The Use of Videos in Teaching

– *Some Experiences from the University of Copenhagen*

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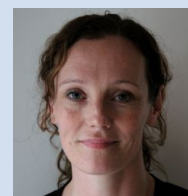## Martin Ehrensvärd

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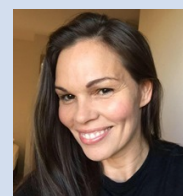
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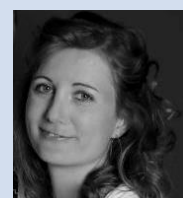

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Abstract, English

This paper covers videos created and used in different learning patterns. The videos are grouped according to the teaching or learning activities in which they are used. One group of videos are used by the teacher for one-way communication, including: online lectures, experts interacting with one another, instruction videos and introduction videos. Further videos are teacher-student interactive videos, including: feedback on student deliveries, student productions and interactive videos.

Examples from different courses at different faculties at The University of Copenhagen of different types of videos (screencasts, pencasts and different kinds of camera recordings, from quick-and-dirty videos made by teachers at their own computer to professionally produced studio recordings) as well as audio files are presented with links, as an empirical basis for the discussion.

The paper is very practically oriented and looks at e.g. which course design and teaching situation is suitable for which type of video; at which point is an audio file preferable to a video file; and how to produce videos easily and without specialized equipment, if you don't have access to (or time for) professional assistance. In the article, we also point out how a small amount of tips & tricks regarding planning, design and presentation technique can improve recordings made by teachers themselves.

We argue that the way to work with audio and video is to start by analyzing the pedagogical needs, in this way adapting the type and use of audio and video to the pedagogical context.

Abstract, Danish

Artiklen handler om brug af video i undervisning. Videoerne er inddelt i typer i forhold til hvilke læringsaktiviteter, de indgår i. En type video er envejskommunikation fra lærer til studerende og denne gruppe omfatter online-forelæsninger, eksperter der taler sammen, instruktionsvideoer og introduktioner til emner. En anden type er videoer med interaktion mellem lærer og studerende, og denne gruppe omfatter feedback på studenteropgaver, studenter-producerede videoer og interaktive videoer.

Artiklen viser eksempler på brug af video i undervisningen på tværs af en række fag på Københavns Universitet. Det er bl.a.: screencasts, pencasts, og forskellige former for optagelser, fra quick-and-dirty videoer, optaget af læreren selv, til professionelt producerede studieoptagelser, og dertil kommer lydfiler. Til alle eksempler hører links til konkrete video- og lydfiler som empirisk basis for diskussionen.

Artiklen er meget praktisk orienteret og belyser fx: hvilket kursusdesign og hvilken læringssituation der passer bedst til hvilken type video, hvornår en lydfil er bedre end en videofil, og hvordan man selv nemt kan producere videoer uden særligt dyrt udstyr, hvis man ikke har tid og råd til professionel produktion. Artiklen peger også på nogle få tips & tricks i planlægning, design og præsentationsteknik, der kan gøre egne videoer mere attraktive.

Artiklen argumenterer for, at man skal tage udgangspunkt i det pædagogiske behov for bedst at kunne vælge og tilpasse video/audio-type.

Introduction

In this paper we present examples of different types of video (screencasts, pencasts and different kinds of camera recordings, from quick-and-dirty videos made by teachers at their own computer to professionally produced studio recordings) as well as audio files. The empirical basis is a range of examples from online and blended learning courses at The University of Copenhagen.

The paper is based on cases and on extensive experiences with the use of video in teaching. We have not performed direct studies, and do not have concise measurements of learning directly related to the video type or production. Rather, we present the videos and discuss the pros and cons based on our experiences and in some cases also based on specific feedback from students. The videos are to a limited extent discussed in relation to current learning theory.

The term "video" is used for any type of visual or audio piece or file that consist of visuals (camera recording, animated graphics, sequence of stills, text or combination) and audio (real sound or overlay narration). Our examples also include pure audio files (usually termed podcasts).

Videos may be produced in different formats and are distributed in the form of separate files (typically using one of the described video formats) or a cluster of connected files. The videos may be embedded in or downloaded from your Learning Management System (LMS), a homepage or one of the video-sharing websites like Youtube or Vimeo.

Videos are becoming increasingly popular in university teaching, irrespective of the learning design. They serve as resources for the learners in the form of teacher produced online lectures, screencasts for explanation of specific details in the curriculum, feedback to assignment deliveries or teachers distributing links to videos shared as open resources on the internet. The popularity of videos is on the rise as they become easier to produce, easier to download due to higher bandwidth and easier to distribute on university LMSs.

One driving force for publishing this article is our observation that many teachers are increasingly aware of and interested in improving the pedagogical and didactical tools and results. Videos may be part of the improvement though there are also examples of videos reducing the overall quality of the teaching compared to the traditional face-to face delivery of messages and teaching.

A video can not be considered a pedagogical strategy or a learning pattern in itself; so, in the patterns and strategies applied in the online and blended learning project at The University of Copenhagen, as presented in May et al. 2016, videos are grouped among resources.

A video may be considered a modern replacement for a written document, the narration replacing the typed text and animations or video recordings replacing drawings and pictures. A video may also replace a lecture or can be a supplement to the textbook. We will return to our work with the design patterns later in the article.

Richard E. Mayer has studied intensively how people learn from multimedia instruction and published his results in numerous papers, e.g. Mayer and Moreno 2002 and Mayer 2008. According to Mayer, learners have limited capacity to absorb inputs from presentations and therefore it is important to reduce extraneous processing of unnecessary inputs. The basic elements of learning are:

1. learners process visuals by another channel than when processing text or narration (this is termed dual channels),
2. learners have limited capacity to process each channel, and
3. finally, an integration of the results from both channels takes place.

This limitation lead, through Mayer's extensive research, to a number of quite practical principles for the optimal design of multimedia productions, such as (in order of proved significance (Mayer 2008)):

• present narration and corresponding animation at the same time
• place printed words next to corresponding graphics
• reduce extraneous material
• do not add on-screen text to narrated animation and highlight essential material.

The significance of this was demonstrated through tests where the learners were asked to apply what they learned about a new situation in order to answer advanced questions. This test showed that the learners actually understood what they saw in a 0.5-2 minute video. Thus videos may also contribute to higher learning outcomes. There is a limit to how much students or individuals can take in via this medium, but it is a good possibility for the

brain to build knowledge and understanding, provided the video is well designed.

Why use videos in teaching?

There are a number of good reasons to include videos among the resources of a course, e.g. as described by Heilesen 2009, Bergmann and Sams 2012 or Mathiasen 2010. Learning videos may be seen from three perspectives: 1) the learning perspective, 2) the teacher perspective and 3) the student perspective.

Learning perspective: Videos can support better learning:

- Optimized knowledge building: According to the dual coding theory (Mayer and Moreno 2002) the construction of knowledge is done best when the input (graphics and text) is well aligned so the voiceover comes in a well-designed amount and well-timed with the graphical side. This is most effective when the text is narration (not written on screen), and the video doesn't contain irrelevant visuals and sound interfering with the users' learning experience. This theory is probably best implemented in a short and concise video, well planned by the teacher. In more informal situations such as classroom teaching, explanations often take much longer time. And even though the presentation aids (e.g. PowerPoint) are generally aligned with the narration, they usually also contain disturbance or interference from the surroundings.
- When classroom lectures are being replaced with short videos, class hours can be used for more "advanced" learning activities than lectures, which may induce more skills or competency level learning. This is also known as flipped classroom (Bergman & Sams 2012 and Hachmann & Holmboe 2014).
- Knowledge building takes place mainly at the edge of one's existing knowledge. It is difficult to have a large class of students ready for the lecture at the same time. Some are prepared and can grasp the lecture, and some are not. When the lecture is recorded each student can see it at the best time for his or her own learning.
- Repeated learning: Students also learn by repetition and often it is necessary to hear and see new things repeatedly. Videos (like readings) are particularly well suited for repetition, unlike classroom lectures.

Teachers' perspective: Videos may improve teachers' quality of work:

- More interaction with students: If the weekly hours for physically facing the students are fixed (which often is the case in regular university teaching, class hours), online lectures or recorded feedback to students leave room for discussions or supervised exercises or similar which is often more rewarding for the teacher because it gives

immediate feedback from the students and the possibility of interacting at the edge of their knowledge.
- Demonstrations are reduced to a minimum: In many areas from lab work instructions to language pronunciation, basic demonstrations and instructions can be replaced with a video and make room for more interactive teaching.

Student's perspective: Videos may improve students' time management:

- Time and place flexibility: Students can see the videos whenever and wherever it fits into their personal schedule, on a lot of platforms, from smartphones to large screens. In this way, students can optimize their studies. For example it may be possible for a student to travel during the semester and still follow the course. It is generally not recommended to watch learning videos while occupied with other activities, because these videos typically require full attention, but at least it is possible to see a video with full benefit during e.g. transport in trains and busses.
- Media flexibility: Each student can see the video as needed; pause it while taking notes, enlarge it to see details, repeat a section or turn the volume up to hear the words clearly etc. so as to get the most out of the video.
- Freedom of choice: The student can skip parts of a presentation or browse it when the subject matter is already known or irrelevant to the student. This is trickier during regular class.
- Especially in language learning, students' recordings prove very effective for working with pronunciation, spoken language and oral analysis. When students themselves produce audio or video files as part of assignments, they tend to record and adjust their assignment several times before handing it in, thereby going deeper into their learning process.
- Furthermore, by engaging themselves actively in working with these media, students become increasingly aware of the possibilities and limits of the media.

One place where videos are used extensively in teaching is on the open platform MOOCs like Coursera, EdX, Udacity and Khan University where videos make up "the lectures". The videos produced for these platforms are typically of a high technical standard, but this is not always the case - nor is it necessary - in regular university teaching.

A few words about production
The choice of video depends on its purpose. E.g.:

- If it is important that students listen to the narration so as to acquire pronunciation skills or to practice listening skills in language courses,

an audio recording/ podcast may be the most appropriate. Audio recordings mean smaller file sizes than video and may be listened to in some situations of "lower attention activities", like cleaning, cycling etc. Furthermore, the students can focus on listening without being visually disturbed.

- If the purpose is to welcome the students to a course, a webcam recording with the teacher allows the students to see the teacher. This provides a personalizing element, and a low-tech solution such as a webcam recording is often appropriate.
- If the purpose is to solve a mathematical problem, analyze a sentence, demonstrate something visual in 2D or give students oral feedback on written assignments, screencasts (for online visuals) or pencasts (for writing and drawing by hand) are excellently suited.

Videos may be produced on a number of different platforms and devices - computers, tablets, digital cameras and mobile phones. Recordings may be low-tech, created by teachers themselves, or high-tech with support from a professional crew of photographers, graphic designers and video editors. Both types of recordings are relevant for university teaching, as the examples in this article will show.

Traditional video recordings can be produced with a webcam or digital camera. Videos showing what happens on the computer screen (screencasts) and handwritten presentations (pencasts) can be recorded from the computer, the latter also from a tablet or mobile phone. In both cases, the voice is recorded as well as the screen or handwriting. Finally, different kinds of animation are also an option.

Some of the audio files and videos presented in this article are produced with the following software:

- Audio recordings by Audacity or DropVox
- Animations, audio and quizzes by PowerPoint together with iSpring or Adobe Presenter
- Screencasts by Screencast-O-Matic or Jing
- Pencasts by Explain Everything
- Video editing by Audacity, Adobe Premiere and Final Cut

Videos in different contexts and pedagogical design patterns

Some of the courses mentioned in this article have been part of the online and blended learning project described in May et al. 2016 and Jacobsen et al. 2016, where a pedagogical framework of learning design patterns were developed as part of sharing experiences within the project group. Our work with learning design is therefore based on the model and pedagogical basis presented in that article.

As mentioned, videos are categorized as resources, inasmuch as videos per se do not constitute design patterns or pedagogical strategies. However, videos can be a key component in pedagogical models such as flipped classroom. In the University of Copenhagen framework, flipped classroom would be categorized as a meta-pattern (see figure below), being the basis (or one basic component) of a specific design pattern.

The main goal of the exchange of experiences leading up to this article has been to discuss and investigate what makes a good video - good in the sense of being effective for learning, depending on various teaching and learning scenarios. Our presentation is therefore based on experiences in the classroom, and the involved teachers across faculties base their teaching on many different pedagogical models. Only the teachers directly involved in the University of Copenhagen project have been working with the pedagogical design patterns framework.

As described in May et al. 2016, the design pattern framework features the following elements:

- Motivation(s) for applying a given pattern
- Meta-pattern(s) (including learning principles)
- Pedagogical design pattern(s)
    - Description
    - Activities (performed by teachers, tutors and students)
    - Resources (including media and tools)
    - Use cases
- Macro-pattern(s)

It would be easy to group videos according to the kind of tools used to produce them (pencast, screencast, video camera recordings etc.), but it would not say much about the teaching situation they are used in. In the following example of a design pattern described as part of the project, we present a version of the flipped classroom model as applied in the fully online course Classical Greek for beginners at the Faculty of Humanities.

There is much more to the flipped classroom model than just presenting your students with a series of videos. The pedagogical objective is not the videos, but the "flipping" of the learning activities in order to shift the weight in the classroom sessions from instruction to discussion/collaboration and the students' direct interaction with the subject. (Bergman & Sams 2012 and Hachmann & Holmboe 2014). Actually, you can omit videos completely from your learning scenario and still be teaching according to the flipped classroom model.

The aim of flipping the classroom was to avoid instruction and lectures to take up the main part of the time in the classroom. Therefore, the students were

presented with grammar instructions on video beforehand in order to have more time for discussion and text analysis during the online meetings.

Working with the design pattern framework made it very clear that the context surrounding the videos is important (recording a series of videos can be time consuming with the result, that the focus of the teacher can easily end up being solely on the video production and not on designing the whole pedagogical scenario), e.g.:

- The students need activities (quizzes or other types of assignments) to work with the material presented in the videos before class. The video is monological in nature as opposed to classroom instructions with time for questions (Hachmann & Holmboe 2014: 21-22.
- They need a forum for asking questions so as to help each other.
- As part of the online sessions, the students are asked to meet in groups and work on a common assignment before meeting with the teacher (again, this is so as to work actively with the material presented in the videos and to socialize in the online environment).

The design pattern for the part of the online course in Classical Greek that is based on the online version of the flipped classroom can be viewed as follows:
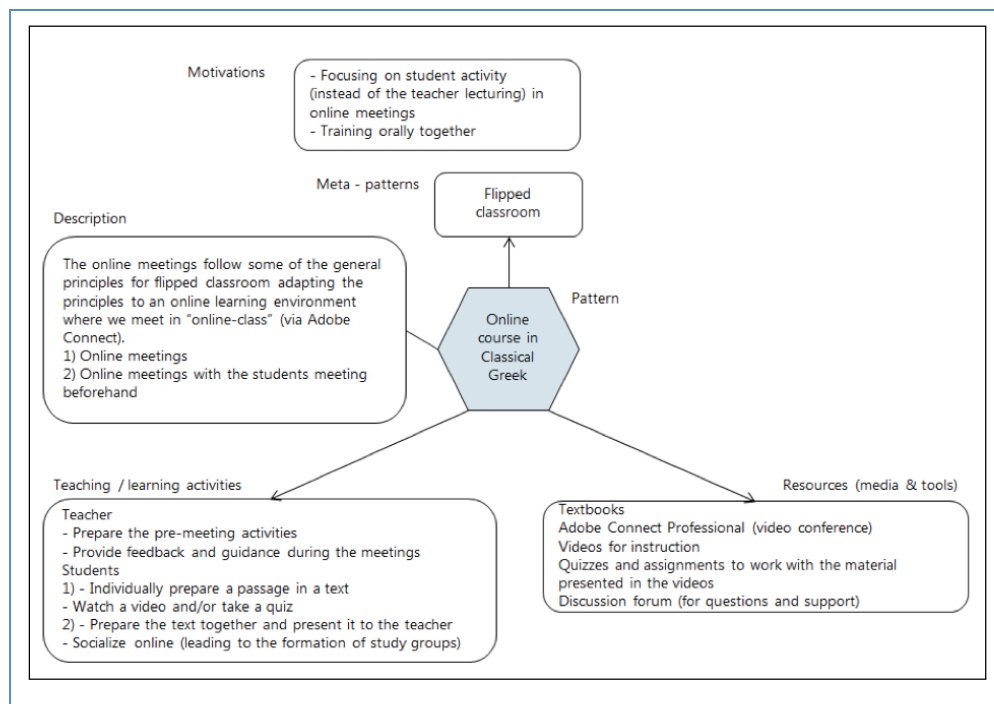
This example shows the importance of designing (and developing, Hachmann & Holmboe 2014: 70-72) the pedagogical context surrounding the video resources. Other contexts and learning scenarios require other pedagogical models and considerations.

As it would be too extensive to present design patterns for all the examples and courses presented in this article, we suggest grouping videos under the following headings that refer to various teaching situations:

Teachers' one-way videos

A. Online lectures

B. Interaction between people

C. Instruction videos

D. Introductions to e.g. coursework and teachers.

Teacher-student interaction videos

E. Feedback on student deliveries and solutions

F. Student productions or deliveries

G. Interactive videos

Overview of videos at The University of Copenhagen

In the following is presented a range of examples of videos produced in various courses across faculties at The University of Copenhagen in order to illustrate the diversity. The examples can be accessed via the links and come with a short description of how they are produced and used. For the main examples a more elaborate description is given. After the presentation, we discuss some characteristics of each heading.

Teachers' one-way videos

A. Online Lectures

- Two plain talking head videos. *In these videos, Martin Ehrensvärd is lecturing about Arabic grammar for the camera in a professional studio (high tech) and about Syriac grammar for an old flip video camera in his office (low tech).*

- Advanced recording and editing in studio. *This video with Jens Juul Holst has advanced animations and is recorded with a film crew for use in a Coursera course, applying teleprompter. High quality, but also expensive to make.*

- Screencast with mouse point and drawing on the text *This lecture by Chresteria Neutzsky-Wulff about Greek morphology is recorded by screencast-o-matic based on a scan of the text that the teacher points to.*

- Powerpoint with voiceover. *This video by Susanne Rosthøj is recorded with the screencast program Camtasia.*

- PowerPoint with voiceover. *This lecture by Chresteria Neutzsky-Wulff with introduction to Greek mythology is a screencast using Jing on a PowerPoint presentation.*

- PowerPoint with voiceover. *This video with Wilma Doedens is based on her PowerPoint slides and she recorded the narration from a manuscript using Adobe Presenter that works from within PowerPoint. It is very simple to do for any teacher*

- Two ways to read a text. *These two lectures by Chresteria Neutzsky-Wulff function as support for pronunciation training made as screencast with Screencast-O-Matic and the other one as a pure audio file.*

    > **Case:** Introductory short lectures recorded as a PowerPoint with voiceover. (screencast). Either professionally produced and publicly available (e.g. an introduction to a concept) or a teacher's own production (e.g. an explanation of a model). These videos serve as an introduction to material to be covered in traditional face-to-face lecture sessions. The videos are produced with the purpose of helping the students prepare for class and to allow for more dynamic lecture sessions as less material need to be presented during the lecture. The introductory videos are used in the course Regression Analysis for Research Year students (described in more detail in May et al. 2016). Among 89 students (in 2015 and 2016, a total of 110 students enrolled), 55% preferred to prepare for class using videos only, 44% preferred a mix of videos and textbooks whereas only one person preferred textbooks only.

B. Interactions between people

- Podcast interview with an expert. Chresteria Neutzsky-Wulff interviews George Hinge (in Danish) about the Greek language.

- Videoconference-based classes in Hebrew, Arabic and Syriac at the Faculty of Theology are recorded - sound only - and shared as mp3 files with course participants. The link is not shared publicly for the sake of students' privacy.

- Live broadcast with polls saved as video. (In Danish). This video with Jørgen Olsen includes voting in Answergarden and 33fewas originally broadcasted and the recording was used as video for review for the students before exam. The production is quite professional and expensive, but similar productions could be made with simple equipment.

- Online interview with expert abroad. In this video the course coordinator interviews Manuel Garcia Goni (in Spain) through Adobe Connect. This format is very easy to use and can be accomplished with free programs, only simple cutting has been done in this video.

C. Instruction videos

- Screencast of software introduction. Presentation by Chresteria Neutzsky-Wulff on how to use the audio recording software Vocaroo using Screencast-O-Matic

- Screencast of software introduction. Presentation by Susanne Rosthøj on how to use a statistical program, using Camtasia for recording.

  > **Case:** Statistical program. In the course Regression Analysis for Research, the introduction to the use of software is now fully online and the students are required to learn how to use the software on their own hand supported by a large number of videos and a few textbooks. Thereby more time is available for discussion of statistical methods in the face-to-face sessions. The videos are recorded using Camtasia. None of the instruction videos used in the course were edited, although several of the videos could benefit from an edit, in particular because the teacher sometimes make errors. However the students find these videos personal and an important part of working with the software is to correct inevitable errors. Furthermore 97% of the students respond that it is not important whether the videos are professional or not - and some even claim that they appear to be professional.

D. Introductions to e.g. course work and teachers.

- Webcam talking head. The teacher Chresteria Neutzsky-Wulff welcoming new students to the online course in Classical Greek, recorded at home with webcam.

- PowerPoint with voiceover. Introduction by Gert Ludeking to course on Shelters in emergencies and teachers

- Semi-advanced recording outdoors. This video with Henrik Bregnhøj is recorded with a cheap GoPro camera outside + a cheap microphone in the smartphone and has been fairly simply edited afterwards.

Teacher-student interaction videos

E. Feedback to student deliveries and solutions

- Screencast in various forms and situations by Chresteria Neutzsky-Wulff:

   o Group feedback, made with Screencast-O-Matic

   o Individual feedback, made with Jing

   o Feedback "on the go" – tips for reading offered during a weekly lesson, pencast on iPad using ExplainEverything

   o Screencast solution to an assignment for self-grading made with Screencast-O-Matic

F. Student productions or deliveries

   o Screencast with drawing and marker. This is an example of a delivery in a Greek course. It is made by the teacher Chresteria Neutzsky-Wulff and similar to what students deliver.

G. Interactive videos

- Safety in chemical fume hoods. This video includes quizzes with auto-answers, produced with iSpring. The videos are professionally produced (expensive), but the inclusion of quizzes among videos or PowerPoint with voiceover is relatively simple.

- PowerPoint with voiceover + integrated quiz. This well-animated PowerPoint with voiceover has built in quiz questions with the use of iSpring. It is made by Camilla Sichlau Bruun with inexpensive tools.

   Case: In the course Veterinary genetics, a lecture on DNA laboratory techniques has been replaced with PowerPoint presentations with voiceover. The motivation for the replacement was to provide a visually more engaging material supporting the stepwise progression of the techniques in a better manner and also to allow the students to review the presentations.

   The various components of the techniques are illustrated with figures/drawings made in PowerPoint and their motions and interactions are illustrated using PowerPoint animations and effect tools. The illustrations are supported by voiceover and a minimum of text.

   At the end a few quiz questions are included.

   In general the students gave very positive feedback. Especially the animations, the possibility to see the presentation again and the quizzes were emphasized as important for their learning.

Types of videos and their didactical application

In this section we will discuss the teaching and learning activities that rely on videos, which types of videos that are used, and the various reasons to choose one type over the other.

A. Online lectures

The main purpose of online lectures is to present some of the course content. Either to give an overview of a topic (allowing details to be studied from readings or other resources) or as an in-depth presentation of a subject. Compared to the classical classroom lecture, the video version is almost always shorter, even if the topic is the same. A special case of this is interactive videos presented in F.

For the online lectures we can distinguish between three main types: Those recorded with a camera including the speaker or teacher, the screencast types, and podcasts. This small video illustrates three fairly cheep types of self-operated online lecture recordings: With inbuilt webcam, screencast and with an inexpensive GoPro camera.

- **Expensive camera recordings:** Especially after the emergence of MOOCs during the last five years, much production of professional looking video lectures has taken place. Most videos are of the talking head type in a studio where either a live mixing technique or post-editing has added headings and figures or slides, sometimes with animations. The attention is more focused when the speaker or teacher looks into the eyes of the viewer or student. Each step in professionalism like writing a manuscript, recording with professional camera with teleprompter, production of professional graphics and animation and professional post-editing adds to the cost, which may add up to around 120€ per minute. But "walk-in" studios (which are expensive to establish) with live-mixing by either the lecturer or a photographer do exist in some universities, and this cuts costs because everything is done during recording. The precise chronological post-editing of animations to follow the narration may support an effective learning according to the dual coding theory (Mayer and Moreno 2002).

- **Inexpensive camera recordings:** Video recordings do not have to be expensive at all, however, if a less professional appearing result is acceptable. This example of a teacher in his office is a plain talking head recording with a basic webcam and costs basically only the time of the lecturer. The focus in the learning is on pronunciation of a language text (that the students have access to elsewhere) and it has been chosen to limit the signals to the attention of the eye contact and

the narration, at the same time giving an informal impression of the teacher in his office.

- **Screencasts:** In a screencast the focus is on the print or graphics or slides and the narration. In some instances a small video of the teacher is included in the corner, perhaps just part of the time, but it is not considered important as in the camera recordings. We show a range of examples from different fields of study that differ in the way they are produced. When using a screencast like Screencast-o-matic, Camtasia or Jing, any action or program or graphic on the screen can be recorded as shown in some examples above where the recorded layer is either PowerPoint, pdf or shifting between PowerPoint and an app. One advantage is that the pointer guided by the mouse is recorded as well, so it is easy to show the viewer what to look at. When it comes to PowerPoint there are a couple of add-on programs, iSpring and Adobe Presenter, that screencast in a special way, adding a list of slides on the side for easy scrolling from slide to slide. A big advantage of using screencasts is also that they are easy to produce and easy to re-record. Some teachers prefer to re-record if they make major mistakes in the narration while others prefer to make quick edits in a video-editing program afterwards. When producing screencasts it is easier to record a prepared manuscript, but since manuscripts take a long time to write, screencasts are usually made without manuscripts.

- **Podcasts:** A less used type is the podcasts. They are particularly useful for teaching pronunciation like in the classical Greek example. Audio alone gives the possibility of concentrating the focus of the students exclusively on hearing the sentences. The students may have to follow a written text while hearing the audio recording and therefore some prefer screencasts instead with the text on the screen while they listen and repeat the words.

B. Interaction between people

Videos where people interact can be used to bring in some more informal feeling or make it possible to include new knowledge through an expert interview. There can be various reasons for recording conversations for use in teaching. Sometimes the motivation is a desire to include knowledge from an outside expert, and a practical way of doing it is as an interview like the podcast with a Greek language expert or like the screencast with an expert abroad through an online communication platform. These experts may not have been able to appear in class and give a lecture, so the interview format, where the expert knows the questions in advance, is a very practical way to harvest knowledge. Another example is a recording of an online meeting or videoconference which becomes a resource for the course, possibly as an mp3 file for easy sharing and listening. The last example shown is also a recording

of an online presentation, with activating elements for the students. In all the cases of interaction between people without a manuscript, it is important to consider the length of the resulting video because particularly when the video contains non-focused talk, the attention of the viewer quickly fades.

C. Instruction videos

Instructions on how to do specific calculations, writing or drawing can be considered a special type of video that is much more detail-oriented than presentation of content. Extensive instructions in the use of software is not effective to do in class or in real time for a group of students, because the instructions are typically very detailed and it is necessary to "do" the instruction while it is being given - which is not feasible for a class. So it is more effective to use a video. Even though many software programs have online screencasts and help pages, some teachers prefer to produce their own videos. The primary reason for this is to direct the instructions towards the specific use in the course and make sure everyone has access to the necessary information. Two examples are shown in this article, from a Greek course and a statistics course. Both of the instruction videos are prepared as screencasts, because this is the obvious tool for that purpose.

D. Introductions to coursework etc.

Administrative types of introductions are used to make sure everyone understands what to do. When students are starting a new course they have a need for an overview and it is more welcoming to present a video rather than just a written description. A video displaying the (friendly) face of the teacher appears better than a screencast. One example is a clean talking head recorded with a webcam directly into the LMS. Another example is recorded outdoors, with fairly cheap equipment, in an environment that is related to the course content. Afterwards simple editing has been made. And the third example is a PowerPoint with voiceover, displaying the teacher with a picture. In another example a teacher made a selfie movie with his smart phone. All of the examples tend to show the teacher in a kind of relaxed way, at home or making funny moves. When it is the welcome-movie the teacher can perform in a more personal way than when presenting course content.

Teacher-student interaction videos

E. Feedback on student deliveries and solutions

When students deliver an assignment, the teacher can give feedback as a video, because it gives an opportunity to explain more in a shorter time. The same may be used in peer assessment. The traditional way of giving feedback to assignment deliveries is to write comments on the delivery or a summary comment, or giving oral feedback. But written comments are often rather brief and oral comments may quickly be forgotten. Feedback given as a video solves

both problems, because it is easy for the teacher to explain things briefly and for students to hear it again. (France & Wheeler 2007, Ribchester et al. 2008, Stannard 2006) The feedback examples cover feedback for various types of deliveries and are of the screencast type where the teacher points in the text of the assignment and draws on the text with the mouse while commenting. It takes a bit of training and the teacher needs to know exactly which comments to make before recording, possibly with the help of a bulleted list.

F. Student productions or deliveries

Students can also deliver videos, e.g. with the purpose of training presentation skills in a more lively format than the traditional written report. And in language education pronunciation training through production of podcasts are excellent. Students are increasingly delivering videos, either so as to practice the format or for a specific reason. One of the places this happens is in connection with coursework where students are doing a large project over several weeks or months. This could also be the bachelor or master's thesis work. Videos are sometimes used to produce a mid-way presentation to get feedback on the progress from the teacher and peers. Students can e.g. produce such videos with one of the screencast tools and upload it to a discussion forum on the course Learning Management System, and then receive feedback in the thread. Another place it is very relevant is in language education. Due to the focus on pronunciation and speaking in language learning, audio files play an important part in students' assignments, especially in an online classroom. These assignments could be handed in as video files as well, but many language students are shy when learning a new language and so audio files seem less intimidating to them. This advantage is even more evident when applied to the students' own training, for example in language learning where the students repeat words or phrases over and over until they are satisfied with the audio- or video recording, gaining much speaking practice during the process.

G. Interactive videos

We will consider interactive videos as a special group; it is typically an online lecture type that is supplemented with active content, typically quizzes, where the student can test their learning. Online quizzes are becoming an increasingly popular part of university teaching. Students are interested in knowing whether they have understood the course content and a practical way to give this option is to provide topical quizzes. And videos with inbuilt quizzes, either during the video or at the end, are also beginning to emerge. Various tools like Storyline, iSpring and Adobe Presenter make it easy to attach quizzes to either videos or PowerPoints with voiceover. We have shown two examples that both embedded in iSpring. One is based on [PowerPoint, where the teacher has developed highly animated slides](). The other is actually [videos that are put into iSpring](), mainly to make use of its

well-developed quiz module. When quizzes are added to a video, the video changes from being a resource to a full learning activity.

Box: Overview, advantages & disadvantages of the different types of audio and video

AUDIO RECORDINGS
- Allow students to focus on the speak
- Shy students might find it easier to make an audio recording instead of a webcam recording

TRADITIONAL VIDEO RECORDINGS WITH A DIGITAL CAMERA
- Personalizing digital surroundings
- Visual focus on the speaker's face and facial expression
- Allowing several persons to be recorded simultaneously
- Can be combined with visual references to texts, PowerPoint presentations etc. (may be live-mixed (advanced) or edited subsequently)
- Studio or camera recordings need to be edited and this delays the distribution to students, and furthermore the editing process is time consuming for the teacher.

TRADITIONAL VIDEO RECORDINGS WITH A WEBCAM
- Personalizing digital surroundings
- Visual focus on the speaker's face and facial expression
- Recording a maximum of 2 persons
- No need for editing after recording - instant distribution via a link to the software server

SCREENCASTS
- Visual focus on the screen (i.e. using the screen as a blackboard including demonstrating software programs, websites and digital resources)
- A webcam recording can be integrated
- May be edited after recording or re-recorded until it is satisfactory, and instant distribution can take place via a link to the software server

PENCASTS
- Visual focus on your handwriting
- Good for subjects which are most easily explained by hand
- No need for editing after recording, instant distribution takes place via a link to the software server

ANIMATIONS

- There is almost nothing that cannot be explained by an animation, but they can be more challenging to produce, depending on the need for complexity

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What makes up a good video

A special study was made in two blended learning courses at The University of Copenhagen, Environmental Management in Europe and Climate Change Impacts, Adaptation and Mitigation, which has a significant amount of online lectures, most of them of the PowerPoint with voiceover type. The following results were taken from students' general feedback. They were asked to comment on the quality and use of the online lectures in the 2015 version of the courses.

- **Seeing the lecturer.** Students like to see "who is talking", meaning there is a preference for seeing the lecturer on the screen, as opposed to only the slides. This format is described as "friendly", "attractive and catching the attention" and is compared to a "regular lecture at the university". It is generally opposing the cognitive load theory, where a talking head would act as a disturbance. Though, in a more recent study by Mayer and DaPra 2012, they find a positive correlation between seeing an animated onscreen agent, acting with human gestures and lip synch and the learning. It is ascribed to a feeling of social partnership in the learner.

- **Personal touch.** Students give positive feedback regarding presentations where they perceive lecturers have added a "personal touch". One student feels that the lecturers are "speaking to a select little crowd and that [he is] one of the lucky few." Giving a short presentation of oneself, along with a "short insight on their topic", as well as "[seeing] the professor standing in the presentation and talking to us" has also been assessed positively, and has therefore been thematically grouped along with the "personal touch" theme. It has some relation to Mayer, who demonstrates the positive effect of "personalization", as a much more limited principle of presenting in a conversational style (Mayer 2008).

- **Content.** Good content is obviously at the heart of a successfully attractive presentation. Therefore the lecturer's presentation of the content within the slideshow must be interesting and easily digestible. Good presentation skills cannot compensate for "too little content". Students negatively assessed when "each slide [looked] like the last one" as "endlessly boring". They expressed interest in lecturers "[illustrating] each [theoretical] part with an easy example" when course material contained " a lot of theory". When high-level topics are covered, in which the "density of information was very high", one student requested "some learning resources/references that would have explained some concepts at a more general level, e.g. textbook chapters" as supplementation to the presentation. However, students also notably "appreciate [the presentations] being short". Supplemental reading material is not the focus in this paper, but this

feedback suggests certain limitations of audio/video presentations in concisely presenting high-level, theoretical material.

- **Ease of following.** Students described presentations which were "easy to follow" as "excellent". This theme has been grouped together with some practical elements of the presentation. Having the presentations available for indefinitely repeatable listening, however, was assessed positively. Students stated that they "love the audio presentations, and especially that you can always go back and hear them again", as well as expressing being "very pleased with the video lectures, where you can pause, re-watch etc." This feedback suggests a strong practical advantage of audio/video lectures online because they can be followed in a customizable way, giving students the option of re-listening or re-watching if they like. Furthermore, students mentioned a desire for "paper" material to follow along with, including "learning resources/references that would have explained some concepts at a more general level, e.g. textbook chapters", as well as a "PDF copy of every video presentation". Finally, one student says that she "[appreciates the presentations] being short", suggesting that a concise presentation of the material is valued.

- **Audio quality.** Poor audio quality is extremely evident to students, as evidenced by nearly unprecedented level of student feedback about poor audio quality in one particular lesson. Students are perhaps quite accustomed to good sound quality in the media they interact with on a daily basis (YouTube, Vimeo, television, radio), as well as relatively good sound quality on other presentations in the same course, which makes one instance of poor audio quality stand out especially. Students specifically mention that "proper microphones" should be used, and that the "microphone quality changes a lot", implying that consistency in the audio recording equipment being used is important, as inconsistencies are very obvious and distracting ("makes it hard to listen to them", "really annoying to listen to!", "almost impossible to hear what the speaker is saying", "really annoying..."). Evident background noise, characterized by "a very annoying 'humming'" is described as "distracting".

Though some of the themes mentioned by the students refer to some of Mayer's principles, they also differ in being more practical, like proper content, ability to re-hear parts of the presentation and the audio quality. One thing that seems to be relevant is the "personalization" of the teacher in a broader sense than Mayer's conversational style (Mayer 2008). The videos included in this paper fit in general with Mayer's principles, though not in all details. Some are simply of the talking head type like in teaching Syriac grammar, with no graphics at all. Some quite

loaded slides for statistics teaching and many of the screencasts use the mouse pointer for creating attention to certain parts of the graphics rather than highlighting the important parts. And still the presentations are very popular and presumably effective for the learning.

Production of videos is often taken up by the teachers with small or no extra funding or time allocation, and they speak the audio themselves, often without a script. Teachers tend to use the technology and tools they know of, prefer and have at hand. Therefore the productions are at the same time simple and also reflect the personality of the teacher. The videos thus reflect the teachers as they are known to the students from class or through several online sessions, and not like they would appear on a highly well-produced studio recording. Based on the feedback above on "seeing the lecturer" and "personal touch", we suggest that a broad sense of "Personalization" may have a positive effect on the interest in watching and presumably also on the learning outcome.

Conclusions

Use and production of videos is on the rise in university teaching, not as a structuring content, but rather as a resource. Videos are particularly highly adopted in flipped classroom-type courses, but not only as overview lectures. They are used in different situations, both by teachers and learners and as an interactive tool. We have suggested a way to group the various kinds of videos in terms of its purpose and relevance to the learning design. The videos presented in this paper are of many different formats from podcasts to PowerPoints with voiceover to professionally produced videos and interactive videos. All types of videos can be produced by teachers themselves, with a minor introduction to principles and software. Even though the videos presented generally follow current principles for good videos the results are quite different in their appearance. The personal touch of the teacher appears to be an important element for students.

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APPENDIX: Course examples from the OBL project

Video and audio podcasts in Hebrew, Arabic, and Qur'an courses in a Scandinavian, joint programme (fællesuddannelses) setting.

The Religious Roots of Europe is an MA programme offered by five Nordic universities together - Copenhagen, Aarhus, Lund, Oslo, Helsinki. The Faculty of Theology in Copenhagen is responsible for Hebrew, Arabic and Qur'an courses, and VC is a crucial tool in the teaching. One week pr. semester is a face-to-face teaching week, and the rest of the semester has to rely solely on online learning.

For several years, the classes proceeded as video or audio conference classes, but in 2013, we produced a set of videos to cover all grammar lectures for Biblical Hebrew and Qur'an Arabic, 16 and 23 respectively. They are found on YouTube, and for convenience, we have gathered the videos (and textbook materials) here:

http://ehrensvard.dk/?Hebrew

and here:

http://ehrensvard.dk/?Arabic

Note that the pages load slowly because of the many embedded YouTube videos.

The Hebrew and Arabic courses have run in the flipped classroom style since then, to the great benefit of the students. They now watch the lecture before class and can put the teacher on hold during lectures, and they can always access the core content of the course. They know that when they master the subject matter given in the videos, they can very comfortably pass the exam - and read the Qur'an in Arabic or the Bible in Hebrew with the help of the online tools here: http://corpus.quran.com/wordbyword.jsp

and

http://biblehub.com/text/genesis/1-1.htm.

The videos work surprisingly well. As teachers we are struck by how much less we have to repeat ourselves, and how much time is freed to interact with students rather than lecture. A further help to students is that the classes are

audio recorded and uploaded to kiwi6.com, so that students that were present can revisit them, and making it easier for absent students to catch up.

We have also produced audio recordings of the teacher reading textbook texts in Arabic and Hebrew, helping the students read and pronounce these difficult languages.

Video and audio podcasts in Arabic courses in a Nigerian setting

Recently we taught the Arabic course in a very different setting, the Theological College of Northern Nigeria. The course ran as an intensive face-to-face course over three weeks, with twelve deeply engaged students completing the course. Our intention was to make full use of the flipped classroom, but this was made difficult by the scarcity of electric power. Some students had devices with enough battery life to watch videos and listen to audio files between classes, but many did not. The ones that did, got the expected benefits. But in the end, the teacher used part of the daily classes to playback the videos for the students. In this way, the teacher got a break from teaching all the time, and the students got a recap of the grammar by way of another medium. This turned out quite well.

A Beginner's Course in Classical Greek

The course in Classical Greek is primarily a language course for beginners with elements of culture, the learning outcome being reading skills and grammatical analysis. It is a 30 (3x10) ECTS course over three terms (level 1-3) offered by SAXO Institute at the Faculty of Humanities, University of Copenhagen. During the course, the students advance from learning the Greek alphabet to reading original texts such as Plato and Homer.

There's a lot of rote learning and training involved in the course. Learning a set of basic forms and a basic vocabulary by heart makes the students able to navigate through the text in an easier way. The philological method is learned by extensive training of the basic principles.

The course has a very steep learning curve, and the students have an urgent need for scaffolding and high-guidance. They also have a strong need for oral dialogue about and immediate feedback on their work.

Each level consists of 14 lessons over a period of 14 weeks combined with 2 half day seminars at The University of Copenhagen. The students hand in one written and/or oral assignment per week followed by feedback (in different forms) from the teacher. The written communication between teacher and students is supplemented by one online meeting every three weeks (Neutzsky-Wulff (2009), Neutzsky-Wulff (2010)).

Especially at level 1 (described in this article) the students need high guidance learning consisting of rote learning and training as well as an ongoing dialogue

with immediate feedback on their activities from the teacher and fellow students.

Therefore, in the OBL project, concerning the use of videos, we have tried to:

- Support method training at level 1 by breaking the weekly lessons into small training steps with a high level of guidance, showing the students how to analyze a text step by step. This includes instruction videos, quizzes and other forms of exercises with automated feedback.
- Improve feedback on written assignments by experimenting with video based feedback, individual as well as group feedback.
- Improve oral training by creating oral assignments for the students at level 1 and 2 (pronunciation, translation and grammatical text analysis).
- Flip the classroom in the online meeting sessions by using instruction videos, quizzes and text-based assignments to activate the students prior to the meeting and strengthen their basis for entering into the dialogue at the meeting.

This design patterns for the course are described in May et al. (2016). Three patterns are relevant in this context:

Individual step-by-step E-lessons (level 1)

The E-lessons support the students' work with the weekly assignments and the method by breaking the work into smaller steps. Every step consists of an introduction (written, oral or on video) and a number of activities. To guide the students, some of the activities have automated feedback, e.g. the quizzes, while other activities are graded/reviewed by the teacher, e.g. the weekly assignments. Every E-lesson is initiated with a synchronous chat session.

Reflective feedback activities

Instead of just providing written feedback on the written and oral assignments, we are developing a variety of ways to provide feedback adapting the feedback to the situation and needs of the students. According to John Hattie, in every feedback situation, the student should be able to answer the following three questions:

- Where am I going?
- How am I going?
- Where to next?

Examples of video-based feedback activities

Feedback leading up to handing in the assignments:

- Grading assignments half-way (providing feedback on the learning process)

Individual or group feedback on the assignments:

- Screencast comments
- Oral comments (audio only)
- Written indicative solutions – can be combined with videos and quizzes

Activities to support (self-)reflection and dialogue:

- Screencast videos, by which the students grade their own assignment, followed by reflections posted in the discussion forum

<u>Flipped classroom online</u>

The online meetings follow some of the general principles for flipped classroom adapting the principles to an online learning environment where we meet in "online-class" (via video conference).

1) Online meetings

2) Online meetings with the students meeting beforehand

Teacher:

- Prepare the pre-meeting activities
- Provide feedback and guidance during the meetings

Students:

1)

- Individually prepare a passage in a text
- Watch a video and/or take a quiz

2)

- Prepare a passage in the text together and present it to the teacher
- Socialize online (hopefully leading to the formation of study groups)

Regression Analysis for Research Year Students

Regression Analysis for Research Year Students is an intensive course for medical research year students. Besides being taught biostatistical methods, the students are introduced to a command-based statistical software program. The course consists of six weekly traditional classroom sessions, each session containing three lectures followed by three hours of computer labs. Becoming familiar with the statistical methods and the statistical software program requires training, and in particular rote

learning is needed to learn the technical programming details of using the statistical software. Specific challenges teaching this course are that students often do not prepare sufficiently for the lectures. As part of this project we have tried to use a wide range of online tools to aid the students with their work:

- Facilitating the students' preparation for the classroom sessions by being specific on and preparing their preparation (elements from flipped classroom).
- Supporting the training of the use of statistical methods and programming between teaching sessions with a range of homemade and professional videos that covers all subjects. The students are carefully guided through the activities as these are broken into small steps with a high level of guidance. Frequent and immediate feedback are given using online quizzes supplemented by online chat fora.

To pass the course the students have to complete at least 80% of the weekly training activities as well as a group based written report with a low level of guidance. The teaching structure is described in more detail in (Rosthøj, 2014).

Veterinary Genetics

Veterinary genetics is a compulsory 7.5 ECTS course in the first year of the veterinary medicine study program. The number of students is approximately 180. The core of the course consists of lectures and theoretical exercises and during the last couple of years various e-learning activities have been developed according to specific needs to improve the teaching material and to support the students' learning and understanding of difficult topics in a better way.

This year a three hours lecture on laboratory techniques has been replaced by online PowerPoint presentations with speak. The online presentations are anchored in the physical course by a short follow-up lecture to add perspectives, applications and to discuss questions.

The students used to find the techniques difficult to comprehend. One reason could be that they do not have any practical experience with laboratory work. Another reason could be the lack of suitable illustrations in the original lecture.

The online presentations are based on custom made figures and animations, which have been time consuming to produce. They are, however, central in terms of illustrating the dynamics and interactions of the elements of the techniques. Moreover, the level of details etc. is specifically tailored to these students' level and intended learning outcomes.

The quizzes in the end of each presentation help underlining the intended learning outcomes, give the students the opportunity to test their learning and provide some degree of interaction.

In a brief survey the students were asked to rate their learning outcome and to comment on the presentations:

- 37% responded
- 90 % rated their learning outcome "big" or "very big"
- 10% rated their learning outcome "ok"

The presentations were also evaluated at the end of the course. In general the students gave very positive feedback. Some representative comments were:

- "Nice and simple animations"
- "Great illustrations, easy to understand, well formulated and clear cut"
- "The quizzes are a great idea – they made me reflect on what I had just heard"
- "I really liked that I could see the presentations more than once"
- "The best thing was the online presentations – it has been a huge help to go through them before exam for a better understanding"

Several students also suggested additional online presentations to support their learning of other complex topics.

EME & CCIAM

1. *Environmental Management in Europe/Climate Change Impacts, Adaptation and Mitigation*

In accordance with the OBL project objectives, Inez Harker-Schuch and Marin Lysak at the Faculty of Science, will work on developing e-learning for the existing courses they coordinate: Environmental Management in Europe (EME) and Climate Change Impacts, Adaptation and Mitigation (CCIAM), respectively.

The aim of the EME course is to provide a solid understanding of how environmental management in Europe is applied at different scales, from the EU level to the national, regional and local levels. Focus is on environmental management of soil, water, air and biodiversity.

The focus of the CCIAM course is climate change impacts and the human response to climate change, including efforts to adapt to climate change, as well as efforts to avoid or reduce the negative impacts of climate change.

Podcasts and videos allow students to experience distance learning environments, teachers from far-off places, high-risk experiments or locations or, simply, to record a particularly poignant or meaningful lecture or event.

Options for creating podcasts and videos in the EME and CCIAM courses include:

1. Audio feedback to assignments

2. Use of new platform for weekly online meetings

3. Streamlining e-sibling report each week with a template