# The effective use of video in higher education

**Zac Woolfitt**
**Lectoraat Teaching, Learning and Technology**
**Inholland University of Applied Sciences**
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# 1 Introduction and Context

## 1.1 Introduction

The Inholland research group (lectoraat) Teaching, Learning & Technology[1] conduct research into the relationship between, teaching, learning and technology and the on-going developments in this area. As part of this research the group are focusing on the use of video in higher education. The following document presents an overview of this subject by drawing on a number of literature and sources indicating an overview of what is already known, and which areas require further research.

According to Siemens, Gašević, & Dawson (2015) 'Education technology has gone through three distinct generations of development and now a fourth is emerging'. This fourth generation includes 'distributed and digitally shaped technologies: adaptive learning, distributed infrastructures and competency models'. Greater emphasis will be placed on 'the process of 'stitching' together distributed interactions' with learners who control their preferred toolsets (p. 206). Video in education is one element of those 'distributed interactions' and the role that video plays within education, and how that role develops will be explored further.

Technology ranges from 'the basic notion of tools, to systems which employ or exploit technologies.' (p. 196) and Higher Education needs to find ways to use tools in groups, and connections between tools, to create systems (Bates, 2015). In spite of the prevalence of technology, Bates states that 'the key component is the intervention of the teacher' (p. 198).

Video is defined here as digitally recorded content that has sound and motion that can be stored or delivered live, and can be streamed to a variety of devices. It may or may not have the lecturer visible and can include an animated film, or a demonstration.

The main question to be examined is:

**What do we know about the effective use of video in higher education?**

Chapter 3 below covers the central question in more detail.

### 1.1.1 Increased use of video in Higher Education

Johnson et al. (2014) provide an overview of current short-term and long-term trends regarding how technology is affecting Higher Education and consider the integration of online, hybrid and collaborative learning to be a fast trend, driving changes in Higher Education over the next one to two years. The increased use of video as a teaching medium is encroaching onto traditional face-to-face teaching in Higher Education. This affects lecturers, students, Universities and Colleges and there is a need to bridge the gap in digital competencies (Jacobs, 2013).

## 1.2 The learning process in context

The learning process can be described as a dialogue (iterative conversation) between the lecturer and the student, that takes place at a conceptual and applied level (Fransen, 2015; Laurillard, 2002). For a detailed discussion and analysis of the learning process, technology impacting education and social and educational developments, see (Fransen, 2015).

[1] http://www.inholland.nl/onderzoek/Lectoraten/eLearning/

Bransford, Brown, & Cocking (2000) discuss video use in the classroom and the importance of interactivity in helping students to learn by being able to re-visit and review the material. They emphasise the potential of technology to help learning, but only if it is used properly. De Boer (2013) places the use of video in education in the following context:

> The emergence of digital networks, like the internet, disconnected video-watching from a set time because the video can be watched at any time. It has also led to disconnecting the lesson, in some sense, from a set place (i.e. the classroom): the video can be watched on any computer connected to the internet. (p. 17)

This 'disconnecting' of the physical classroom, the lecturer and the students is one important consequence of technology and video, which is having an impact on the learning process within Higher Education. Siemens et al. (2015) refer to this as 'thinning of classroom walls where learners are now able to use a range of technologies and interactions with learners and content around the world (p. 205). In turn this has led to opportunities outside the classroom with the emergence of MOOCs (Baggaley, 2014; Fox, 2013) and is leading to a transformation in the educational landscape (Bates, 2015).

## 1.3 Video in context

Video usage currently dominates internet bandwidth. According to Cisco[2] 'Globally, total Internet video traffic (business and consumer, combined) will be 77% of all Internet traffic in 2019, up from 59% in 2014.' High quality video can be streamed quickly into mobile devices in an educational context. While it took 12.5 minutes to download a song on-line in 2002, as of 2014 it only took 18 seconds[3]. When YouTube report that '300 hours of video are uploaded to YouTube every minute'[4] this astonishing statistic barely raises an eyebrow. The increasing prevalence of video in daily life is reflected in the educational environment.

Continuing technological developments enable video to be accessible more easily, faster, and across multiple platforms and devices. It can be viewed on multiple (student owned) devices, in multiple formats (before, during, and after class). Within Higher Education, the increasing prevalence of technology is driving the viability and availability of online teaching and the open academic resources, and video is playing a role in facilitating these developments (Bates, 2015; van den Brink et al., 2014). Greenberg & Zanetis (2012) state that:

> Education is undergoing a major shift, as brick-and-mortar classrooms are opening up to rich media content, subject matter experts, and to one another. This shift has been influenced largely by technological and pedagogical trends, greater worldwide access to the Internet, an explosion of mobile phone users, and the appreciation for these technologies by young people, as well as by teachers. Video appears poised to be a major contributor to the shift in the educational landscape, acting as a powerful agent that adds value and enhances the quality of the learning experience (p. 4).

In their second annual survey into video in education, Kaltura state that in 2015 video is 'undeniably a hot topic' and that:

[2] http://www.cisco.com/web/solutions/sp/vni/vni_forecast_highlights/index.html
[3] http://www.themainstreetanalyst.com/2012/08/22/the-growth-of-the-internet-over-the-past-10-years-infographic/
[4] http://www.youtube.com/yt/press/statistics.html

> 'Video is permeating our educational institutions, transforming the way we teach, learn, study, communicate, and work. Harnessing the power of video to achieve improved outcomes—for example, a better grade in exams/assignments or more effective knowledge transfer—is becoming an essential skill. A key pillar in the drive towards improved digital literacy, video brings considerable benefits to educational institutions: streamlined admissions, increased retention, and improved learning outcomes.'

The revolutionary impact of video has been pronounced in the past on many occasions (De Vera & McDonnell, 1985) but according to one of the educational video software manufacturers Sonicfoundry, the use of video as a teaching device in College and University campuses has reached a 'tipping point', the point when a new technology 'is pushed over the edge from popular to pervasive' (Sonicfoundry, 2013, p. 1).

In 1989, librarians were already questioning how to deal with the 'video revolution' and the challenges of accessing and storing the increased amount of video material available to the public (Pitman, 1989). Videomaker magazine gives an overview of the technical developments of video equipment, from the development of the first video cassette by Sony in 1964, to the latest portable devices of today[5]. The overall pattern with the development of video is one of increasing technical specifications, greater quality, higher speed, lighter equipment and increased flexibility of production.

As the availability of video continues to increase, the impact within the classroom continues and it is affecting the educational process and changing education.

### 1.3.1 Educational video – from cassette to DVD to streaming

Video has changed dramatically over the years. When the format of video was a physical video cassette, video viewing was restricted by the physical copy of a the cassette (Pitman, 1989). A lecturer could borrow a video from the library and play it to the class via a television. This required planning, ensuring adequate equipment was available, and had certain technological challenges ensuring sound quality and visibility of the image. A general timeline for video technology in the classroom is presented by SURFnet/Kennisnet (2011, p.5). The timeline below is is adapted from Greenberg & Zanetis (2012). Web lectures and screencasts have been added along with live lecture capture. What the 2020s will hold for video technology in the classroom is yet to be seen.

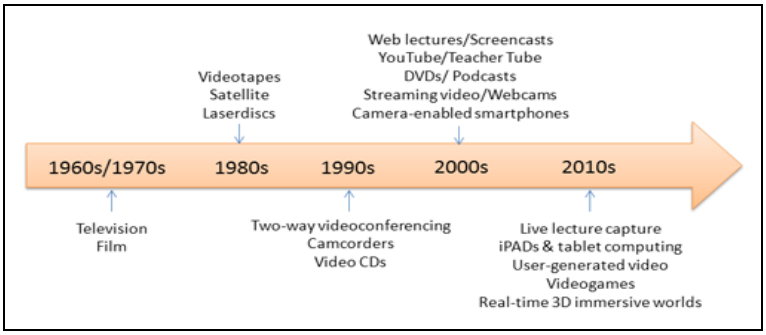


*Figure 1* **Time line of educational video technology (party based on Greenberg & Zanetis, 2012)**

The process of showing a video within an educational context has become simpler; by including a hyper link to a video in course material, a lecturer can easily share video content. However, within many online course, the production of video remains a major cost (Hansch et al., 2015). Aspects that

[5] http://www.videomaker.com/videonews/2011/10/history-of-video-now-and-then

can make the production of video less expensive[6] will enable its use in Higher Education to continue growing (Bakel & Groot Kormelink, 2011; Panopto, 2014; Sonicfoundry, 2013). The rapid rise of the Khan Academy[7] illustrates how 'homemade' instructional videos can fill a specific teaching need for students. At the Khan Academy, more than 2,000 videos are accessed around the world more than 100,000 times per day. The website has been translated into 23 languages and the videos into 65[8].

### 1.3.2 Now anyone can make and share a video

Within the last ten years the production of video has gone from a small group of experts, to the general masses. It has become possible for anyone with a mobile phone to make a video recording. In the past, this process required expert technicians with specific knowledge, and access to expensive specialist video equipment, processing and streaming files. Now, mobile devices, from smart phones, digital device, iPads and digital cameras have the standard option of recording video at an ever-increasing quality. Recorded video files can be instantly uploaded via Wifi to social media and to servers in the cloud.

Some American Universities (such as Penn State[9]) have developed 'video boxes' which enable 'self-service video recording'. A lecturer or student simply needs to plug in their USB, and can make an instant video recording with their slides; the complex technical issues such as audio quality, lighting and uploading to a server all happen seamlessly out of view. They have seen an increase from 80 students a year making recordings, to 4,500 a semester 'because the studio is so easy to use; there is virtually no training needed.'

Whether we like it or not, we have entered a new stage in the 'video age' in which everything can be instantly filmed including students recording their own classes (Reece, 2013; Winterbottom, 2007). An example of the ease of recording and sharing information is the application *Lecture Monkey*[10] 'the future of lecture note taking'. Once downloaded, this application turns student's iPhones into lecture capture cameras so their classes and lecture content can be instantly uploaded to shared files available to class mates and other students in searchable indexes. 'Students collaborate on note taking by collectively tweeting comments during class, or in a quick editing session later. Comments are collected, shared and made a natural part of the flow of the lecture'. While *LectureMonkey* states that students should always check their institution's rules regarding recording and sharing lecture content, it is not clear whether these protocols are always followed. Within this context, videoed lecture content can be made by students in various formats and shared through digital networks.

## 1.4 Video is impacting Higher Education and education is changing

Within this context, video as a medium continues to have an on-going impact on higher education, on the role of the student, challenging the (traditional) role of the lecturer and the format of delivering course content via a lecture. Many lecturers lack adequate knowledge, support, guidance and training to integrate this technology into their teaching, either at a practical, technical level, or at a didactic, teaching level (Stover & Veres, 2013). Lecturers may not be convinced of potential benefits, may be afraid of this new technology, or see no need to adapt (Reece, 2013). The possibilities offered by new technology can appear overwhelming, challenging and unsettling to traditional teaching. However, technology has a habit of promising much, but without always delivering[11]. Without help, traditional teaching approaches may not be maximizing the technological possibilities. There is often limited structured support offered for lecturers to develop in this context,

[6] http://www.21edingen.nl/eding-8-weblectures/

[7] http://www.ted.com/talks/salman_khan_let_s_use_video_to_reinvent_education

[8] https://en.wikipedia.org/wiki/Khan_Academy

[9] http://campustechnology.com/articles/2015/07/23/making-an-impact-with-self-service-video-recording.aspx

[10] http://www.lecturemonkey.com/

[11] http://www.bbc.com/future/story/20140110-technologys-greatest-myth

it mostly happens in an informal, ad-hoc manner and without an adequate theoretical foundation (Mishra & Koehler, 2006). However, according to Hansch et al. (2015) 'the use of video in [online learning] has come to be taken for granted, despite a relative lack of evidence as to video's effectiveness for learning' (p. 1).

### 1.4.1 Video availability challenges the traditional role of lecturers in Higher Education

The increased presence of video impacts the traditional teaching environment within Higher Education. While some lecturers may be embracing this (Greenberg & Zanetis, 2012), there are still lecturers who do not yet have the skills, experience, confidence, understanding or expertise to teach effectively with and through video. Teachers may not even necessarily see recording lecture content as part of their job (Beaudoin, 2014) or that they should have (parts of) their teaching available via video. Teaching 'into camera' requires an adjustment of established teaching practices and developing a new set of teaching skills (Guo, Kim, & Rubin, 2014). Kereluik et al. (2013) refer to the 'sometimes ambiguous impact of technology and globalization on teaching and learning' (p.131). This ambiguity puts pressure on the traditional teaching formats in Higher Education. Preston et al. (2010) found a need for lecturers to be 'more reflective in examining their own roles and the roles of [traditional] lectures in light of the changing needs of students' (p. 725). Lecturers also need to make decisions about the role of technology as well as managing student expectations by explaining to students the specific role of technology in the educational context. Bassili (2008) explains the importance of considering whether instructional technology adds value to the learning process and its experience by students. Using technology simply because it is available does not necessarily lead to effective teaching outcomes.

'The introduction of digital technologies has changed the methods and techniques of acquiring, representing, and manipulating knowledge in almost all disciplines, from mathematics to music, astronomy, and archaeology' (Kereluik, Fahnoe, & Karr, 2013, p. 132). Levy (as cited in Jacobs, 2013, p. 47) states 'it is a characteristic of labour markets that technology can change the nature of work faster than people can change their skills'. Lecturers need support to develop their skills and their role as lecturer. And students need to be supported in learning how to learn with technology.

### 1.4.2 Effectiveness of the classical lecture format

Within this changing technological landscape, questions continue to be raised regarding the traditional teaching formats within Higher Education. The classical lesson format in Higher Education has traditionally been based on the lecture, the one-to-many transmission of information. Having considered the 800 years of University tradition, Laurillard (2002, p. 93) asks 'Why aren't lectures scrapped as a teaching method?' and states that from the perspective of individual learning, 'the lecture is considered a grossly inefficient way of engaging with academic knowledge' (pp. 93-94). Preston et al. (2010) report the discussion on declining lecture attendance and Day (2008) questions the effectiveness of lectures. Preston et al. (2010) found a need for lecturers to be 'more reflective in examining their own roles and the roles of lectures in light of the changing needs of students' (p. 725). There is also a need to make decisions about the role of technology as well as managing student expectations and explaining to students what the specific role of technology is in the learning environment. Today's University lecturers may find themselves in a battle to 'entertain' the student (audience), in an effort to engage the students. Not all lecturers have the 'performance skills' to hold the audience as the 'sage on the stage' and many Higher Education institutions are transitioning into forms of 'blended learning' in which the course content is delivered in person and via other media (Allen & Seaman, 2014; Bates, 2015; Fransen, 2006a). This has resulted in some cases in the transition of the lecturing role from 'sage on the stage' to the 'guide on the side', a more consultative role within an interactive classroom.

It remains a challenge for lecturers to compete with the attractions of the instant online community of social contacts that students can access via their mobile devices[12]. 'The expanding horizon of learning possibilities that has opened up in response to this mixture of influences is both exciting and daunting, adding new dimensions to thinking about core educational purposes in [Higher Education]' (Healey, 2013, p. 7). Higher Education institutions and a generation of lecturers face the threat of falling behind and not adjusting quickly enough to this new environment, being reactive rather than proactive. Being able to use video effectively as a teaching medium can be considered an aspect of digital literacy (Jacobs, 2013) and an important teaching skill. Failure to develop proficiency and understanding of these technologies could impact future career development. Some lecturers may experience a problem as they find their teaching skills and digital literacy are not up to date in the new teaching environment (Johnson et al., 2014). Universities and Colleges find their hand is forced by the incessant trend of video. If they do not embrace video as part of their didactic approach they could face lack of competiveness in relation to other institutions that do offer this. Online formats such as live streaming of classes, searchable web lectures and Massive Open Online Courses (MOOCs) also threaten the traditional format of education (Fox, 2013) though their long term impact is still a matter of much discussion (Baggaley, 2014). Questions remain about whether video is the most effective format for delivering content (Hansch et al., 2015).

This chapter has examined the historical developments in (video) technology that are impacting the traditional teaching process within higher education. This creates pressure on teaching staff and the organisation to remain current and competitive within this fast-changing environment. The challenge remains how to use technology to remain relevant and contemporary for the new generation of students while engaging them in a learning process that involves an interactive dialogue. The main question and sub questions are outlined in the next chapter.

[12] http://news.unl.edu/newsrooms/unltoday/article/unl-study-shows-students-play-with-phones-in-class-a-lot/

# 2 Main question

**What do we know about the effective use of video in higher education?**

This question contains certain constructs that requires further definition in order to clarify what the key elements of the research subject are.

Firstly, the concept of the effective use of video needs to be examined in order to explore the criteria that impact the effectiveness of a video. Video has certain functions that can enhance the learning experience. What are the features of video that enable it to be effective as part of the learning process.

Secondly, effectiveness can be seen as the extent to which the video is deployed to most didactic effect. The video that is produced can be considered effective if it is connected to the learning goals of the course and is constructively aligned with the course content. This aspect relates to specific features of the video, the type, length, content and how effective this is in conveying the specific intended message or learning goals. How is the video embedded into the didactic structure of the course and how effectively is it employed? Does it leverage its full potential, or is it an expensively produced set of segments that are not viewed by the students and adds no value to the course? A video could be beautifully produced but if it is not deployed in the course effectively it may not maximise its full potential to support the learning process.

Thirdly, there is the actual learning effect which is dependent on the individual learner within their specific context; this includes specific strategies adopted to learn effectively from video.

Finally, the focus is specified as higher education, but consideration is also made of on line courses, as part of continuing professionalization in the form of MOOCs, on line seminars and life-long learning.

In order to answer this question, the following areas need to be examined:

- The context in which learning is taking place within Higher Education.
- Various definitions of video, and ways of categorising and presenting these different types.
- 'Video learning' from the perspective of the student
- Teaching 'with' and 'through' video from the perspective of the lecturer and the educational institution
- Approaches to didactically embedding and integrating video into a course that results in effective learning.
- The process and support needed by the (traditional) lecturer to create and deploy various types of video content.

These areas have led to the forming of the following sub questions:

- Sub question 1: What are the different types of video within Higher Education?
- Sub question 2: What do we know about effective learning through video?
- Sub question 3: What do we know about effective teaching with and through video?
- Sub question 4: What does the literature tell us about effective didactic implementation of video in higher education?

Having defined the main question and sub question, the next section examines the nature of video as a medium with its specific qualities. An overview of different types of video and the various characteristics of each type is presented in the next section.

# 3 A typology of video

## 3.1 Classifying the different forms of video

Before the question of effective use of video in higher education can be examined, video and its various features, characteristics and types need to be described. Video is being used in teaching in many different ways, from lecture capture (Filius & Lam, 2009) to peer feedback on video streaming (Swager, 2008). This is a continually evolving field and defining and mapping the various video forms is an on-going process. It remains challenging to arrive at a clear overview of the subject. The next section presents a number of different approaches to defining, arranging and organising the various types of educational video.

### 3.1.1 Laurillard's conversational framework

Laurillard (2002) suggests that any classification of educational media should be done 'in terms of the extent to which they support the interpersonal and internal dialogue' (p. 83) and comments further that attempts to classify the various types of media in education have not been useful or very illuminating since most media were developed outside education and not specifically for educational purposes. Any attempt to classify the various media should take its starting point from the perspective of the pedagogical ideal, rather than from stating what there is (Laurillard, 2002). Laurillard questions the extent to which video can be interactive stating that at best video can be 'active'. To be effective, and in order to engage in the dialogue, video needs to be integrated into the learning process.

### 3.1.2 Koumis' Potent Pedagogic Video

Koumi (2014) presents a division of the specific pedagogic roles of video[13] for 'techniques and teaching functions for which video is outstandingly capable' which is due to video's 'rich presentational attributes [which] can result in learning facilitation'. The functions are allocated into four domains: Cognitive, Experiential, Affective and Skills and a link is made to a revised version of Bloom's Cognitive Learning Taxonomy. In total, 33 specific qualities of video in teaching are identified, including the different options this provides for both teaching and learning. This framework is helpful for understanding the many specific ways that video can be used to illustrate various types of information.

### 3.1.3 Affordances of Video and a Typology of Video production styles

Hansch et al. (2015) analysed the video components in a variety of MOOC courses and interviewed the instructional designers. Their analysis led to video types based on what they refer to as the 'different affordances of Video' and list nine features that include:

- Building Rapport
- Virtual field trips
- Manipulating time and space
- Telling stories
- Motivating learners
- Historical footage
- Demonstrations
- Visual juxtaposition
- Multimedia presentation

[13] http://association.media-and-learning.eu/portal/resource/potent-pedagogic-roles-video


*Figure 2* **Affordances of Video (Hansch, 2015, p.12)**

Hansch et al. (2015) also provide a catalogue of video production styles 'as a method of providing a current overview of the field'. Their division is based on what they refer to as the production style's 'different affordances of learning'. The production styles they define can also be combined in various forms. They list the following 18 production styles:

- Talking Head
- Presentation Slides with Voice-Over
- Picture-in-Picture
- Text-Overlay
- Khan-Style Tablet Capture
- Udacity Style Tablet Capture
- Actual Paper/Whiteboard
- Screencast
- Animation
- Classroom Lecture
- Recorded Seminar
- Interview
- Conversation
- Live Video
- Webcam Capture
- Demonstration
- On Location
- Green Screen

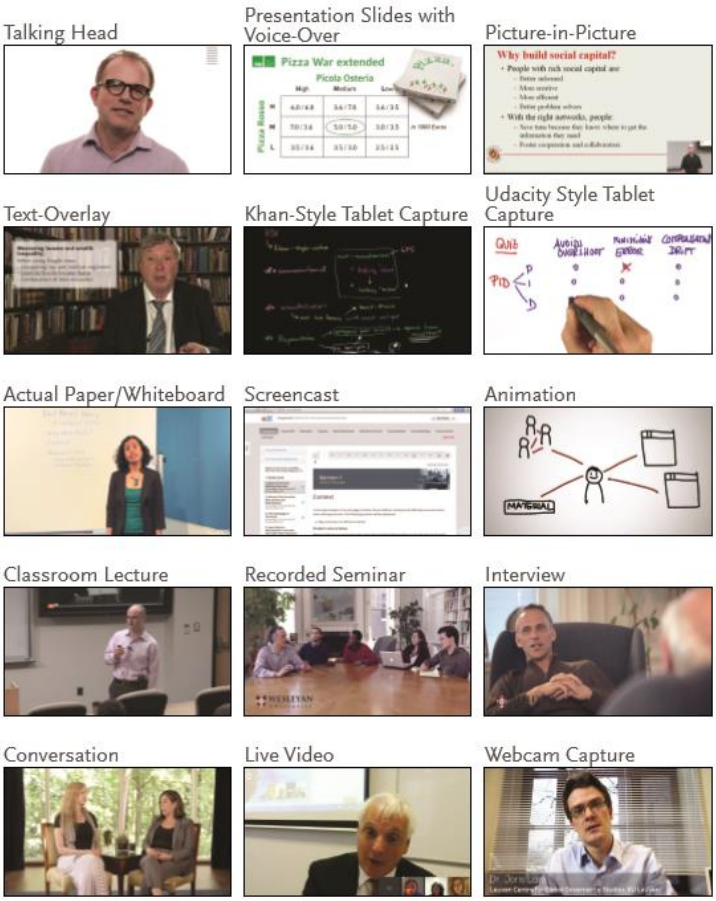


*Figure 3* **Typology of Video Production Styles (Hansch, 2015, p. 21)**

With each description, a series of questions are asked which are designed to help the lecturer or instructional designer in the decision making process when selecting the appropriate 'production style' for the relevant teaching moment. For example, in the case of 'Presentation Slides with Voice-Over' they ask, 'Does the voice-over compliment the content of the slides and vice-versa, are the slides clear and visually engaging, is the text big enough for mobile device viewing?'

### 3.1.4 REC:all framework

The REC:all framework[14] outlines different types of video in education and differentiates between Lecture Capture, Live Lecture Capture, Video Conferencing, knowledge/instructional clips and student generated content. Like Koumi's categorisation above, it is based on Bloom's taxonomy (the complexity of the learning goals) and the varying degree of involvement of the teacher and student. There are several sets of variables to represent visually. The model is a useful starting point in that it maps many different types of video usage onto one page.

[14] http://www.weblectures.nl/publicaties/didactiek/recall-model

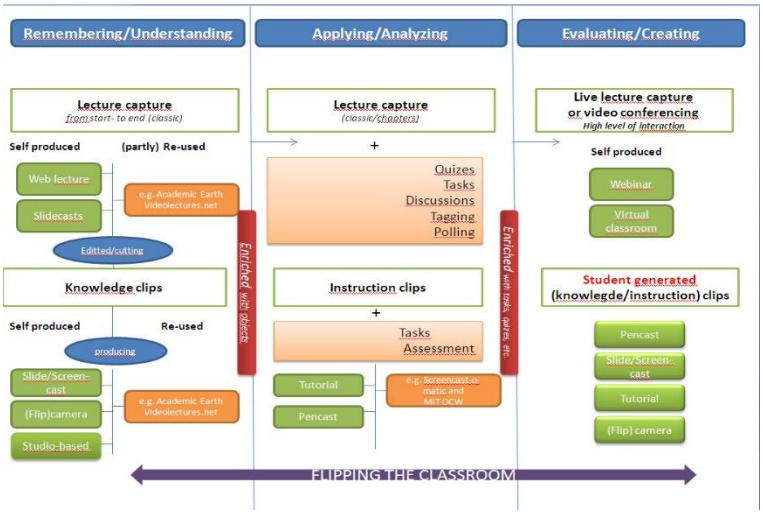


*Figure 4* **Figure: REC:all framework**

### 3.1.5 Web lecture 'tree'

In a handbook to explain the implementation of web lectures into the teaching process, www.weblectures.nl present different types of video teaching in a model in the form of a plant (Weblectures.nl, 2011). This model focuses specifically on 'web lectures' in which part or all of lecture is recorded. The roots of the plant are represented as 'constructively aligned' education with the explanation that no education can flourish unless the education is firmly rooted in an aligned educational context. The branches on the bush are divided into three types of web lecture (Instructional, College, and Web Lecture in Interaction). The higher up the bush, the more advanced (effective) the learning. This visualisation is useful in its focus on the importance of the education being firmly rooted in aligned education and the emphasis on the importance of active student involvement in the learning process. However, the organic and 'bushy' nature of the representation indicates that the mapping out of the different forms of web lectures is fluid, not fully defined, and an on-going process.

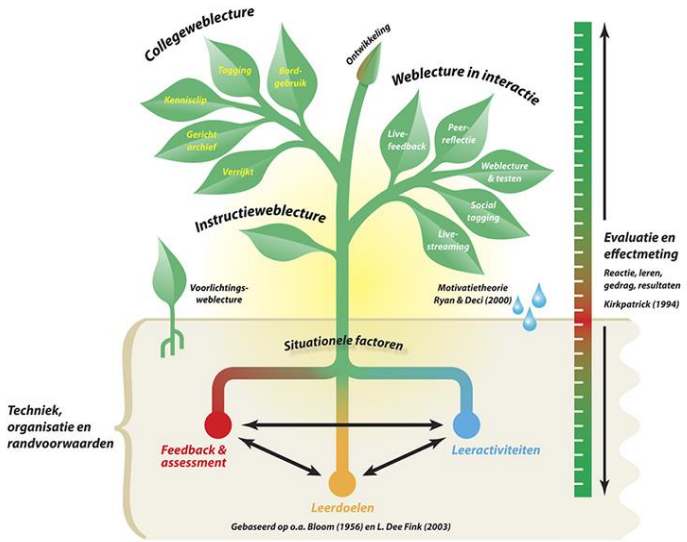


*Figure 5* **Web lecture tree (Anonymous OASE, 2011)**

In another framework that presents the different functions of web lectures, Sylvia Moes[15] maps learner independence against depth and complexity of learning (also based on Bloom's taxonomy). In this framework, the simplest format is classic lecture capture and the most complex is student generated content.

### 3.1.6 Woolfitt – complexity of technology for lecturer

Another way to consider arranging the different types of video formats is to consider the video from the perspective of the level of complexity for the lecturer, the degree of permanence of what is produced. Some video formats involve almost no input from the lecture (pasting a YouTube link into a power point) or having a Skype session with a student. However, there are progressive levels of complexity from having a technician record a live lecture, or the lecturer recording their own educational clip. In addition, there are different degrees of permanence in the video produced and the degree of visibility of the lecturer (Woolfitt, 2014). While the categories outlined in the model below are not definitive, they can provide a way to consider the different components of the specific types of video.

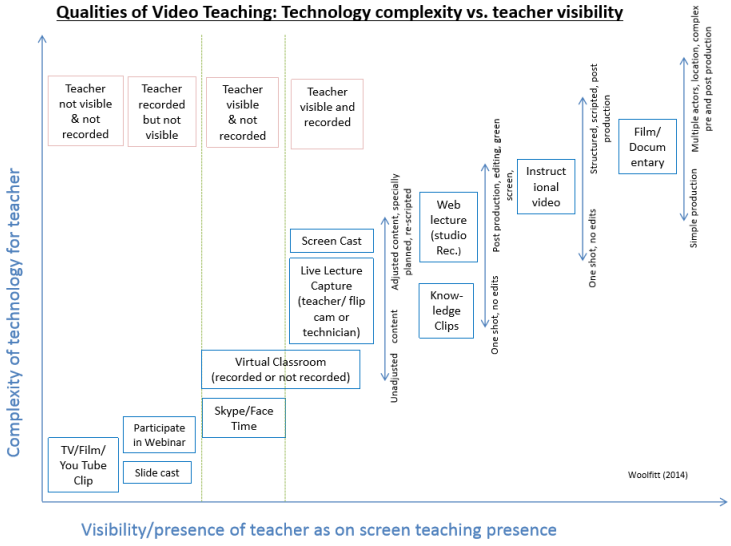


*Figure 6* **Complexity of technology for lecturer (Woolfitt, 2014)**

The distance the lecturer is from the video production is also a factor; do they produce it themselves 100%, or is it delivered to them fully produced and with no involvement. It is not the intention that all teachers make and star in videos of all their teaching, but it can be considered important to be conversant in how to use, integrate, incorporate and leverage the pedagogic potential of video.

### 3.1.7 Siemens et al. and the impact of networks on learning

The impact of networks on learning is outlined by Siemens et al. (2015) and examines the shift from content being created exclusively by the educational institution, to creation from students, external experts and open educational resources.

[15] https://hrblendedlearning.files.wordpress.com/2013/11/20131119-reira-def-frameworkweblectures.jpg

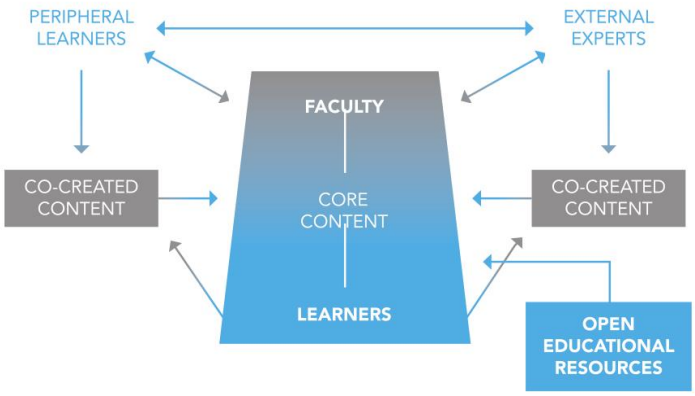


*Figure 7* **The impact of networks on learning (Siemens et al., 2015)**

This model shows that the core content traditionally delivered by the Faculty to the learners, is now also being co-created from the periphery by external experts, other learners and supplemented by Open Educational Resources. Within this context, video is one delivery platform for educational content. It is now no longer being produced and delivered exclusively from within the educational institution but from students and from outside the organisation.

There is a division between video that is generated by the institution/lecturer/students or by an outside party. This can be described as the 'production distance' between the lecturer who is teaching the course, and the video through which is part of the teaching. A lecturer might be closely involved in designing the video, and appear in the video in person, or as voice over. In this case the distance is small and the involvement in producing the content high.

However, the lecturer could be far removed from the production of the video and have the video content made available to them by an instructional designer, or external company who has produced it, or simply select it from already existing online video content via Open Educational Resources or a source such as YouTube. These pre-recorded and usually publically available content can be used to support the teaching process. In this case, suitable clips or content are found online or via databases or archive and is made by someone else than the lecturer. It is external to the course content (e.g., the person who made it did not do so with the intention of it being used in the specific course the lecturer is teaching. It is therefore supplemental and external). This is someone else's video content which can be appropriated for the purpose of the lecturer's course (to highlight or explain a specific point, to give context). It may be copyright, or freely available such as Open Educational Resources. It can take the form of:

- Clip/fragment (YouTube)
- Khan Academy (covering a specific subject)
- Film/documentary
- Publically available web lectures or video content (via MOOCs, IUniversity, Slide Share, …).
- Other sources…

### 3.1.8 Institution/Lecturer/Student generated

In video generated by the institution/lecturer/student, each element of the video content can be customised and linked to support/reach specific didactic goals within the course. There can be a high degree of customisation of learning content to match specific course goals. This category could also include commissioning a technical department (internal/or external) to create suitable video content to support pre-established didactic goals. Student generated content can take the form of making and submitting a video assignment as part of a final assignment. It could include the recording of a

student assessment (final presentation, research defence). There are benefits of using video as a reflection tool for teachers and for students (Yousef, Chatti, & Schroeder, 2014).

A student who is doing a presentation in class could give their mobile phone (video recording device) to a classmate and ask that classmate to video record the student's presentation on the student's mobile phone. After the presentation, the classmate returns the phone to the student who presented, with the video recording on it. This is an informal way for a student to have a presentation they make videoed, while avoiding any proprietary rights or privacy issues. The video is on the phone of the student who presented and is available for reflection on the learning process, without the need (or fear) of this being distributed further without the student's specific choice.

### 3.1.9 Overview of types of video

The table below is a first attempt to provide an overview of the different representations of video.

*Table 1* **Distinguishing qualities of different types of video and their use in higher education**

| Type of video | Example | External Made by someone else | Made by technician (T), lecturer (L), student (S) | Approximate (ideal) Length (minutes) | Lecturer's form of implementation (how do they plan to use the video in the course?) | Didactic Goal | Koumi (Koumi - 1) Cognition, 2) Experiences, 3) Affective, 4) Skills) | Interactive element | Distribute (D), Interact (I), Collaborate (C) (Fransen based on Reinmann-Rothmeier) |
|---|---|---|---|---|---|---|---|---|---|
| Clip/fragment (YouTube) | | Y | N | any | multiple (Koumi) | Many | Many | If teacher stops it, what happens next? | D |
| Khan Academy (covering a specific subject) | | Y | N | 5 to 10 | Many | Many | Many | If teacher stops it, what happens next? | D |
| Feature Film/documentary | | Y | N | 5 to 2hrs + | Show in class, assign as viewing assignment | | | | D |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Live Lecture Capture (technician or student recording) | Live Lecture Capture (automatic or technician assisted capturing of a lecture with live student audience) | N | T/L | 45-90 | Record lecture | Assist in revision | ? | | D/(I) |
| Live Lecture Capture (automatic recording, or iPad Swivl) | Live Lecture Capture (automatic or technician assisted capturing of a lecture with live student audience) | N | L | 45-90 | Record lecture | Assist in revision | ? | | D/(I) |
| Web lecture (pre-recorded studio lecture, covering several subjects) | | N | T/L | 10 to 45 | Pre (flip), post | ? | Many | Pause, questions, quiz, assignments | D/(I) |
| Knowledge Clip(pre-recorded studio lecture, covering one subject) | | N | T/L | 5 to 10 | Pre (flip), post | ? | Many | Pause, questions, quiz, assignments | D |
| Micro Clip (pre-recorded studio lecture, covering one subject) | | N | (T)/L | 1 to 5 | Pre (flip), post | ? | Many | Pause, questions, quiz, assignments | D |
| Self-made web lecture (pre-recorded lecture by teacher, e.g. using MyMediasite, from teacher's own computer) | | N | L | 5 to 20 | Pre/Post, extra | ? | Many | Pause, questions, quiz, assignments | D/(I) |
| Screen Cast (with audio and visual, (does teacher need to be in view?). Showing mouse clicks, on screen action. | | N | L | 1 to 10 | Instructional, demonstration | ? | Many | Follow step by step | D/(I) |
| Webinar (live streamed discussion, recorded). | | Y | T/L | 60 | Communicate, share, discuss, forum, exchange, debate, experts, share | ? | ? | Post questions | D/I/C |
| Google HangOuts (live streamed discussion, instantly available on external server, e.g. YouTube) | | Y | (T)/L | 30 | exchange ideas | ? | ? | Interactive | D/I/C |
| Skype/FaceTime (can be recorded) | | N | L | Varies | One to one discussion, coaching, assessment, support | ? | ? | Two way | I/C |
| Virtual Classroom | | N | (T)/L | Varies | To give a class live to students in and outside the classroom with live interaction) | ? | ? | Yes | D/I/C |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Student generated video content | | N | S | Varies | Assignment, project, evidence, data collection (observation) (animated film PowToons.com) or Drone footage of a destination | ? | | Recorded | C |
| Video recording of students (by students/lecturer) | Student group final presentation, recorded for archive or video blog as part of reflective report, or to be used to reflect on student performance in a staged workshop scenario (e.g. sales training) | N | L/S | 10 to 20 | assessment, archive, | ? | 4) skills | Recorded | I/C |

The table categorises "Types of Video" by the following categories:

- **Type of video**. Names the type of video
- **Example** (where available)
- **Who has made the video?** (Either the institution/lecturer/student or an externally made video, pre-recorded clips, YouTube, or films publically available)
- **Approximate (ideal) length (minutes)**: Gives an indication of the approximate length. This is only a rough indication and there will be many exceptions.
- **Lecturer's form of implementation** (how they plan to use the video in the class). Some Types of Video may be used in certain ways by the lecturer. From flipping the classroom to a record of the content delivered.
- **Didactic goal**: Each Video type may be linked to different didactic goals within the course. The lecturer's link to specific didactic goals may be specified in detail, or loosely implied.
- **Koumi** (2014) [16] lists four different domains: assisting cognition, providing realistic experiences, nurturing motivations/feelings and demonstration of skills. 33 different pedagogic roles that are particularly suited to video are categorised across these four domains. These categories are based on original analysis by the Open University teams dating back to 1984.
- **Interactive element:** Some of these Types of Video contain the potential for interaction with the viewer (through building in quizzes, assignments, 'social' tagging and questions) or through the original interaction from the audience that is recorded from a live lecture capture or from interaction in a webinar.
- Function of the media (video), distribution, interactive, collaborative: Based on Reinmann-Rothmeier in (Fransen, 2006b)

[16] http://www.weblectures.nl/sites/default/files/Potent_Pedagogic_Roles_for_Video_6.docx

## 3.2 The functions of video teaching

### 3.2.1 Greater availability makes content accessible to a diverse student population

Marinissen & Gratama van Andel (2012) suggest that alternative approaches of delivering material can offer good options to reach students of different levels. Several Colleges and Universities have implemented live lecture capture with the specific intention of making lesson content available to students with disabilities (Reece, 2013).

### 3.2.2 Cost effective, time efficient and enjoyable for students

Another function of video teaching can be seen as a better use of resources to enable deeper didactic interaction in other formats. Day (2008) found that courses with web lectures were efficient, citing achieving equal or higher student results with 25% less classes. Once video material has been created, it can be re-used by the lecturer (or fellow lecturers) in a subsequent lesson cycle (Gorissen, 2013). And it can be viewed multiple times, at a speed and time that is convenient to the student. Day (2008) found that implementing the web lecture format was inexpensive and easy to do, while increasing the engagement of students and turning the classroom into a space of active learning. He provides evidence that this format was effective and the students found it enjoyable. Moving more classes on line can also be cost effective (Schwartz, 2013).

### 3.2.3 Freeing up in-class time for interactive learning

Day (2008) found that in 'light of contemporary learning theory, the traditional one-to-many lecture still prevalent in most classrooms is arguably not the most educationally effective' (p. 19). This statement can be attributed largely to the inherent lack of learner engagement in often passive lecture settings. Lengthy lectures which transmit large amounts of information are less and less matched to current student learning desires. The function of lectures has been questioned due to inefficient use of educational resources which usually focus on lower level learning goals (Preston et al., 2010; Woo et al., 2011). Day (2008) found that video usage can be a way to 'decrease the in-class time spent on information transfer and increase the in-class time available for more engaging learning activities that facilitate learners' active knowledge construction' (p. 19). This time can be used to activate students to engage directly in relevant learning activities (Bishop & Verleger, 2013). 'The extra in-class time available as a result of using web lectures can be used to answer questions, discuss difficult subject material, and engage in meaningful learning activities' (Day, 2008, p. 29). Social tagging can play a role in creating interaction between the student and lecturer and help lecturers understand which parts of their teaching are clear and effective.

Video teaching can play a part at many levels of E-learning and can be used for distributing information, creating interaction within the learning process and as a part of the collaborative process (Fransen, 2006b). The aspects of E-learning presented by Fransen (2006a) can be applied to the three types of video teaching and the traditional lecture.

Several approaches to understanding the qualities and functions of the numerous different types of video have been presented in this section. The next section examines the question of effectiveness from the perspective of student learning.

# 4 Effective learning through video

**This section addresses the second sub question:**

Sub question 2 - What do we know about effective learning through video?

Colvin Clark & Mayer emphasise that E-learning should keep the focus on the learning rather than technology (2011). Delivery of content through various technological formats must fit into the human capacity for learning and the cognitive hard-wiring of the brain (Sweller, 1994). Often, the most effective ways of learning are not always what one would intuitively think they are (Carey, 2014; Foer, 2011).

Since MOOCs generate massive amounts of data, video viewing behaviour and learning results can be analysed in detail. They also give the opportunity to do some A/B testing by offering different types of video content and measuring the impact. Guo et al. (2014) examined over six million pieces of data to draw conclusions on student viewing patterns and at which point students stopped watching a video, or lost interest. More recently, analysis of viewing patterns of videos on a MOOC at the Technical University of Eindhoven showed that students completing the course with honours did not always view videos chronologically and that during the final weeks of the course, video viewing was very unstructured[17]

### 4.1.1 Effective learning skills for 21st Century

On-going digitalisation is having a substantial impact on the traditional work environment but 'digital tools are not just taking work out of the economy; they're also providing new opportunities for people to contribute work to it' (Brynjolfsson & Mcafee, 2014). As such, it is the responsibility of Higher Education to ensure that students develop appropriate 21st century skills, 'the skills required for a knowledge-based society' (Bates, 2015, p. 22).

Digital literacy equates to 'being competent with a wide range of digital tools for varied educational purposes, or as an indicator of having the ability to critically evaluate resources available on the web' (Johnson, Adams Becker, Estrada, & Freeman, 2015, p. 24). Jacobs (2013) provides an overview of the discussion surrounding 21st Century skills and the gap that exists between students and lecturers. In the Kaltura Report, The state of video in education 2015[18], Kaltura define digital literacy as 'the ability to locate, organize, understand, evaluate, analyse, create and communicate information using digital technologies' and they predict that the role of the lecturer will change 'from lecturers to facilitators of active learning'. It is important that Higher Education provides students with an appropriate set of skills to learn effectively with technology. Due to the amount of learning that is done online, having basic level of digital literacy is and important starting point for effective learning.

The commodification of higher education can lead to high price courses leaving students with high debt when they graduate (an average of US$30,000 leaving debt in The U.S.). This leave students with high expectations, but that fail to equip them with the necessary and suitable skills to find appropriate work in the rapidly changing working environment (Standing, 2011). Higher Education needs to ensure it is forward looking and not left behind. This involves coaching and supporting the students in developing approaches to learning online and through video.

[17] http://www.slideshare.net/joosbuijs/20150526-vor-symposium-what-is-a-successful-learning-process-withing-moocs

[18] www.kaltura.com

### 4.1.2 Constructivism, a theory of knowing

The constructivist theory argues that learning is a process whereby the student is actively involved in the process of constructing relevant knowledge, and the more active the involvement, the more potential there is for learning at a more complex level (Simons & Bolhuis, 2004; Valcke, 2010). 'The contemporary view of learning is that people construct new knowledge and understandings based on what they already know and believe' (Bransford, Brown, & Cocking, 2000, p.10). Schunk (quoted in Valcke, 2010, p. 238) explains that 'constructivism does not propound that learning principles exist and are to be discovered and tested, but rather that learners create their own learning'. This perspective that learners 'create' supports the idea that each student brings with them their own 'created' experience to the learning process but they need adequate support in this process (Simons & Bolhuis, 2004). In order to understand the process it is necessary to be aware of the different ways each student learns starting by establishing what the learner already knows and believes. Within this context, education can be seen as a form of dialogue at different levels between educator and student (Fransen, 2006b; Laurillard, 2002) which can lead to a co-constructivist approach between the student and teacher (Carnell, 2007). Hattie (2009) states that 'constructivism is not a theory of teaching, but a theory of knowing and knowledge and it is important to understand the role for building constructions of understanding' (p. 26). When deploying video and considering its educational effect, it can be helpful to keep the constructivist perspective clearly in focus to ensure that the student is assisted in taking an active role in constructing the relevant knowledge. Because by its nature, video viewing is often passive, there remains a continual challenge in how to activate the learning process of students in order to stimulate them to construct relevant knowledge from what is presented on screen (De Boer, 2013)

### 4.1.3 Transfer, cognitive overload and the multimedia theory

Involving the student actively in the learning process creates the opportunity for near and far transfer of knowledge leading to a deeper and more complex level of understanding (Bransford et al., 2000; Perkins & Salomon, 2006). Any examination of the effectiveness of the didactic implementation of video should consider the degree to which students are actively involved in the learning process.

Certain perspectives on learning can help illuminate the role that video can play in education. The theory of cognitive overload suggests that we learn through the acquisition of schema and automation, and that this should be taken into consideration as part of the process of instructional design. There is only so much information that any individual can process at a given time and a clear understanding of this is important in order to match the learning capacity to the individual (Colvin Clark & Mayer, 2011; Huib K. Tabbers & Merriënboer, 2004; Sweller, 1994). Understanding human cognitive architecture is essential when designing education which incorporates technology and the importance of guidance during student instruction has been outlined (Kirschner, Clark, & Sweller, 2006). Cognitive load is of specific relevance in the use of video in education. Mayer & Moreno (2003) propose a theory of multimedia learning and suggest nine ways in which cognitive overload can be reduced when creating multimedia content (videos) in order to ensure lecturers 'use words and pictures to foster meaningful learning' (P. 43).

Colvin Clark & Mayer (2011) recommend that E-learning (which includes video formats) include both words and graphics and provide evidence to support the importance of delivering information in the correct audio and visual mix, in order to create balance in the visual and audio channels of the student. Several principles are presented that give guidelines in how to arrange and present E-learning materials effectively. Words should be placed next to the graphics and spoken words should be synchronised with the relevant graphic (contiguity principle). Words should be presented as audio rather than on the screen as text (modality principle). Visuals should be explained with words or text, but not both and graphics should support rather than distract from the content (redundancy principle). Unnecessary audio should be avoided since it can distract from learning (coherence

principle). Lesson content should be carefully planned and segmented into more manageable sections. This segmentation, also known as 'chunking' can lead to better understanding and retention (Guo et al., 2014).

Video content should take into consideration the aspects of human cognition in learning. How much information, in what format and via which channels (audio/visual) can a student acquire and for what specific learning goals? To learn effectively, a student should be made aware of this process and how they learn.

### 4.1.4 Individual student learning preferences

It is important to understand different learning preferences within the student population and it can be helpful to allow them to learn at their own pace (Schwartz, 2013). This can enable content to be provided in a variety of formats other than the traditional classroom setting (e.g., video) with the potential to make learning more accessible to students with different learning preferences. A number of different ways in which students actually view video teaching have been identified. Some students watch the entire video in one go without stopping, some watch it again having already viewed it, some select a part of the video and view it multiple times, and some 'zap' through it skipping from one section to another (De Boer, 2013). This feature is referred to by Laurillard (2002) as self-pacing which provides greater learning control. It is important for lecturers using video in their teaching to understand the individual learning patterns of students and how these can impact the effectiveness of learning.

### 4.1.5 Effective online learning strategies

Bates (2015) examines the impact of technology on teaching and learning in the digital age. He states that soon on line learning will not be a separate activity, but integrated into the overall learning process:

> '[…] while the proportion of online learning compared to face-to-face teaching is increasing, and will vary according to context, online learning is becoming increasingly an integral part of teaching and learning. Thus, in the future, online learning will not be a separate activity, but one component within a wide range of decisions about teaching and learning.'[19]

Hansch et al. (2015) aim to 'stimulate critical reflection on video's role in online learning' and argue that there is a relative lack of evidence for video's effectiveness in online learning.

### 4.1.6 Effective learning with video

Video can be a more intimate way of communicating between the lecturer and the student. While it is important that students enjoy the learning process, as Kirschner & van Merriënboer (2013) argue, students are not always the best managers of their own learning in the digital world so any perceptions of students claiming improved learning should be carefully examined. The fact that students indicate a preference for a certain learning format should not necessarily be equated with the fact that it is the most effective didactic format, so adequate evidence must be provided to support any implementation of this educational format. Gorissen et al. (2012) found both discrepancies and similarities between how students reported watching video and what the data from the lecture capture system said and found that viewing recorded lectures could serve the function of exam preparation. Nashash & Gunn (2013) found that students considered lecture capture as an effective way to help them study, with 24 hour availability and the opportunity to review material.

[19] http://www.tonybates.ca/latest/

Within the context of effective learning, there are also specific strategies that can be used by students to learn effectively from Video. De Boer (2013) identifies four ways in which students watch videos: unbroken from start to finish, unbroken from start to finish and watching it again, watching specific sections several times, and random with short intervals. De Boer also identified different types of strategies that students used when watching and learning from video. This varied from a structured approach to a zapping or skimming approach and the strategy is influenced by the motivation of students and time available. In many cases there remains a discrepancy between the way that students report they view videos (self-reported in logs), and what the data collected from servers indicates (Gorissen, 2013; Sutherland-van den Heuvel, 2015). Finally, it is not straight forward to track the learning process of students; just because a video is streaming to a student's computer, it is not clear if the video is being watched, or what kind of learning is taking place. This is an area for further research.

In a list of ten tips to effectively use video in eLearning[20], nine of the tips are to do with production qualities of the video (length, content, budget) and only one focuses on where to put the video in the course, and for what didactic purpose. This is symptomatic of much data that focuses on the elements of the video rather than on how it can be implemented in a didactically effective manner. There are many tips on line regarding how to make notes for lectures and strategies for studying. But there are not so many that help students with the process of actually learning from a video[21]. However, there remains lack of empirical research on the effectiveness of different video viewing approaches to learning.

[20] http://elearningindustry.com/10-tips-to-effectively-use-videos-in-elearning

[21] https://www.csbsju.edu/academic-advising/study-skills-guide/lecture-note-taking

# 5 Effective teaching with and through Video

**Sub question 3: What do we know about effective teaching with and through video?**

The first section examines effective teaching 'with' video. This covers the aspects of integrating a video effectively into a course at a didactic level, and how this impacts the role of the lecturer.

The second section examines the effectiveness of teaching 'through' video. This is when a lecturer steps into the recorded content and uses their on screen presence in the medium of video to teach. This impacts the role of the lecturer, their relationship with their students and the manner in which they teach

## 5.1 Effective Teaching, Constructive Alignment and Visible Learning

According to Bill Hettinger, Founder, Effective e-Learning,

> 'Technology is a tool, but it's not the only tool. The real tool is the knowledge, the facilitator's knowledge and the designer's knowledge. We need to be able to take this knowledge and use it in a way that can help us educate students.'[22]

Hettinger also discusses the importance of constantly being 'on the lookout for new tools which can do something useful. You don't have to be in the forefront or the first person to use new tools but you do have to understand that the tool you used six months ago doesn't necessarily work anymore.'[23] Thomson, Bridgstock, & Willems (2014) state there is still very limited research into which pedagogic strategies are effective with video. They have developed four principles for planning educational videos: '(i) Give context and align purpose; (ii) Tell (show) a story; (iii) Keep it as short as possible; and (iv) Present with authenticity.'

Effectiveness of teaching is examined by Biggs & Tang (2011) in the theory of constructive alignment and with the Structure of the Observed Learning Outcome (SOLO) taxonomy. This places the active construction of knowledge within the perspective of constructivist theory, and emphasises alignment as establishing correlation between what is taught and what is to be learned and assessed. The SOLO taxonomy examines intended learning outcomes, through phases of 'increasing structural complexity' developing from a quantitative to a qualitative phase. Preparation, high expectations of students, in class interaction and the importance of treating students in an appropriate manner are considered key aspects of what the best college teachers do (Bain, 2004). Allan, Clarke, & Jopling (2009) examine effective teaching from the perspective of first year undergraduate students. They outline ten features that describe the effective University lecturer, highlighting the importance of lecturer actions that lead directly to enhancement of student learning and the personal skills of lecturers that improve interaction between lecturer and student which could also be related in the context of video. Hattie (2009) confirms that teaching is considered one of the main contributors to learning, describing effective teaching as visible teaching and learning, whereby the learning goals are explicit, appropriately challenging, including deliberate practice and appropriate feedback, and

[22] http://onlineedureport.org/faculty/effective-e-learning-b/ (page 4)

[23] http://onlineedureport.org/faculty/effective-e-learning-b/ (page 5)

teachers focus specifically on their own teaching, and become 'learners of their own teaching'. Hattie (2009) did not find significant increase in effectiveness of teaching through audio/visual methods (television, film, video or slides). However, he found that using interactive video methods could have positive effects on student achievement, but many other environmental variables had to be taken into consideration. Any teaching that uses video has to understand, benefit from, and employ the 'interactive' nature of video (Laurillard, 2002)

## 5.2 Teaching 'with' video

Staff in Higher Education need to stay up to speed with technological developments and resources are available where lecturers can learn the 'technology, creative and business skills you can use today'[24]. But it can be overwhelming for staff to stay informed. Coursera[25] currently offers an online course to help teachers who are 'overwhelmed by the tidal wave of new technology' and provide a course to help teachers to develop understanding.

### 5.2.1 Lecturers in Higher Education need support to use technology

The low digital fluency of faculty is considered a challenge that is understood and can be solved (Jacobs, 2013; Johnson et al., 2014). Many lecturers in Higher Education do not come from a technological background and there is sometimes a generational gap between the technological capability of the lecturer and that of their students (Palfrey & Gasser, 2008; Tapscott, 2009). Lecturers may have inadequate or inappropriate technological experience, and learning how to use new technology can be complicated and time consuming (Bichsel, 2013; Stover & Veres, 2013). Tracey, Unger, & Waddell (2013) consider it imperative that teachers in Higher Education integrate the tools of distance learning into their classes, and these tools can include the use of video as a teaching tool. Hughes & Daniels (2013) states that there is a responsibility for teachers to engage with technological developments; '[…] no teacher can continue to ignore the technology that surrounds us' (p. 5). If teachers are to provide students with the skills needed to survive in the 'Second Machine Age' (Brynjolfsson & Mcafee, 2014), then it is important they understand the technology at a deeper level (Hughes & Daniels, 2013). Kereluik et al., (2013) consider digital communication as being one of the important skills for teachers. In this context, the term digital communication can also include being comfortable, adept and capable in teaching with and through video. Cobo Romani (2009) describes the importance of teachers in developing their technological literacy as the 'confident and critical use of electronic media for study, work, leisure and communication […] represented by the ability to interact with hardware and software, as well as productivity applications, communication devices and management applications' (p. 21). So while there are certain expectations placed on teachers to develop new technological skills, there is also sometimes a generation and technology gap between teachers and students, which complicates this process and challenges education to be relevant (Johnson et al., 2014).

### 5.2.2 The pressure to incorporate new technology is not always matched by adequate training

While there is continued pressure on Higher Education organisations to stay contemporary by incorporating the latest technology into the classroom, this is not always matched with adequate training or support for lecturers on how to do this. Preston et al. (2010) discuss how Web Based Learning Technologies are implemented by Universities who are trying to adapt to the changing needs of their students. While this is received well by students, teaching staff are sometimes less positive as they try to understand how to deal with the changing teaching environment.

[24] www.lynda.com

[25] https://www.coursera.org/course/newtechtools

Lawrence & Lentle-Keenan (2013) identify the contradiction that exists between institutions that promote increased use of online teaching, but do not always provide adequate technical training and consider this to be a subject for further research. Technologies don't define how they should be used but offer a 'zone of possibility' as described by Kereluik et al. (2013). They identify criticism of the current format of many technology training courses where teachers are passive consumers of instruction and are taught by the IT department, indicating that one reason that some technology innovations fail could be due to the quality of the training courses themselves. They suggest that teachers need more help and support in understanding the 'zone of possibility' offered by the technology, what this means for their teaching, and how they can effectively implement new technologies into their classroom. Lecturers have limited time so support can be provided in the form of helpful tools such as workshops, consultation or handbooks (Kliphuis, 2008).

## 5.3 Teaching 'through' video

When teachers start recording their lessons on video, they often record exactly the same content as for the live lecture, except it is video recorded (Thomson et al., 2014). Initially the delivery is not different form a standard live lecture, nor the content.

### 5.3.1 The concept of video teaching

Teaching 'through' video can also be termed 'Video Teaching'. This is defined as teaching via video in which the lecturer plays an active role, is visible and audible, is recorded, and where the screen presence of the teacher plays an important element in the didactic process. This section examines the discussion regarding the different types of video teaching and how they are placed in relation to each other within the educational landscape. Difficulties in adjusting didactic approaches and the support needs of staff are examined.

Three types of video teaching are identified and defined in more detail. Some pros and cons of video teaching are discussed, along with the specific qualities of teaching via video and the impact this can have on the teacher when using this format as part of their teaching.

### 5.3.2 Difficulties in changing didactic methods

A gap exists between knowledge and understanding for experienced lecturers who are used to teaching in a face-to-face format (e.g. traditional lectures, workshops, coaching, tutorials) and the quickly developing new technologies which seem to offer endless possibilities, but are not easy to adapt to because they require re-imagining the teaching process (Guo et al., 2014). Due to the complexity of the situation, academic resources, time available, underlying fear of change and uncertainty, there is sometimes limited momentum to change established and accepted practice. In some cases resistance and fear exists to adapting, changing, and experimenting with established teaching processes within the written curriculum, and stepping outside one's comfort zone. For many reasons, some individuals do not warm to being videoed, are camera shy, or don't enjoy seeing themselves played back on camera (Waters, 2011). Within this context, traditional 'frontal' lectures (because of convenience, cost and accepted tradition) continue to remain a significant part of the delivery of learning (Gorissen, 2013) even as their effectiveness is called into question.

### 5.3.3 Lecturers need support to implement video into their teaching

If they are to gain access to the suggested benefits of new technology, and incorporate technology effectively into their teaching processes, then lecturers need appropriate and adequate support to do this in the form of staff development (Laurillard, 2002). Lecturers have traditionally taught their students face-to-face and have developed their teaching skills based on the personal interaction within this teaching dynamic. When a lecturer starts using video to capture their teaching (whether live lecture capture, web lectures or screencasts), they teach into a camera which requires different teaching skills and techniques than face to face contact. Filius & Lam (2009) found that a majority of

lecturers they researched wanted didactic support when implementing video teaching; firstly, by seeing examples made by colleagues and secondly, from ICT support. Lecturers considered learning about video teaching as being an important part of their professionalization. Germany (2012) found that once they started using video at a basic level, lecturers need to be supported to find suitable recording solutions in order to move beyond basic video usage. Support is needed at two levels; firstly, the technological know-how to make the video and secondly, help to understand how to incorporate the video into the course so as to have maximum didactic effect. Questions remain about the appropriate form of support needed for lecturers developing this teaching approach. Based on their experience and expertise with technology, it is likely that different lecturers will have different requirements in the type of support they need in order to move forward. Ryan & Tilbury (2013) discuss the potential of flexible pedagogies in Higher Education and suggest that an interesting first step should be to 'explore the potential of these new ideas [flexible pedagogies] and to understand some of the ways in which they can be embedded coherently in teaching and learning' (p. 31).There is a clear need from lecturers to receive adequate and accessible support.

> When it comes to teaching with technology, or even teaching in general, most faculty could use a little support. […] attention is directed to helping faculty evolve their instructional practices for a technology-laden learning environment - whether for online or hybrid courses; as part of active learning programs; or to better exploit the benefits of technical resources such as learning management systems. (Schaffhauser, 2014, p. 1)

The impetus to train and support staff can come from many angles, including the intrinsic motivation from the lecturer to adapt, student demands and expectations regarding a minimal level of technology and external pressures as technology changes and internal organisational developments. All of these put the lecturer in a situation where they need adequate and appropriate support.

### 5.3.4 Impact of video teaching on the role of the lecturer

While some lecturers may be comfortable using new teaching technology, others may be lacking appropriate technological experience. Learning how to use new technology can be complicated and time consuming; 'Many faculty may have attended College when educational technology was not as predominant as it is today. Learning new technologies and figuring out how to effectively integrate them into a classroom can be time consuming for an already busy faculty' (Stover & Veres, 2013, p. 97). At Manchester University many lectures are automatically recorded. The academic policy gives lecturers the chance to opt out of this process per lecture (Reece, 2013). Opinions of teaching staff have been polarised by the introduction of this large scale lecture capture process. Concerns from staff give insight into areas where they feel that this technological adaptation is changing and impacting their role as a lecturer. Examples of concerns raised include; lecturers do not want to be recorded, intellectual property right and copyright issues of lecture content, fear that lecture attendance will decline, concerns that material cannot be controlled once it has been distributed, concern that the video will be used by management when assessing the performance of the lecturer, and finally, that this process was pandering to student needs. However, Reece (2013) replies to these concerns by stating that 'The almost ubiquitous nature of recording devices (Dictaphones, mobile phones, etc.) means that, even in the absence of University-enabled lecture recording, teaching staff must assume that all group-based teaching activities are already being recorded' (p. 7). This encapsulates aspects of the changing teaching environment in Higher Education. Whether University lecturers want to be formally recorded or not, technology available to students means that they most probably will be recorded.

## 5.4 Three types of video teaching

In the following section, three types of video teaching will be examined in more detail. These three types are live lecture capture, screen cast and a recorded studio web lecture. Each of these formats includes the lecturer as a visible presence on the screen, and their teaching is carried out through their

### 5.4.1 Live lecture capture

Live lecture capture may be the first step into video teaching. A camera is positioned in the lecture room and the lecturer gives their traditional lecture to a live audience and the lecture is recorded for future playback. Deal (2007) describes live lecture capture as webcasting, and defines five processes; classroom presentation, classroom recording, processing and editing, hosting, and distribution and playback. Brotherton and Abowd (2004) describe this as webcasting which attempts to capture temporary and transient information like conversation and writing on a whiteboard while combining it with slides to be accessed later. According to Germany (2012), live lecture capture is the capture (video recording) of live lectures. The lecture capture can take the form of automatically filming the environment of the lecture room, including the teaching area (white board, smart board, power-point screen, audience). It can be made with one or more cameras (without a technician, or student), or with a technician guiding the camera to follow the action, filming both the lecturer and the audience.

Gorissen et al. (2012) refers to live lecture capture as recorded lectures which use:

> computing technology to facilitate the automatic capture and integration of and access to the media (blackboard, electronic whiteboard, presentation software, etc.) used during a lecture […]. The lecture dictates the length, contents and structure. […] An increasing number of Universities support their students by making recordings of lectures available online […] The recordings are aimed at remote or part-time students as well as at on-campus full-time students that could attend the live lectures. (pp. 298-299)

The process of recording a web lecture started by simply placing a video camera in a standard lecture, and recording it. However, as this pedagogic development has become more prevalent, it has become clear that different pedagogic styles need to be developed in order to increase the effectiveness of this format (Guo et al., 2014).

Sonicfoundry is one of several companies that produce the technical systems to capture lectures and held about 40% of the market share for web capture technology in 2009 (Ramaswam, 2009). They describe lecture capture as:

> Recording classroom-based activities in a digital format that students can then watch over the web, on a computer or their mobile device. Lecture capture technology records the presenter's audio and video, as well as any visual aids - laptop, tablet, whiteboard, document camera, visualizer - synchronizes them, and webcasts the stream live or archives for on-demand playback. (Mediasite, n.d.)

Sonicfoundry explain that the term lecture capture is sometimes known under other names, including 'E-learning, video-based instruction, online classes, blended education, hybrid courses, distance education, course-casting, virtual classrooms, virtual learning environments, academic capture and more.' (Mediasite, n.d.). There are several other companies that produce the technical recording equipment to capture lectures such as Presentations2go[26] and Echo 360[27]. Panopto simply

[26] http://www.presentations2go.eu/lecture-capture/

state that 'On campuses around the world, lectures are recorded to use as an on-demand study resource' (Panopto, 2014, p. 7).

### 5.4.2 Screencasts

In 2004, John Udell defined the term screencast as 'a digital movie in which the setting is partly or wholly a computer screen, and in which audio narration describes the on-screen action' (Udell, 2004). Several different types of screencast have been identified that serve different purposes; tutorial, short how-to, conversational demo, feature story, animated whiteboard, software review, screencast-enhanced video and concept screencast (Greenberg & Zanetis, 2012; Koumi, 2014; Moel, 2010; OASE, 2011). Gorissen et al. (2012) see screencasts as a variation of a web lecture that 'focus on what happens on the screen, for example, to explain the usage of a website. Screencasts may contain video of the presenter, but they usually only contain the audio and a recording of the screen' (p. 298). Gorissen et al. (2012) emphasise that quality can be high because it pre-recorded in a 'controllable setting' and the script can be prepared ahead of time. Green, Pinder-Grover, & Millunchick (2012) describe a screencast as a video that can 'capture computer screen output with concurrent audio commentary'(p. 717), the technology for which was originally used for software tutorials and demonstrations, but has subsequently been adopted by teachers to support student learning. The term screencast has had various other names such as streaming desktop video captures, online tutorials, and screen captures (Betty, 2008 quoted in Sugar, Brown, & Luterbach, 2010).

Many of the screencast software tools are free to download and relatively straightforward to use, such as Screencast-o-matic[28], Jing[29], Screenr [30] or Screencastcom[31]. There are also commercial options such as Camtasia Studio[32]. In contrast to the definition given above that screencasts usually only contain audio, all of the screencast software packages listed here have the function to capture video of the teacher via a web camera. A Screencast can be made quickly, at almost no cost, and on any device that has the appropriate software. It can contain video of the instructor, or simply audio narration that directly captures the activities on the screen, including mouse clicks and other activities. It is also possible to screencast only a specific part of the screen. The screencast can be made instantly available on a public server, or edited and then distributed via other (secure) channels. The specific nature of a screencast means that it is particularly well suited to explaining and demonstrating a series of steps through the format of a (computer) screen. As a result of this, each screencast software option uses the format of a screencast to explain and demonstrate how to use the software. Screencasts can also be used to give feedback on student documents, increasing engagement and involvement, and saving instructor time (Beaudoin, 2014; Sugar et al., 2010; Winterbottom, 2007).

Learning to make a screencast is straight forward as the current researcher experienced. The software can be downloaded in a matter of seconds, and a high degree of plug-and-play leads to instant results. For the lecturer, a screencast can be seen as one step beyond Skype or FaceTime because it requires a degree of planning and scripting, there is no live feedback or interaction with the student and the teacher's audio (and often video screen image) is recorded.

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[27] http://www.lecturecapture.com/

[28] http://www.screencast-o-matic.com/

[29] http://www.techsmith.com/jing.html

[30] http://www.screenr.com/

[31] http://www.techsmith.com/screencastcom.html

[32] http://www.techsmith.com/camtasia.html

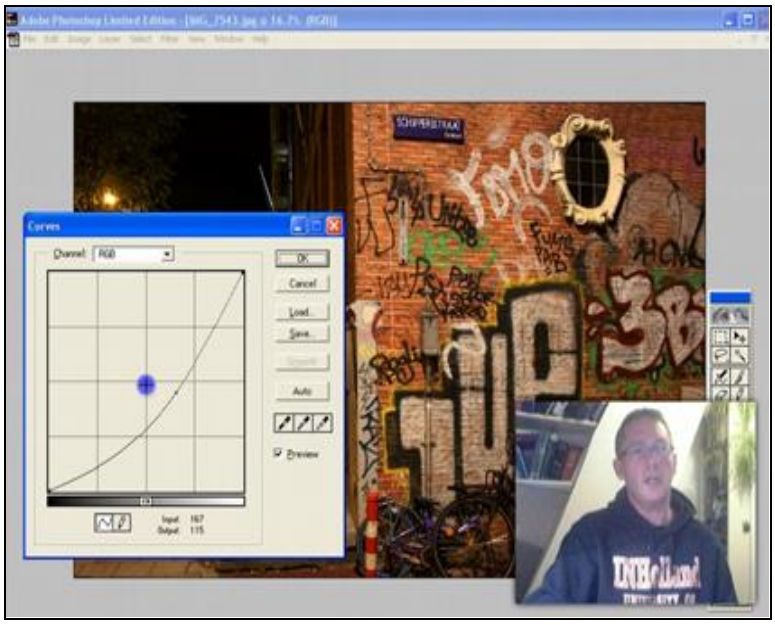

*Figure 8* **Sample Screencast, Adobe Photoshop demonstration** [33]

Because a screencast can be audio only, it can be a good place to practice 'recording' the teaching process in a non-confrontational manner where only the audio is captured. In the case of Skype or FaceTime communication, the student may choose to record the audio of the communication, but the actual video image of the teacher usually remains unrecorded and is temporary. Having used Skype communication with students, making a screen cast is an ideal first step into video teaching because of the low technology entry barrier and its informal nature.

### 5.4.3 Web lectures

Web Lectures are defined as 'condensed, studio-recorded lectures made available via the web as multimedia presentations that combine video of the lecturer, audio, lecture slides, and a table of contents' (Day, 2008, p. xi). A web lecture is usually split into two screens. Screen 1 is the screen in which the video image of the teacher appears, the screen in which their video teaching takes place. Screen 2 is where material is presented that visually supports the information presented in screen 1. This can be in the form of a PowerPoint presentation, or writing on a smart board. As the teacher gives the lecture, the software records the teacher in screen 1 and synchronises this with the lecture content in screen 2. A web lecture differs from live lecture capture in that it is made without a live audience, may be recorded in a studio (or teacher's office) with a technician.

There are options for teachers to use software to record their own web lecture without the aid of a technician. The Inholland Lectoraat Teaching, Learning and Technology ran a pilot (May 2015) to examine how to introduce a new self-record web lecture software into the organisation. Through a series of workshops and trainings, six technology pioneers (one from each faculty) supported and trained a group of staff on the MyMediasite software. The software enables lecturers to record their own content (web lectures, screencasts, slide casts) from behind their own computer. There have also been experiments with Inholland lecturers making a live recording of their own class using using an iPad Swivl (though this requires a certain degree of technical proficiency and an adjustment in teaching technique)[34].

Web lectures are usually shorter in length than a traditional lecture (Day, Foley, Groenweg, & van der Mast, 2005; Day, 2008; Filius & Lam, 2009, 2010). Gorissen et al. (2012) adds that web lectures

[33] http://screencast-o-matic.com/watch/cIXb3wV9V3

[34] http://www.weblectures.nl/content/best-practice-college-opnames-maken-met-behulp-van-de-swivl

'consist of a studio recording containing a combination of video and audio with a synchronised view of the lecturer's computer screen while displaying a presentation. A web lecture usually does not exceed 20 minutes' (p. 298). Web lectures can be substantially shorter than 20 minutes, in which case they may be referred to as a micro web lecture or knowledge clips and usually focus on one specific subject in detail.

The recording process for a web lecture takes place 'behind the closed door' of the recording studio. It is a private and intimate recording process between the teacher and the technician. There can be multiple takes and if the teacher makes a mistake, they can re-record the lecture, an option which is not possible during a live lecture. The presence of the technician and the 'live' recording studio, may put additional pressure on the lecturer creating additional 'nerves' during the recording session. Traditional teaching takes place with a group of students 'behind the classroom door'. A web lecture is often recorded behind the studio door, but it is recorded 'in private' with the technician. A web lecture can also be recorded by the lecturer without the help of a technician, using software such as MyMediasite[35] or Camtasia[36]. This has potential to reach a much larger audience than could ever be reached within the physical confines of a classroom.

Web lectures can be based on established lecture content (e.g., a lecturer uses the same content and PowerPoint slides as for their standard live lecture) or the standard content/slides can be specially adapted for the web lecture.


*Figure 9* **Screen shot of sample web lecture** [37]

Once video teaching has been recorded and made available to the student, students have differing viewing options. They can select from a full screen talking head (just screen 1), to talking head plus slides (screen 1 and screen 2), to slides only (screen 2). Options exist for slowing down (to half the normal speed) or speeding up (to twice the normal speed), pausing, stopping, skipping backwards and forwards at will through slide navigation. The video teaching can be viewed on personal devices with appropriate software. These options enable students to navigate the media based and

[35] http://www.sonicfoundry.com/mediasite/capture/mymediasite/

[36] http://video-capture-software-review.toptenreviews.com/camtasia-review.html

[37] https://Mediasite.inholland.nl/Mediasite/Play/109f7e3ca8504005aabca2889384af011d?catalog=d60b0fd0-ade5-4fac-ab04-76bbaf572ad8

customise the play back experience based on their individual learning preferences (Panopto, 2014; Sonicfoundry, 2014).

The opportunity exists for web lectures to be interactive. Students and lecturers can enrich the content with social tagging (Ying et al., 2009) indicating important sections, or adding subject headers to guide the viewer to relevant information more quickly. This can act as a form of note-taking which can help students in their learning process, leading to higher achievement (Gorissen, 2013). Kragten (2014) found that using web lectures in combination with mind maps could support meaningful learning. Examining the viewing logs of students who have watched web lectures can also indicate which parts of the recording are most viewed. This can indicate a difficult or important subject, or may indicate the lecturer has not explained something clearly. It is also evident from these logs at which point the student interest and attention has been lost (Guo et al., 2014).

Adapting to teaching through a web lecture requires adjustments in the teaching approach including having to 'visualise' the student audience (because they are not present in the studio). It is also important to have a clearly outlined structure and deliver the information concisely (Guo et al., 2014). By its very nature, a web lecture needs to be carefully prepared and structured in advance. This process can be assisted by using storyboarding techniques to script and outline what will be covered for each section of the lecture (Leeder, 2009).

## 5.5 Some pros and cons of video teaching

Having described the qualities of three types of video teaching in more detail, it is now possible to describe how specific qualities of video teaching benefit the teaching process, and what disadvantages there are.

### 5.5.1 Possible benefits of video teaching

Several potential benefits of using video teaching in the teaching process have been identified. Some benefits have been backed up by research, while others are opinions, or beliefs which need to be researched further. Preston et al. (2010) suggest certain conditions when they see additional value to using video lectures (large class size, students not able to attend for valid reasons, students looking for flexibility, and students who are non-native speakers to the language of instruction). They also suggest situations where using these formats are not appropriate, such as where face to face teaching is used for problem solving, where copyright issues may play a role, or where the lecture content is sensitive or disturbing.

Yousef et al. (2014) examined 67 peer reviewed papers from 2003-2013 that focus on (what they refer to as) video based learning and conclude that use of video in teaching can improve learning outcomes as well as learning satisfaction. Martyn (2009) states that the impact on learning outcomes through video (lecture capture systems) could be significant and deserves to be investigated further. Gorissen et al. (2012) found evidence that studying recorded lectures during exam time increased the chance of students passing the exam although they point out that these results could be due to more active students being the ones who study the web lectures. Filius & Lam (2009) found that two thirds of the lecturers they surveyed felt that using web lectures increased study success. Preston et al. (2010) found that 76% of students they surveyed considered the video format (Web Based Learning Technology) to have a positive impact on their learning, and to make it easier to learn. In Manchester University, over 90% of students believed watching the recorded lectures would increase their exam performance. For one specific course where the only difference to the previous year was the availability of lectures on line, there was a significant positive difference in exam results (Reece, 2013).

### 5.5.2 Possible disadvantages of video teaching

In general, the research into video teaching is positive, showing support from students and some lecturers. However, Ryan & Tilbury (2013) state that while Information Technology use in class can broaden the learning experience, they warn it could also lead to a downgraded pedagogical interaction, challenging the reasons for its implementation. Reece (2013) describes the concerns voiced by teaching staff that introducing lecture capture would lead to reduced lecture attendance. However, no significant decline in students attendance at live lectures was observed by Filius & Lam (2010). Nashash & Gunn (2013) found that technical difficulties in accessing the content of videoed lectures provided frustration and resulted in students wasting time trying to resolve these difficulties. Finally, there remains limited empirical data to support the effectiveness of this format (Hansch et al., 2015; Thomson et al., 2014).

### 5.5.3 Teaching into camera

Beaudoin (2014) explains that teaching online 'is not a direct transfer of the traditional face-to-face class [and it may require] a different set of skills that may not come easily to brick-and-mortar instructors' (p. 1). Once a teacher starts using video, the nature of the teaching dynamic changes (Waters, 2011). Teaching traditionally involves unrecorded live-interaction between teacher and students which usually takes place behind a 'closed' classroom door. What a teacher says, how they interact and communicate, has not normally been recorded. Teachers are not used to having their teaching recorded and may only have done this during their teacher training, or intermittently throughout their career. However, once a teacher starts using video to record their teaching, whether from their own choice, or as a requirement, it means that their teaching becomes available to a wider audience. A teacher may be concerned about 'making a mistake' on camera, saying something that is not true, or being caught in an awkward situation. They may have concerns about how they look on camera, and their 'video identity', how they come across. They become exposed to a larger audience and lesson segments can be checked and replayed. Deal (2007) reports that lecturers reported reviewing their own recorded videos with the purpose of reflecting on their own teaching processes, self-evaluation, and learning from mistakes.

### 5.5.4 Challenges for the teacher

There can be an element of fear or lack of confidence for some teachers to be recorded on video. This exposes their teaching skills to a wider public of peers. This can have an impact on teacher's levels of motivation and self-confidence (Waters, 2011). At the same time, it can also showcase excellent teachers and enhance their public academic profile. Some support for teachers unfamiliar with teaching via video (with their own image on camera) would be necessary. However, this would likely become less necessary as more teachers become familiar with this tool (Germany, 2012).

# 6 Effective didactic implementation of video in Higher Education

**Sub question 4 - What does the literature tell us about effective didactic implementation of video in higher education?**

At the heart of the question is the word effective, which can be applied to the manner in which video is used (effectively). This relates to aspects of course design, alignment with learning goals and assessment. The concept is to deploy what has been made (the video) as effectively as possible. There are also elements of the video design itself including multimedia theory and 'potent pedagogic' approaches that can maximise the impact the video has on the learning process. Measuring the actual impact remains a contentious issue and tracking student use of video shows differences between reported viewing and actual server data. There is limited empirical research that confirms video being a 'more effective' or 'better' tool than any other (non) digital teaching tool, even though it remains incredibly popular as seen in its dominant use in online courses including MOOCs.

As Hansch et al. (2015) stat that 'along with a general lack of research into the use video for online learning, itis not yet clear how to best measure a learning video's effectiveness.' They comment that 'general statements about the relevance of quality for online learning videos are hard to make given the many variables and diverse populations involved.' Given that there is no consensus on what makes an effective learning video or how to measure this, it is not clear what the standards are that should be implemented. Many questions about the use of video remain unanswered, and both more research and more experimentation are needed.

## 6.1 Effectiveness

The question of effectiveness can be examined at two levels. Firstly, there are certain strategies and approaches to make various forms of Video more or less effective. These can include features such as video length (Guo et al., 2014) and by creating the most effective balance of content based on audio and visual channels (Colvin Clark & Mayer, 2011). There is still scope for further research into what the connection is between certain formats of video and increased learning results.

### 6.1.1 Effective didactic implementation of video in higher education

Koumi (2014) advises that video by itself will not prove effective and 'will fail to achieve this potential if is designed badly. It has to be pedagogically effective, designed for cognitive engagement, constructive reflection, and hence learning'. A practical framework of effective pedagogic video design principles is also outlined (Koumi, 2013). This framework is a 'flexible recipe' that includes the following elements; a hook, signpost, facilitate attentive viewing, enable constructive learning, sensitise, elucidate, reinforce and consolidate/conclude. These steps can help to encourage the viewer to participate in 'mindful, constructive viewing'.

### 6.1.2 Impact of digital learning on students

Bates (2015) argues that the 'advent of new tools that give students more control over their learning will not necessarily change their need for a structured educational experience' (p. 252) and states that:

> ‘the use of these tools or approaches should be driven by a holistic look at the needs of all students, the needs of the subject area, and the learning goals relevant to a digital age, and not by an erroneous view of what a particular generation of students are demanding.’ (p. 267).

Bates also advises that it is wiser for teachers to use established tools that are tried and tested because these have been found to work (p. 269).

## 6.2 Conclusion

In order to answer the main question, **‘What do we know about the effective use of video in higher education?’** several aspects have been examined. These include the current impact of technology on society and higher education, changes in society including the ‘wired’ generation and the impact on traditional roles, including course design, teaching methods and the role of the lecturer.

The rapid increase in the amount of video that is available, increases in quality, speed and flexibility in delivering video has resulted in an incessant prevalence of video in many aspects of society, including higher education. This has resulted in many different types of video which have different aspects, functions and uses within the educational context. Categorising, describing and defining the differences between these many different forms is a challenging process and because of the fluid nature of the field, a process that is continually shifting and developing.

For the lecturer, adjustments need to be made when deploying video in the class, and when stepping from the dynamic of face to face teaching, into a screen persona through which the teaching process takes places. Understanding how to do this effectively and efficiently, maintaining a clear focus on the teaching process and not becoming lost in the complexities of new technologies, will remain an on-going challenge. While it may still be confrontational for some lecturers today to have their teaching recorded and made available to a larger public, it is quite likely that this will become more standard over time and that future generations of new lecturers may view ‘video teaching’ as nothing more than the transition of a previous generation of lecturers experienced, from overhead project to power point.

For the student there are some apparent benefits and conveniences of learning from video. These include accessing content at any time, from any place, the ability to pause, review, slow down, skip and skim through the content, to interact with and watch the content many times. But these benefits should not distract us from the basic dialogue of learning (Laurillard, 2002).These benefits needs to be balanced with less positive aspects such as passive video viewing in which there is no constructive engagement or active learning. The speed of technological development is outstripping the pace of educational change and while higher education tries to play catch up, there is room for creative and innovative learning approaches that will challenge students and lecturers, and push technological possibilities to their limit. Bates (2015) states that:

> ‘Technologies are merely tools that can be used in a variety of ways. What matters more is how technologies are applied. The same technology can be applied in different ways, even or especially in education.’

## 6.3 Further research

Possible subjects could include establishing clear distinctions between learning from video (the medium itself) and learning with video (video embedded in pedagogical strategies). This can include

exploring both levels, as well as how these levels are connected, and how to develop new instruments for measuring perceived learning effects and achieved learning effects.

There are opportunities to set up experiments that can provide empirical data to demonstrate the effectiveness of certain types of presentation of information via video. And to examine what the measurable effect is of embedding video into the didactic structure of a course, including activating exercises and activities for students to assist their learning. Finally, there could be experiments to examine the effectiveness of different learning strategies from video, considering the individual student perspective and their specific learning context.

Ultimately, there is a need for further empirical research into the link between video and effective teaching and learning. The importance of the contact between lecturer and student within a learning context should not be lost through the sometimes overwhelming promises of the benefits of technology.

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# 8 Appendix

## 8.1 Use of Video within selected higher education organisations

**Inholland web lecture department and Lectureship Teaching, Learning and Technology**
The Inholland web lecture department has been making web lectures since 2009. On the internal Inholland intranet an intake form is provided for lecturers wanting to make a web lecture (whether live lecture capture or studio recorded). Once the lecturer returns the completed intake form, a technician follows up to talk through the recording process in more detail and to give feedback on the proposed teaching materials. An archive exists of all the web lectures recorded to date. Some of these are only available within Inholland, others are available to the general public.

The Inholland Lectureship Teaching, Learning and Technology [38] provides technical and didactic support to teachers making web lectures. Inholland's educational technology strategy is currently under development. The group gained experience from 2009-2012 under the project 'Didactic scenarios with web lectures' producing, publishing and embedding web lectures within a specific teaching practice. Knowledge developed in this context is shared inside and outside the organization through discussion papers and the website. The lectureship works in close collaboration with the Inholland web lecture department to develop support for lecturers.

**Weblectures.nl**[39] is a consortium of 17 Universities and Hogescholen in The Netherlands and Belgium that provides an online platform to discuss and share information about web lectures. The resource provides an overview of different types of video teaching, several models and examples of web lectures explaining the preparation steps for lecturers and how to approach the process. A Linked-in group informs members of news regarding upcoming congresses, sharing slides and recent presentations in an up to date resource of current developments (Breuker & Rosendaal, 2014).

The list below presents a selection in alphabetical order of some of the Weblecture.nl members, along with a couple of other national and international Hogescholen and Universities who are active in web lectures.

**Delft University of Technology** The Technical University of Delft provides a succinct 6 minute web lecture[40] of presentation tips for an online lecture. This addresses practical aspects such as the restricted area that the camera records, microphone use, language use presentation tips when writing on the board/smart screen. The TU Delft also provides media training[41] for its lecturers along with a clear explanation that online teaching is different and requires adjustment of traditional teaching skills.

**Fontys Hogeschool**[42] has some web lectures publically available and provides a resource to other databases containing video teaching.

[38] www.inholland.nl/elearning

[39] www.weblectures.nl

[40] http://Collegerama.tudelft.nl/Mediasite/Play/8858c3cb-4254-42d2-8b9e-def7fb3d745b

[41] http://www.slideshare.net/RECall_LLP/leon-huijbers-recall-2013 (slides 50-62)

[42] http://fontys.nl/ACI-eLibrary/eLibrary-materials/Weblectures.htm

**Haagse Hogeschool** The Haagse Hogeschool gives a short overview[43] of different types of web lectures with examples that provides basic practical support for the lecturer regarding the specific didactic shift that needs to be made and advise the lecturer to simply try it out.

**Hogeschool van Amsterdam** The HVA published a vision document on new media in education in which they ask how lecturers can expand their teaching repertoire to take control of the process of modernising education (Jacobi, van der Burg, & de Groot, 2012). There are also links on the site to a number of recorded web lectures that are available to the public.

**Hogeschool van Arnhem en Nijmegen** The Hogheschool Arnhem and Nijmegen lists some aspects of web lectures[44] on its blog[45]. They also present information about tagging options and examples of web lectures including links to short videos on using different software. An interesting example[46] from HAN is the web lecture on the multimedia theory of Richard Mayer where the main principles of the theory are clearly explained. This is an example of providing information that is specifically relevant for lecturers who are in the process of making web lectures. And the format of a web lecture is used to demonstrate how it should be done.

**Hogeschool van Utrecht** The Hogeschool van Utrecht has a public catalogue of its web lectures which shows the subject of the lectures, the date recorded and the number of views. This gives an insight into the activity regarding web lectures. The catalogue can be sorted based on number of views. The top lecture viewed was viewed 3,422[47] times (as of June 16th, 2014).

**K.U. Leuven** Gruyter, Verraest, Luyten, & Driessens (2011) produced information for KU Leuven about web lectures. This provides background information about what web lectures are with specifics on the systems and thee elements that make a web lecture along with technical details. However, there is little practical information about how the lecturer has to adjust their teaching in front of the camera.

**Massachusetts Institute of Technology** The Massachusetts Institute of Technology video channel[48] lists over 12,000 videos publically available in its catalogue that can be searched by category, type, date and alphabetically.

**Universiteit van Utrecht** The University of Utrecht lists 7 'tips[49] for making web lectures' on one of its web pages and has a good overview of different web lectures available.

**Universiteit van Amsterdam[50]** The UVA has a resource on video teaching including didactic and technical aspects, authors rights and selected web lecture projects.

**Vrije Universiteit** The Vrije Universiteit has a series of pages[51] on how to make a web lecture. Most of this information focuses on the technical aspects, how to reserve the location, and the use of different programmes for do-it-yourself recorded lectures. They also provide clear access to the library of video teaching that has already been recorded.

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[43] http://sites.dehaagseHogeschool.nl/icto/weblectures/voorbeelden

[44] http://blog.han.nl/onlineeducation/?s=weblecture

[45] http://blog.han.nl/onlineeducation/weblectures-opnamen-presentations2go/

[46] http://video.han.nl/p2gplayer/Player.aspx?id=9ALHL

[47] https://www.weblectures.hu.nl/P2G/cataloguepage.aspx?type=most

[48] http://video.mit.edu/

[49] http://www.umcutrecht.nl/onderwijs/docentenopleiders/Colleges-registreren/tipsopnemenweblecture.htm

[50] http://icto.uva.nl/video

[51] https://sites.google.com/a/ond.vu.nl/podcasting-en-weblectures/hoe

In addition to the resources listed by Higher Education organisations, some informal sources are listed below which provide a variety of support for teachers to develop video teaching skills and (listed alphabetically).

## 8.2 Additional resources

**How to record your own MOOC**[52] This seven minute YouTube video by Rosie Redfield, professor at the University of British Columbia, is an example of how pioneers are taking initiative to record their own video teaching. She explains how she records her video teaching in her office, including what software is used, the microphone and touch pad, and how to set up the lighting. This set-up gives her direct control of the recording process, and enables the experience to be informal, as if a student walked into her office for a chat. There is not the pressure associated with a recording studio with expert technicians and the end product has a more improvised and relaxed feel.

**JISC Digital Media** JISC is an organisation in the UK with the mission 'to support the UK's education sector in achieving greater digitisation and use of digital media resources (still images, moving images and sound resources) for teaching, learning and research.' JISC provides online resources and their comprehensive guide[53] on this subject has 11 sections covering many aspects of videoing lectures, from tripod selection to copyright laws.

**TeacherTrainingVideos.com**[54] On this web site (which is an individual initiative from one teacher) the subject of video teaching is clearly presented. Through Screencast and web lectures, the practicalities of video teaching are illustrated, demonstrated and explained.

[52] http://www.youtube.com/watch?v=0q-JKBEwNy4

[53] http://www.jiscdigitalmedia.ac.uk/infokit/video-creation

[54] http://www.teachertrainingvideos.com/presentme/index.html