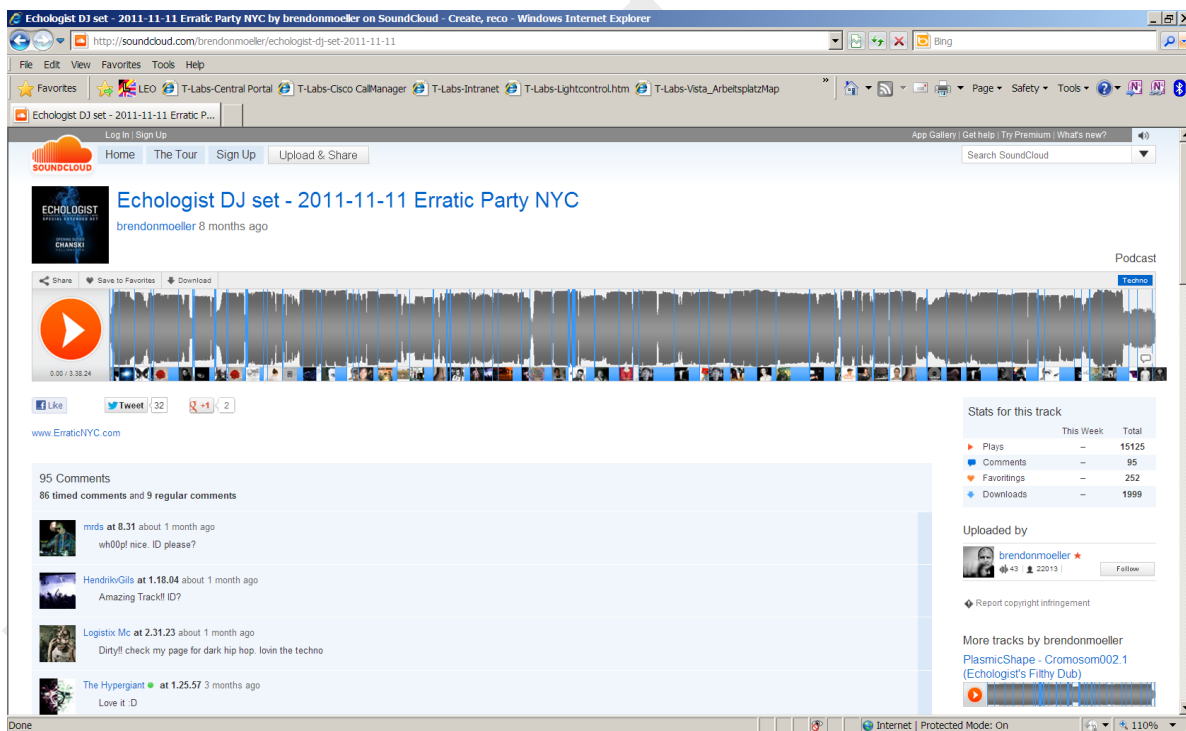

Figure 1: Layout of SoundCloud, where user comments to an audio track are listed below including the time in the track they refer to ('ID' in the comments refers to 'track ID', i.e. the specific title of the piece of music playing at that time)

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[3] http://stefansundin.com/stuff/youtube/youtube-copy-annotations.html

[4] http://www.soundcloud.com

[5] http://mootools.net/forge/p/moostarrating

ever, one big difference to these sites is that for lecture recordings a large group of later users were already present during the time of recording. Thus it might be useful to offer them a way to start annotating in real time, i.e. while sitting in the lecture to facilitate *blended learning*, the desired combination of face-to-face and electronic lectures (Wieling & Hofman, 2010). Here, our proposal is a simple app that synchronizes with the first slide via a QR code (containing the title of the lecture or the later video file name) and then offers a GUI to immediately mark critical moments and stores them in the same XML format as the subsequent annotations so that they can later be loaded together with the actual video file. As annotation should not distract too much from attending, few, easy-to-reach functionalities would be desired (Schleicher, Sahami, Rohs, Kratz, & Schmidt, 2011). An exemplary GUI is depicted in figure 2.

The available tags or markers are limited to four types, each represented with an icon: indicating moments where the listener did not completely understand what was explained, moments that appeared important to listener or included a good example, and finally moments where the lecturer pointed out that the current statement might be relevant for the exam. This one-click-tagging might reduce cognitive overload during the lecture as it reduces the need to write down extensive notes and already facilitate later processing of the lecture recording (Mayer & Moreno, 2003).

The individual real-time annotations can be uploaded to the joint web page serving as a starting point for subsequent review by the individual student, while at the same time serving as non-personalized clusters of short tags to see where other students struggled or noted important points. A similar idea is pursued by *myTU*[6], an app for the Technical University Bergakademie Freiberg, however, their emphasis is on providing real-time feedback to lecturer in order to slow down the pace, not on subsequent review.

We are aware that several aspects of the proposed system are not completely specified on a technical level, and others may be disputable. For example the advantage of just having one common, anonymized set of annotations online and thus needing no additional user management for administrating sets of comments comes with the disadvantage that some users may not want to share their personal annota-

tions, or cannot be contacted individually. Here, modifications are easily conceivable. The main purpose of the above given outline is to provide the reader with an idea of the system we have in mind when we now describe the non-technical requirements we see for it to work.

Figure 2: Exemplary GUI of an app that allows for basic annotations during the lecture, containing only four types of labels/tags. Lecture time and title is given in the header of the GUI.

3 NON-TECHNICAL REQUIRE-MENTS

There are certain non-technical requirements to establish a comparable system, the first surely being a change of mind to move away from offering polished videos under centralized supervision, and rather go for uncoordinated low-fidelity versions, as it is the case with written material: if professionally edited video material corresponds to published textbooks, the proposal made here is to go for the video equivalent of manuscripts. As pointed out above, we did not include any video editing prior to publishing it online, because we have the impression that this constitutes a major obstacle to most lecturers interested in offering video material.

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[6] http://mytu.tu-freiberg.de

The time lecturers save editing the footage can be invested to supervise the correctness of the subsequent annotations addressing the content of the lectures, their actual area of expertise, rather than urging them to become semi-professional video editors. There are various examples of amateurish recorded lectures online (e.g. YouTube), which still convey valuable information to the viewer.

The second major obstacle we notice is a general uncertainty regarding legal aspects of offering recordings that may include pictures or other copyrighted material. This uncertainty may differ between countries (c.f. Deimann & Bastiaens, 2010) for a discussion for German institutions), as copyright laws may include a *fair use*[7] doctrine like in the US. Of course, publishing lectures as proposed here requires a certain ambiguity tolerance to reside in a legal grey zone, but we are not aware that this discussion was that prevalent for the master template of a manuscript residing in the library for every student to make a copy of it. These scripts certainly contained copyright-protected material. Here, apparently no one cared, probably because the library was not that easily accessible as content in the internet. Offering the videos only within the intranet of a university or their online learning management system (e.g. Moodle[8]) might be a compromise to establish similar conditions for digital material. However, we rather think the main reason for this previous indifference was the implicit agreement amongst all involved parties that the provisory copy cannot compete with the high-quality original. In a similar vein, the sensitivity towards copyright issues might be attenuated in the right holder if the video depicting protected items is of obviously lower quality than the officially published version, and not a lossless copy. Our intention is not to dry out commercially produced and distributed lecture material, but to complement it.

The availability of manuscripts did not keep authors off from publishing textbooks, in some cases the previously published script was offered as a beta version of the actual book. The ratings collected via 'informal' videos may help to decide which lecture should be edited and released, then in agreement with the publishers whose material is involved.

The third requirement is the willingness to switch from complete control over all content including annotations to 'moderated' control by students. In our opinion, this is the least difficult part

because considering student-generated material to complement teaching is quite common at our universities, and the experiences have been clearly positive (e.g. 'informal' solutions published by a student being declared the 'official' sample solutions later on as experienced by one of the authors). To establish low-fidelity online courses as additional material, it might be necessary to provide student organizations with a couple of annotated lecture videos as some kind of initial seed. Shifting processing partly to students will encourage active learning instead of passive consumption of information, which increases both, learning outcome as well as satisfaction (Zhang, Zhou, Briggs, & Nunamaker, 2006).

The internal discussion of the approach revealed several research questions that arise from using low-fidelity video material for educational purposes.

3.1   Open Questions & Research Directions

The main questions are whether such low-fidelity videos will first be accepted by the students and lecturers, and to what extend it will actually support the learning process.

We think that using platforms and interaction concepts instructors and students are familiar with from their daily internet browsing (watching YouTube videos, rating content, and adding comments) will be less time-consuming than getting used to completely new tools. We are aware of the impact technical quality of audiovisual material has on the recipient (Möller, 2010; Arndt, Antons, Schleicher, Möller, & G., 2012), although the issue might not be as important as reported in Lauer, Müller, & Trahasch (2004) due to a general increase in available bandwidth since then. The Opencast Matterhorn app *Matterhorn 2 go*[9] for example offers searching and watching video lectures on the mobile phone. Nevertheless, the lower quality as compared to MOOC clips will of course be obvious, and may in some cases even lead to ambiguous or non-understandable sections. The euphemistic reply would be that this emphasizes the 'authentic' character of the material like jittery mobile phone clips presented in news shows, where the unedited nature of the clips almost increases their credibility.

However, this may be too optimistic, so let's assume that the quality impairments simply prevent understanding of certain sections. Here, a look in the

[7] http://www.copyright.gov/fls/fl102.html
[8] https://moodle.org/
[9] http://vm193.rz.uni-osnabrueck.de/matterhorn2go

other available course material may be necessary, probably based on the recommendations of fellow students. The fact that processing a lecture cannot be achieved without supplementary material might also help to attenuate one objection we repeatedly heard from lecturers, namely the worry that offering online versions will discourage students to attend the classroom. The more obvious it is that working with the video material already starts in the lecture (by annotating it in real time) and that attending it will have benefits in terms of acoustic and visual quality (as compared to the low-fidelity video), the less an attitude of 'I can attend it later/at home' will arise.

4   SUMMARY & CONCLUSION

In this position paper, we outlined a simple way to offer video recording of lectures with low technical quality to students and enable them to use this as supplementary learning material. Unlike most available systems, the approach aims at utilizing existing platforms and interaction paradigms as much as possible, namely the possibility to watch videos online via e.g. YouTube, add comments, and rate those comments. Instead of editing the videos extensively prior to uploading, the idea is that the main focus should be on content-related annotating, which can to a large extend be achieved by the students. To facilitate this, they should be enabled to already start with annotating while attending the lecture.

Shortcomings due to limited annotation functionalities or arguably low technical quality of the video footage are acknowledged and accounted for by explicitly stating that the videos are just an additional teaching supplement without the intention to replace other material or even lecture attendance.

This proposal is based on our experience that the attempt to compete with platforms that offer professionally produced video lectures might fail without providing substantial additional resources regarding technical as well as legal expertise. At the same time, the imbalance in resources has been dealt with for a long time in other areas of teaching at public universities both by students and lecturers alike, who usually compensate for it by individually providing material with low technical quality and increased participation of the student body. We tried to show how the same principle might be applied to video lectures. The intention is to encourage all involved parties, lecturers and students as well as experts on e-learning to further develop this idea.

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