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Experiences with Using Videos in Distance Education

A Pilot Study: A Course on Human-Computer Interaction

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Abstract

The number of online resources available for teaching and learning in higher education has been growing enormously during the last decade. A recent development is the emergence of Massive Open Online Courses (MOOCs) and of Open Educational Resources (OER). The result is a huge number of videos that are available on line. Can these videos enrich learning? As a pilot study we added sixteen videos to an existing introductory course in Human-Computer Interaction. This course is mandatory in the Bachelor programs Computer Science and Information Science (second year). Watching the videos was optional for the students. The videos originated for the most part from the MOOC Human-Computer Interaction, produced by Stanford University. We offered this course to a pilot group of eight students. The educational context was problem-based learning in distance education. The videos were welcomed by all of the students and were found to be useful in their learning process. The students watched the videos intensively and appreciated them very well. A main reason for the students to be positive about the videos was that they liked to alternate reading texts and watching videos.

Keywords: Distance Education, Video, Massive Open Online Course (MOOC), Online Resources, Podcasts, Human-Computer Interaction.

Introduction

The number of online resources available for teaching and learning in higher education has been growing enormously during the last decade. Recent developments are the emergence of MOOCs (Massive Open Online Courses) and the OER (Open Educational Resources) movement. As a result a huge amount of enhanced learning opportunities exist. Examples are primary sources, instructive TED-talks, discussions between experts, recorded lectures, how-to-do videos, discussion forums, and so on.

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But to what extent are online resources actually used in courses? Studies indicate that despite the promise for use in education, online resources are underutilized. Harley, Henke, Lawrence, and Perciali (2007) found in an extensive study of humanities and social sciences faculty that use of digital materials created by other institutions was rather low. Lindquist and Long (2011) report that online primary resources are underuti-

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lized in humanities. In a study about open educational practices in higher education, Murphy (2013) concludes that the adoption of OERs and open educational practices is still in its infancy.

Several reasons for not using online resources are mentioned by Harley et al. (2007), Eynon (2008) and Murphy (2013); among them are the following:

- too many resources exist and it takes faculty simply too much time to assess their quality and usefulness for actual courses
- problems with managing resources and organizing them for use in teaching
- problems of fitting resources within the instructors' existing teaching approach
- technical problems in having access to resources
- problems with copy rights and availability of resources.

Against this background we had the objective to find out the possibilities of substantially enriching an existing course with videos from external resources. The course is an introduction in Human-Computer Interaction and is mandatory in the bachelor programs Computer Science and Information Science of our university, the Open University of the Netherlands. The context is distance education. Our students are adults and overwhelmingly study part-time, combining study and work. The course offers no face-to-face classes.

We offered the course with the videos to a pilot group of eight students and asked them to give feedback. We wanted to know:

- to what extent the students actually watched the videos: were they ignored, used once in a while, used intensively?
- how were the videos received? Which aspects did students like or not like about them, and why?
- did students meet any problems in playing the videos?
- what is the best context to offer links to videos: by way of an e-book, or by a pdf?

In the remainder of this paper we first describe the course design and the pedagogical approach. Then we focus upon the role of the online resources, especially the videos, in the course. Next we present the feedback given by the students. Finally we discuss the results and reflect on what we learned.

The Course: Content and Pedagogical Approach

The course introduces the students to the basic concepts of human-computer interaction. The emphasis is on interaction design, with a user-centered approach. The students have to come to understand the users and their activities, to design an interactive system, and to evaluate prototypes with users throughout the design process.

The design process consists of three stages. During the first stage the students analyze the users and the tasks they perform in the existing environment. They make a user profile (in the form of personas) and develop a task model (if appropriate).

In the second stage the students design conceptual models of the system under development. To do so they develop several scenarios and a number of designs. They produce lo-fi prototypes, which they subsequently use for a first, informal evaluation with the intended users.

In the third stage the students specify the details of the system, denoting all aspects the user should be aware of during interaction, such as the dialogue and the 'look and feel' of the system. They produce a hi-fi prototype, which they subsequently use in usability evaluations with users. This prototype should have a relevant part of the functionality, but not necessarily the complete functionality.

The pedagogical approach is based upon Problem Based Learning (PBL). Team projects form the core of our course. Teams of about 5 students practice design by performing a 10-week project. We offer a realistic context for the project, with a real client. The students have to work with real users, who are representative for the intended users.

An example project is a project called *Online Participating in Games for Elderly*. Many retirement homes organize evenings for elderly people to play games, such as bingo. But due to severe physical disabilities, not everybody can join physically in these face-to-face sessions. The goal of the project was to design a system to give elderly people the opportunity to participate on-line in such game sessions. As a matter of fact, the intended users were the main challenge in this project; many of them had low affinity with information technology. The question was: How to conceive a system that the elderly could and would use?

The textbook of the course is *Interaction Design*, by Y. Rogers, H. Sharp and J. Preece (3rd or 4th edition, Wiley). Additional course materials can be found on the web, for example, a number of videos. These videos (and other web resources) are meant to support the textbook. They are optional, in the sense that they do not add to the mandatory content.

A study guide explains in detail and ‘just-in-time’ in which stage of the design process which resources (in the first place sections of the textbook) are useful. This study guide has about 20 pages and is available as e-book (on Blackboard), but can also be downloaded as pdf. The e-book as well as the pdf have direct links to the videos and other web resources.

Use of Videos

The course refers to 16 videos. Most of them (13) form part of the Stanford MOOC Human-Computer Interaction and are given by associate professor Scott Klemmer. These 13 videos (and many more) can be found on the Coursera platform <https://class.coursera.org/hci-004/lecture/preview>. The videos can also be found on YouTube. To be sure that the videos could be played on as many platforms as possible we gave the students for every video the link to the Coursera site as well as the YouTube site.

Many videos last 10-15 minutes. They are optional in our course. The lecturer gave them a rating of 1, 2 or 3 stars. High rating means that the content is directly applicable in the project; low rating means that the content is interesting as background material for the project, but not necessarily directly applicable.

First Stage: Analysis

During the analysis stage the ‘current’ situation is studied, i.e., the situation in which the system to be developed will have to function. Typical student activities are:

- interviewing users about the way they perform their tasks in the current situation
- observing users performing tasks in the current situation by methods derived from ethnography
- distributing surveys, with questions about the users’ experiences with the current situation and wishes for the new system
- describing personas to portray typical users.

The Stanford MOOC offers several videos that support these activities. Among other things, one can learn about:

- preparing and conducting interviews
- the usefulness of doing observations
- the usefulness of persona’s for design activities

- several techniques to analyse the current situation, for example indirect observation techniques.

Another video we refer to is the video *What are the benefits and drawbacks of Ethnography?* by Gerry Katz, Executive Vice President of Applied Marketing Science, Inc. (Katz, 2010). One of the points of discussion with the students is why usually interviews are not enough to get a complete picture of the activities in the current situation, and why you need also observations. In the role of expert Katz discusses experiences from practice to stress the need for observations.

Second Stage: Conceptual Design

In the second stage students have to design the global aspects of the interaction in the future situation in which the system to be developed will be used. Typical activities are:

- coming up with several, different conceptual designs; preparatory activities are designing scenario's to describe the way the new system is used, choosing metaphors and deciding about interaction types
- making storyboards and lo fi prototypes, usually paper prototypes
- performing user evaluations with these prototypes
- selecting the 'best' design, or combine elements of different designs into one 'best' design.

This stage is about designing. An important issue to convey to the students is that you get the best design after having considered lots of designs. The Stanford MOOC has a convincing video which discusses exactly this point, supported by evidence based upon research. It stimulates the students not to be satisfied if they have come up with one design, but to consider other designs and compare them with each other.

Another key topic is prototyping. Computer science students prefer to program something and are not inclined to use pen, paper, and other Kindergarten tools for prototyping. Therefore, it takes some effort to persuade them to start with lo fi prototypes. The Stanford MOOC has a nice video on using paper prototypes. It gives several reasons why not to jump immediately to a software prototype.

We also refer to the interview *How to Conduct a Simple User Test* with usability expert Jakob Nielsen. He gives a lot of practical advices for performing user evaluations. (Web Marketing Today, 2011).

The Stanford MOOC offers several other videos that can support the conceptual design stage, for example, about:

- the strength of prototyping
- how to produce lo fi prototypes
- how to perform user evaluations with prototypes.

Third Stage: Detailed Design

In the detailed design stage the user interface is specified in detail, denoting all aspects the user should be aware of during interaction with the future system. Typical activities are:

- designing several elements of the interface, as colors, typography and screen lay-out
- building a hi fi prototype
- performing user evaluations, with the hi fi prototype, and analyzing the results.

The Stanford MOOC offers several short lectures that support these activities. Among other things, students can learn about:

- visual design principles
- typography
- the use of grids and alignment
- a framework for performing evaluations.

Feedback by Students

We offered the course to a pilot group of 8 students. After completing the course they were asked to fill out anonymously a web survey with open questions. We asked the students to give extensive feedback. 7 students participated in the survey. This section presents the themes we asked the students about, and a summary of their feedback.

To what extent did the students watch the videos?

Question

How many videos did you watch?

Answers

All answers are between 70 and 100 %. Some students used the rating (by the lecturer) and indicated that they skipped the '1-star' videos.

How were the videos received?

Four different questions explored this theme.

Question 1

How did you experience the videos (was it useful/interesting/stimulating/boring/...).

Answers

All answers are positive. Most respondents give as reason for their positive comments that they like to study with different types of media. Typical feedback from four students was:

- *'Subject matter is easier to remember and to understand if you alternately read the book and watch the videos'*
- *'I consider videos as valuable complement to the other course materials, and as a welcome alternation of reading texts.'*
- *'I liked the alternation between reading (more active, needing more focus) and listening.'*
- *'It is easier to keep the attention focused if somebody explains compared to reading texts. I think the videos made me understand the subject matter faster and sometimes better.'*

Several students were also positive about the educational quality of the videos.

- *'... especially the integrated exercises were a valuable add on.'*
- *'The videos of Klemmer usually kept me fascinated. Interesting subject matter, valuable explanation and clear examples.'*
- *'... clearly explained what is essential, illustrated by more or less inspiring examples from practice.'*
- *'... when drawings are created 'live' instead of a dull presentation.'*

Question 2

Which videos did you like most, and why?

Answers

Positive comments were given upon the content of some videos.

- *‘During the usability studies, I observed that test persons tried to perform well, and were more critical upon themselves than upon the product. Thanks to the videos of Scott Klemmer I was prepared to this psychological effect and I could anticipate upon this by telling the users that the prototype was tested, not they.’*
- *‘... ‘The power of prototyping’, and ‘Paper Prototypes and Mock up’s’. Clear and interesting content.’*
- *‘Because he (i.e. the lecturer) not only rehearses the slides (by the way, they were a convenient aid), but tells and demonstrates with examples what it is about.’*
- *‘I liked the video in which Klemmer explains the importance of designing alternative prototypes. Something to remember.’*

Question 3

What are the strong points of videos?

Answers

The possibility to alternate reading texts and watching videos again is mentioned several times. Some students like the possibility to play the videos at a higher speed.

- *‘... also the possibility to play the videos in a faster pace was convenient. On 1.25x it is perfect to understand and you gain time.’*
- *‘You can watch them at double speed.’*

Question 4

What is your opinion about using videos in courses?

Answers

The responses were positive. Some students elaborated on the possible functions of videos.

- *‘Definitely an add on. Especially as introduction. When it becomes more technical, a video often is less suitable, because then you need to navigate, if you don’t understand it anymore. This is much easier with text.’*
- *‘I am in favour as long as it is used as an aid. To replace all course materials by videos is not convenient. A text is still more convenient if you want to restudy subject matter or to search for a specific topic.’*

Did the students meet problems in watching the videos?

Question

Did you experience any problems?

Answers

Only one or two minor problems were reported about playing videos.

- *‘Adjusting the speed was not possible in YouTube. Then it is impossible to watch, it is much too slow. On the other hand, Coursera worked not 100% on iPad or Android.’*

How should links to videos be offered?

Question

Links to videos were offered in an e-book and in pdf. What did you use, and why?

Answers

Two students printed the pdf and used text and computer side by side. Five students studied from the screen, with direct links to the web resources. Some of the students used the e-book, others the pdf.

- *'I studied the e-book on the screen. Because it is clear, everything is readable within a page without having to scroll or search. Because the videos are linked to it. On the screen, because I have no problems with reading on the screen and because it is better for the environment (and cheap).'*
- *'E-book on the screen. I prefer reading from the screen. The e-book worked very well.'*
- *'Pdf, because E-book in Blackboard is disastrous. Also because you keep clicking within the e-book and the design was poor (font, colours, background, adapting text width is poor).'*

Discussion

A limitation of this study is the small number of participants: only 7 students (out of a total number of 8 enrolled students) participated. Because of this reason the study is only a pilot study. The next step will be to offer the course to a larger group of students, to be able to draw more rigorous conclusions. Another limitation is the context, which is typically distance education. For distance education students the main learning activity is to study texts. In face-to-face education students alternate in a natural way between several kinds of activities: attending face-to-face lectures and classes, having team project meetings, reading texts. Adding videos in this context might be received quite differently. The findings of this study can't therefore be translated to face-to-face education.

The feedback from the students in the pilot group indicates that adding videos to the course was quite a success. They watched the videos to a large extent and appreciated them highly.

Almost all students indicated they liked the possibility of being able to alternate between reading texts and watching videos. This is a promising result. Maybe the use of videos can help in making courses more motivating and inspiring for distance education students, many of whom have motivational problems, as for example Lee and Chan (2007) report. Fernandez, Simo and Sallan (2009) also suggest that a combination of different learning media (video, text, pictures, etc.) could improve the results of the learning processes of distance education students..

The success of videos in education depends heavily on their qualities. Guo, Kim and Rubin (2014) present an empirical study of how video characteristics affect student engagement in online educational videos. Their study is based upon data from millions of video watching sessions across several MOOCs. They map their findings upon a number of recommendations for the production of videos. Their main finding is that shorter videos are much more engaging. Their first and most important recommendation therefore is the following: Instructors should segment videos into short chunks, ideally less than 6 minutes. The second recommendation is to record the instructors head and then insert into the presentation video at opportune times. A human face might provide a more personal feel and might break up the monotony of PowerPoint slides. The third recommendation is to try filming in an informal setting where the instructor can make good eye contact. By this 'personalization' trait the students feel that the video is being directed right at them, rather than at an unnamed crowd. The fourth recommendation is to record Khan-style (i.e., an instructor drawing on a tablet) tutorials if possible. If slides must be displayed, add emphasis by sketching over the slides. The natural motion of human handwriting can be more engaging than static computer-rendered slides.

The videos of the Stanford MOOC comply largely with these recommendations. They are longer than the recommended 6 minutes, but still rather short. The head of the lecturer can be seen regularly. The setting is informal and the lecturer is not only talking, but is also sketching and handwriting. These educational characteristics might explain part of the positive feedback from our students upon the quality of the videos.

From the point of view of the lecturer, using videos from other universities is an efficient way to get high quality course materials from well-known institutions and proficient lecturers. According to their comments our students realized that the quality of the content of the Stanford videos was high. They mentioned several videos they appreciated highly.

Our students brought up some interesting issues. For example, what could be the functions of videos? Some commented they see videos as a way to support the texts, for example as an introduction to the subject matter covered by texts. It was also remarked that it is difficult to search in videos or to 'scan' videos. This could restrict the possible functions. Finding a definition might be much easier in a reference book.

In the Introduction section we discussed possible obstacles for using online resources. Among the reported problems were technical problems. In our case study our students experienced only minor technical problems.

What We Learned

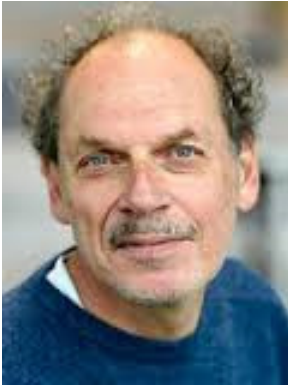
Our objective was to enrich our Human-computer interaction course by adding videos from web resources, the Stanford MOOC Human-Computer Interaction in the first place. The feedback from the students in the pilot group indicates that this was quite a success. They watched the videos to a large extent. They appreciated the videos highly, and indicated that the videos supported their learning process. They did not meet major technical problems. Some students preferred to have just a set of links to the videos, other students used the e-book.

The next step will be to offer the course to a larger group of students, to be able to draw more rigorous conclusions. An interesting question will be whether adding videos (and other web resources) actually can help in making courses more motivating and inspiring for distance education students.

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Biography



Herman Koppelman is assistant professor within the program of Computer Science of the Open University of the Netherlands, and also lecturer in the Human-Media Interaction group of the University of Twente. His research interest is the use of ICT in higher education.