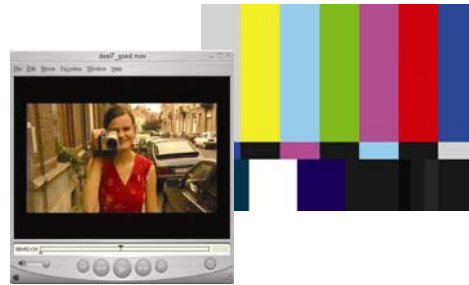




Education and Culture

Socrates  
Minerva



# Handbook on Digital Video and Audio in Education

Creating and using audio and video material for educational purposes.



**VIDEO  
AKTIV**



*Published by*  
**The VideoAktiv Project**  
[www.videoaktiv.org](http://www.videoaktiv.org)





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1141169-CP-1-2004-1-UK-MINERVA-M

## HOW TO USE THIS HANDBOOK?

This handbook is yours, so of course you decide how to make the best possible use of it. However, we tried to conceive it in such a way that it can be used in the most flexible way, according to what we expected could be your individual needs.

Of course, you can start reading at the front cover until you reach the back. However, you can also navigate through it using the Table of Contents, which we hope is sufficiently self-explanatory so that you will find topics and issues that are directly responding to your searches.

You can also just read that part that meets your immediate need: if you are looking for a justification for the use of video in education, then the first chapter "Why I Use Video With My Students" answers your questions. If your institution or department is investigating the possibilities of using video, than "Thinking About Educational Video" may give you pedagogical ammunition in the decision making process.

For individual lecturers and course creators, the following more practical chapters may prove more useful: "Using existing material", "Creating New Material", "Tips for Producing Video" and "Distributing the Material". These handholding chapters are useful if you have the basic skills for video production, distribution and use but you are looking for additional advice. If you are starting from scratch, you may consider consulting "How to Acquire the Necessary Skills".

The final reference chapters contain "Further resources" on production of (streaming) video, and on existing archives of educational videos, as well as a bibliography.

We hope our work is useful to you. If you want to react, please go to [www.videoaktiv.org](http://www.videoaktiv.org).

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# WHY I USE VIDEO WITH MY STUDENTS

*“Video, among other new technologies, offers education a challenge to rethink much of its methods and content, helping it tilt the balance away from teacher-centred instruction towards learner-centred study. It also offers the advantage of utilising vision, that powerful but neglected sense, in new ways.”<sup>1</sup>*

## 1. INTRODUCTION

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In recent years, there has been a growing interest in the creation and use of web-accessed digital video and audio throughout the education sector. The pedagogical vision is clear: only when video and audio have become routine components of education and e-learning will we have an educational environment that reflects the media-rich world in which we now live.

This has been exemplified in Europe for example by a growth in national initiatives such as British Universities Film and Video Council ([www.bufvc.ac.uk](http://www.bufvc.ac.uk)) and Click and Go Video ([www.clickandgovideo.ac.uk](http://www.clickandgovideo.ac.uk)) in the UK, Webstroom (<http://video.surfnet.nl/info/webstroom/english/english.jsp>) in the Netherlands and UniVid ([www.fsknet.dk/univid](http://www.fsknet.dk/univid)) in Denmark. These have been augmented by EU-funded transnational projects such as VideoAktiv ([www.videoaktiv.org](http://www.videoaktiv.org)) and eStream (<http://estream.schule.at>), which have sought to promote media-rich educational approaches through staff development materials and guides.

Many of these projects and initiatives were originally inspired by the emergence of streaming as a technology in the late nineties. Although conventional (analogue) film, television, and video have a long history in education, their widespread use was always limited by production costs and even more importantly delivery difficulties. However, through the nineties the production costs fell steadily with the introduction to the domestic market of high quality, low cost, relatively easy-to-use cameras, and editing software. The creation and use of digital video and audio suddenly became open to non-specialist educators and even learners themselves.

Distribution of video therefore became the main limiting factor; CD-ROM could deliver digital video but by the later nineties for most educators, the web was the medium of choice. However, there was a problem. Before streaming, web-based video and audio files had to be downloaded in their entirety to the computer before they could be played. As media files are usually large, this time delay severely restricted user interaction and largely prevented their extensive use for web-based learning.

Streaming, pioneered by the RealNetworks Company and later adopted by Microsoft, Apple and others reduced download time by allowing the user to play a file directly from the server while it was downloading. The significant improvement in the user experience was implied in the optimistic name of one pioneering UK project of the time “Click and Go Video”. Early streaming was restricted by available bandwidth, limiting both image size and clarity especially for learners connected by a modem. Young and Strom remarked as recently as 2002, “the main choice for developers at the moment is the crucial compromise between image quality and accessibility” but were confident that this problem would soon diminish. Indeed, in the intervening years, educational networks

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<sup>1</sup> Robin Moss, 1983

have improved, public broadband has proliferated, and video has become even more embedded in popular culture. The rapid expansion of public video sites such as YouTube ([www.youtube.com](http://www.youtube.com)) or MetaCafe ([www.metacafe.com](http://www.metacafe.com)) have led to a renaissance of home-produced video as a popular creative medium for entertainment and even education.

In an educational context two technical developments in the higher education sector in particular have been significant. Firstly is the now widespread use of presentation software such as PowerPoint. This has familiarised a completely new community of teachers with the possibilities of simple multimedia production in which sound, images, and video clips can be embedded in slideshows. In turn, many institutions have upgraded their lecture facilities to enable multimedia delivery. At the same time web-based virtual learning environments such as WebCT, Blackboard and Moodle have become mainstream, providing teachers with a relatively simple online framework in which to deliver their learning resources including presentations and media resources to students.

The growth of general access to broadband through mushrooming domestic connection rates and the growing availability of public access networks such as those based on wi-fi have meant that broadband speeds once available only on campus are increasingly available to distance learners, even via mobile devices such as 3G phones.

It is easy to see why enthusiasts of media-rich learning believe web-based video and audio could and should become a commonplace component of online education and e-learning, enhancing the visual literacy of students and staff alike. Of course, what is now technically possible is not necessarily educationally desirable. As Young and Asensio (2002) argued the major barrier to determining what is educationally desirable is not only a lack of awareness among educators as to the pedagogical possibilities of these modes of learning, but an absence of widely-accepted reference models of good practice. Hence, the national and transnational initiatives mentioned above are tending to move beyond technology, seen to be declining as a barrier for uptake, to one in which issues of effective educational design are focused upon. From the learning and teaching perspective, the challenge for educators is to understand how video and audio can act as powerful, innovative and creative elements to enlighten teaching and learning.

For those with a media background, it may seem strange that we are still struggling with the basic issue of the role of moving images and sound in education. Indeed there is an unbroken pre-internet research tradition stretching back at least half a century underlining the educational value of moving images from film through educational television and videocassettes to desktop multimedia applications. However, the lessons from these earlier technologies have been only partially assimilated for a number of reasons. The use of moving images and sound is very uneven across the educational sectors. On the one hand, teachers of media, cultural studies, and the performing arts might be expected to have good reference models. Educators in languages, medicine, sports studies, and natural science generally at least show some experience of the medium. However, in the majority of disciplines there is virtually no widespread tradition of using rich media.

New technologies also attract new participants, both teachers and support staff who have little formal media training. The technologies themselves enable new affordances; Asensio and Young (2002) noted how interactivity and integration (with other technologies or in a blended environment) were adding value to the power of the image itself, but that this demanded new type of visual and digital literacy from the educational designer. They added that the underlying pedagogical theories we use to interpret new technologies had also shifted from a 'knowledge transfer' model to a 'constructivist' model, implying yet another layer of learning design complexity.

Thus although the moving image has a long and honourable pedigree in education, the present day emphasis on interaction and integration in e-learning and an increased focus on student control present opportunities but also complex challenges to teachers using media.

*“Children already spend more time watching television than at school. Video can be harnessed to provide valuable support both for the retraining of teachers, urgently required, and for life skills training for pupils as traditional approaches to career and work are redefined.”<sup>2</sup>*

## 2. A LEARNING AND TEACHING PERSPECTIVE

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### 2.1. FROM THE MAGIC LANTERN TO VIDEO STREAMING

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As the old cliché has it, “an image is worth a thousand words.” Moving images add authenticity and reality to the learning context, and can bring the course content alive. The moving image has long been a feature of education, from the earliest magic lanterns over a century ago to the latest web streaming technologies. Over the course of a century, we have seen a succession of moving image technologies: film, television, videotapes, videodisks, digital desktop video, multimedia, CD-ROM, videoconferencing, interactive TV, and now web-based media. All were primarily developed for the business or entertainment sector then later found a place in education. The obvious feature all have in common is the ability to show the moving image to students. From the late eighties to the mid nineties however, the selling point for videotapes, videodisks, digital desktop video, multimedia, CD-ROM became the promise of interactivity. The image was still important, but was now overlaid with the idea that the user could have easier and more controllable access to the resource. In the mid nineties, the web reinforced further the ideas of accessibility and interactivity, but added a new element, integration. This referred primarily to interlinking with other web materials including communication and collaborative tools, but also combining video with other teaching and learning activities – video is no longer seen in isolation. This changing emphasis on the value of video is partly a case of educators seeing a new technical opportunity, but as we will see later, also highlights the influence of prevalent pedagogical theory in interpreting, sometimes reinventing tools developed for other purposes.

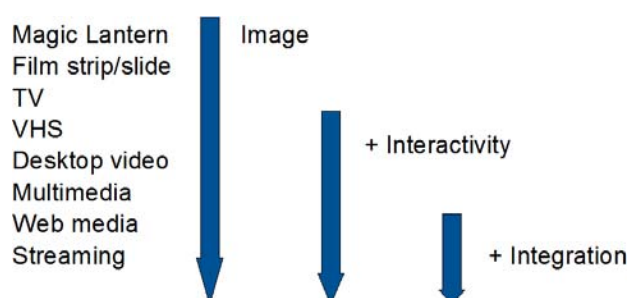


Fig. 1 - Features of moving image technologies

Young and Asensio (2002) describe this interplay of image, interactivity, and integration as the **Three 'I's Framework**. As we shall see later, the Framework provides a useful methodology to analyse historical research ranging over many of the moving image technologies. It also provides a means of unpacking current practice and underpins a

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<sup>2</sup> Robin Moss, 1983

Decision Tool to help develop and design educational resources using streaming video. We will start by examining each element of the Three 'I's Framework in turn.

## 2.2. THE VALUE OF THE IMAGE

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As Jacques (1997) notes, images are a source of knowledge, persuasion and pleasure every bit as powerful as the written word. As early as 1913, Thomas Edison declared: "Books will soon be obsolete in the schools. Scholars will soon be instructed through the eye. It is possible to touch every branch of human knowledge with the motion picture." And nine years later he repeated: "I believe that the motion picture is destined to revolutionise our educational system and that in a few years it will supplant largely, if not entirely, the use of textbooks." A century later, his forecast has still not come true, even though research has confirmed that there is great potential in the use of moving images.

Duchastel and Waller (1979) observed that even static images when supplementing text attract attention, aid retention and recall and are explicative when verbal forms are not enough. Several researchers have made the connection between visual clues, the memory process, and the recall of new knowledge (e.g. Shepard and Cooper, 1982, Mayer and Gallini, 1990). Even half a century ago, it was realised that the moving image, which at that time was mainly film, had a powerful contribution to make to education. In a pioneering study, Hoban and van Ormer (1951) conducted a meta-study of research on the pedagogic value of film going as far back as 1918. They found that the use of moving images could help the students to improve retention of concepts, facilitate thinking and problem solving and that it could be in some cases as good as an instructor in communicating facts or demonstrating procedures. The way in which sound and image can complement each other has also been well researched and is discussed later.

Moss (1983) remarks that video is different from other learning technologies, as it offers the advantage of using the sense of vision "that powerful but neglected sense" in new ways. A moving image can help the student to visualise a process or see how something works, moves, or performs. It provides access to external perspectives, different forms of visual knowledge that can be archived and used for future generations. Goodyear and Steeples (1998) note that video can provide vivid descriptions to articulate tacit information and knowledge difficult to describe through text. Dale (1962) believed the moving image could balance the "over-verbalisation" he saw as endemic in education. Moss captures the radical mood often expressed by proponents of the moving image. He felt that "video, among other new technologies, offers education a challenge to rethink much of its methods and content, helping to tilt the balance away from teacher-centred instruction towards learner-centred study" (1983:12). Video indeed "may offer inspiration to a minority because its ability to represent and stimulate ideas not readily expressed in written form" (1983: 12). This could include what we would now term lifelong learners (e.g. working, retired, returning to study and work) and "open up scholarship to wider, more dispersed and very different students that we have experienced before" (1983: 110). Visually rich resources might perhaps bring more access, control, and choice to the learning materials.

It is not only the visible explicit meaning of the moving image themselves that are important. Academic developers often refer to the motivational aspects of video; it seems to have an emotional resonance to the senses. Hempe (1999) refers to the strengths of video as visual demonstration, dramatisation, presenting visual evidence, and making an emotional appeal. Images always carry hidden or semi-hidden messages such as narrative, emotion, authority, authenticity, and symbolism.

### 2.3. THE VALUE OF INTERACTION

---

Given the educational potential of the moving image, it is not surprising that film and television had an impact on education, with many universities putting in place multimedia support services or even building production studios in support of media based learning and teaching activities. However, effective use in the teaching and learning was limited due to a number of reasons: the lack of skills by the teachers in the use of the media and the necessary equipment, the cost of media and equipment, the unavailability of the equipment when and where needed, the complications with the rights of the materials and finally the difficulties fitting media content pedagogically into the lesson.

Moreover, as Rosenberg puts it, "the main reason why television did not become everyone's teacher was because it lacked the very essential quality of teaching: the ability to interact with the learner" (2001:22). Thus, the advent of interactive video in the early eighties (the various forms of videodisk, CD-I and CD-Rom) was met with some enthusiasm. "The potential application of interactive video technology in educational and training fields is virtually unlimited," concluded an early report sponsored by the UK Department of Industry (Duke, 1983:104). The key to interactivity was the linking of computers to video technology, initially videocassette recorders (VCRs) and videodisks, allowing control over the pace and direction of the video programme. This control enabled self-paced learning leading, according to Palmer (1987), not only to time saving and standardised results, but also distributed learning to a large numbers of students. Interactivity in the original sense was not confined to computer-human transactions but included:

- Access** - availability asynchronously and independent of location
- Choice** - a library of materials to view on-demand
- Control** - ability to start, stop, pause, skip and review material

Even with primitive early interactive video systems, there was educational potential for searchable random access to previously linear video resources with facilities to freeze frame, forward and reverse and select between multiple audio tracks. The materials could support more user-centred and independent modes of study. Some systems also allowed branching from decision points or tests along paths laid down when the programme was designed (Parsloe, 1985). In a series of meta-analyses of educational outcomes, Fletcher (1990) noted that interactive videodisk-based instruction fared much better overall than the computer-based instruction in the well-known study by Kulik and Kulik (1987). It was not until the early nineties that the combination of desktop digital video and CD-ROM enabled the high levels of control and integration with other computer-based learning materials we are familiar with today. The interactive features of modern web-based media players can be used to promote "active viewing" approaches with students (Galbraith, 2004).

### 2.4. THE VALUE OF INTEGRATION

---

Ted Nelson rightly said in 1987 that "the trouble with interactive media is that they all tend to be closed objects that can't be combined or viewed together (Whereas books can quote each other and lie open at once on the same desk)" (1987: DM67). Although video can be used on its own, on the web it can be interlinked with slides, supporting texts, discussion boards, chat, resource links, self assessment quizzes and so on. This can be done by adding interactivity within the media internally for example using Action Script within Flash, or SMIL within other (streaming) media or even more frequently nowadays as part of an organisation's virtual learning environment (VLE) adding



interactions to the shell in which the media are presented. This brings the possibility of designing novel learning experiences and ways of interacting with the media. There is a growing literature on the design of onscreen multimedia resources, for example how best to combine text, graphics and sound (e.g. Moreno and Mayer 2000, Koumi 2005), but less on the complexities of designing integrated user experiences where non-linear multimedia is a major but not the only component.



Fig. 2 - The Video Jukebox: video and interactivity

Laurillard et al (2000) provide a useful approach based on Laurillard's well-known characterisation of learning processes as a 'conversation' between teachers and students (Laurillard 1993). Her learning conversation operates at two levels, discursive and interactive, linked to the twin processes of adaptation and reflection. In a complex, non-linear learning environment, the key is to maintain a strong narrative, in collaboration with the learner. "Teachers and designers must be clear what kinds of learning activities it takes to understand a topic, and then create the affordances for those activities." By affordances she means the characteristics and structure of the learning environment and resources that enable the student to learn about the topic, including for example providing explicit goals, opportunities for reflection and feedback on activities.

## 2.5. THE PEDAGOGIC BACKGROUND

---

Film and video are often associated with a classic instructional or transmission pedagogic approach, though even writers from the fifties such as Hoban and van Ormer and Dale did not see the teacher as the only source of knowledge. Hoban and van Ormer (1951) even suggested that appropriate video material could be as good as the teacher in communicating facts or demonstrating procedures. In other words, the learning of facts or concepts is not dealt primarily by the teacher transmitting information, but because of the interaction between the student and the moving image. However, his approach to teaching is still reminiscent of the transmission model, in that the teacher still has control and choice over the resources and over the time and place for the learning to take place.

Wetzel et al (1994) felt that "the effectiveness of interactive video was related to its being a form of computer-based instruction" and that this effectiveness in turn was explicable in terms of "the greater interactivity and individualisation afforded by the variable control of pace and course of instruction, an active participation in advancement" (1994:204). The constructivism approach claims that people construct their own understanding of the world, by generating their own individual mental models through experience. Interactivity, is therefore a key element within constructivism, in that control, choice, and access over the learning resources and experiences enable the learner to actively construct her/his worldview. Laurillard's 'conversation framework' described above is a good example of this approach.

This approach became more pronounced with the emergence of video streaming in the late nineties. The current pedagogical challenge for educators using this medium seems to move beyond the mere instructional/transmission model, or even the commonly well-supported constructivism view, to encompass the collaborative, situated and conversational modes. The argument is that interactivity with the learning materials might not be sufficient to provoke a meaningful learning experience. Kearsley and Shneiderman (1998), referring to the concept of engagement, argue that students should be “meaningfully engaged in learning activities through interaction with others and worthwhile tasks”. Here the quality of interaction and engagement between the teacher, the students and the learning resources, is arguably more important to the learning experience than interactivity as perceived as an isolated individual cognitive process.

Engagement as described by Kearsley and Shneiderman clearly embodies a more social form of learning, in which the control over the learning resources is distributed and shared among the learning community. The ability to combine digital video seamlessly with other tools over the web offers an opportunity to move our concept from video as a purely presentational and instructional tool to video as a focus for student activity, collaboration, and communication. Thus we can summarise these pedagogic shifts within the Three ‘I’s Framework in the table below.

Value	Technology	Locus of Control	Pedagogic Perspective
Image	Film, television, videotape	Teacher	Transmission model
Image + interactivity	Video disks, digital desktop video, multimedia, CD-ROM	Student	Constructivism model
Image + interactivity + integration	Web and streaming media	Distributed	Collaboration, contextualisation, community

*Table - The Three ‘I’s Framework and underlying pedagogical perspectives*

It is interesting to note that outside the field of education, community-led video websites have proliferated, the most prominent being YouTube ([www.youtube.com](http://www.youtube.com)), a Web service that encourages the sharing of homemade videos.

## 2.6. BEYOND 3 ‘I’S

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The Three ‘I’s Framework’ has proved to be a useful a practical way of ‘unpacking’ video and helps new practitioners in the design of video-based learning events that are both educationally meaningful and technically feasible. A range of ‘decision support tools’ have emerged based on or inspired by this approach. We will look at these in another section.

Since the Three ‘I’s Framework’ was developed there have also been interesting developments in the practical application of video with students. Young and Meldgaard (2006) have noted that there is in particular a growing focus on encouraging students to develop their own video. Allam (2006) observes that the creative challenge of using moving images and sound to communicate a topic indeed engaging and insightful, but

adds that it also enables students to acquire a range of transferable skills in addition to filmmaking itself. These include research skills, collaborative working, problem solving, technology, and organisational skills. When properly embedded in a sensibly constructed classroom activity, for example as a project based learning activity, it combines the different elements of skill, competency and knowledge acquisition in a constructivist manner using tools and technologies that are relevant for and engaging today's learners. Again, this requires additional preparation from the teacher (or team of teachers), who will not only have to be skilled in the subject matter, but also in the media technologies and in the art of teaching media with and for media. (Vanbuel and Bijmens 2005) A balance clearly has to be struck between learning about filmmaking, learning about the subject and acquiring other relevant skills, but combined with the growth of community sharing of video we may be seeing the emergence of a quite new paradigm in the educational use of video.

### 3. USES OF VIDEO IN EDUCATION – A 'TOP TEN' APPROACH

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#### 3.1. INTRODUCTION

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The aim of this section is to highlight the range of innovative uses of digital video in education with reference to their relative pedagogical value. The 'Top Ten' is a populist format but the underpinning pedagogical approach was inspired by Uskov (2005) who in his National Science Foundation project "Technology for advanced e-learning" investigated the perceived value of among video among teachers and learners. As part of his advocacy for increased use of this media, he referred to Edgar Dale's 'Cone of Experience' (Dale, 1969), originally developed to highlight the role of media in learning. According to Dale's intuitive model, learners learn better by "doing" rather than through more passive experiences such as reading and observing. "Learning by doing" is nowadays often termed "experiential learning" or "action learning". At the narrow top of Dale's cone are experiences such as reading, which are furthest removed from real life. At the broad base of the cone are immersive, contextualised learning experiences (see Fig. 1).

Revisiting this list, it seemed that Dale's model could usefully be reinterpreted. Although originally designed to show the role of educational media somewhere between reading and real activity, the changes in video production technologies described above enabled the 'doing' model to be applied to a wide range of educational media approaches. It provides a way of looking at educational video based on the principle that increasing degrees of learner participation may provide increasing quality of learning.

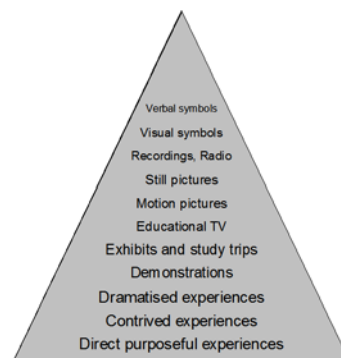


Fig. 3 - Dale's Cone of Experience (Dale, 1969, p. 107)



### 3.2. THE TOP TEN COUNTDOWN

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The Top Ten covers what we believe are particularly innovative applications of digital video in terms of increasing levels of student participation and (inter)activity. It will be clear there is considerable technical overlap between the various categories, and the distinction is based on pedagogical aim. As is customary, the Top Ten list will be presented in reverse order.

#### **Number 10 - Talking head lectures and tutorials**

For many practitioners, the starting point for self-generated educational video is some form of 'talking head', that is a recording of a lecture, tutorial or lab in which the main focus is the teacher who speaks directly to a live audience or the camera. This has the advantage of familiarity of format, role and content for the lecturer and raw video be generated quite quickly if, as is usual, a live event is recorded. The results when transferred into digital video format can be disappointing however in terms of learner engagement. Image composition is often a problem as teachers in live events often move about, which can be distracting and image and sound quality may be less than optimal if the event has been captured live. Nonetheless the idea of capturing an otherwise ephemeral learning event is which can then be accessed at any time is attractive for both students and teachers (Uskov 2005). Moreover, if the teacher is a good 'performer' his or her enthusiasm and approach can humanise a subject and engage a student. The value of humour, intonation, body language, articulation and so on cannot be underestimated; Gladwell (2005) describes research that that students could rate the quality of a teacher after watching only a few minutes of videotaped performance. Post-production editing can make the resource more accessible and engaging. Digital technology makes it relatively easy to navigate and search within a video presentation, the recording is often segmented into short topic-related sequences, and presentation slides can be synchronised to the video. Designs that are more ambitious attempt even more interactivity by posing questions with feedback (sometimes also in video format) at key points. In conclusion, although the 'talking head' is a relatively passive use of video, if well designed and/or featuring a good performance, a 'virtual professor' can be surprisingly engaging.

#### **Number 9 - Using authentic archive video material**

A second common route into educational video for teachers is to use existing video and audio archive resources. Until recently this involved digitisation of videotapes but in recent years there has been an international proliferation of digital archives offering copyright-cleared digital media resources to the education sector. Materials from the growing number of national portals can be searched, selected, sourced, edited and embedded into for example a virtual learning environment. One problem is that coverage in many subject areas is still very patchy and there is still a lack of general awareness of how particular clips can be used to illustrate specific teaching points. These may be transitional issues as online libraries grow and users begin to exchange ideas and even resources themselves.

#### **Number 8 - Animated screen shots**

An important genre of educational video does not involve shooting or using 'live action' material at all. This is the use of software such as TechSmith Camtasia and Macromedia Captivate to record and edit animated screenshots of using software together with a soundtrack in the form of 'mini-movies'. This general technology has been available for some years but was hampered by large file size until increasing bandwidth made it possible to deliver such resources to the desktop. Their most usual application is to train

users to use software, but presentations can also be captured along with audio tracks. Other software such as Photo to Movie allows the designer pan over and zoom into still images, again adding a soundtrack to potent narrative effect. In all cases, the user can select, skip, and fast-forward to specific segments in the materials. The increasing use of Adobe Flash software to combine video clips with animation is beginning to blur the distinction between live and computer-generated material.

#### **Number 7 - Instructional 'how to videos' of a practical activity**

Video is used to show the process, procedures, and different stages of doing something concrete. It is also used as a demonstration method to show experts and apprentices in practice. Instructional video has a long history in education but a major advantage of the digital format is that a linear narrative is no longer necessary and users can choose from a menu of sequences depending on level and need. The best examples such as the BBC "Good Shooting Guide" (2005) may combine animated screen shots, talking heads and archive material (as case studies) to produce an attractive, engaging and relatively interactive experience for the learner. The disadvantage is that designing stand-alone online learning packages is challenging, time-consuming and can be expensive.

#### **Number 6 - Interviewing an expert or expert presentation**

From a technical perspective, bringing a guest speaker into the classroom can be similar to recording a talking head, but the pedagogical aim is usually to contextualise learning through the often tacit knowledge and insights of a practitioner or expert, or to present an alternative viewpoint. Such events are used to trigger further discussion with the contents of the video resource being a point of reference for participants. Mark-up tools are emerging to enable students and tutors to attach comments to specific items of the video and audio track (e.g. Wallace and Donald, 2006).

#### **Number 5 - Video blogs 'think aloud'**

Educational blogs have proliferated where the subject (learner or teacher) record their thoughts and actions. The success of blogs is associated with informal personal reflection and as we have seen above video and audio can capture tone, humour, and spontaneity. The subject by him or herself can be doing a video diary or be prompted by an off-camera person.

#### **Number 4 - Video case studies/simulations/role plays**

Here the intention is to simulate an event such as a lab experiment where safety might potentially be at risk or to engage in a role-playing situation in the form of a case study where the students can experiment with different responses and behaviours. By analysing these behaviours, students can gain a greater insight into the issues at stake. Video in this case provides 'real life' context, and/or emotional impact. West and Donald (2006) comment that in their multilayered simulation of a social work case study "Clydetown", "the use of audio and video has been demonstrated to add an authentic voice to the subject matter being examined".

#### **Number 3 - Videoing real events in situ**

The purpose here is to capture an action that cannot be physically brought into the classroom. This might apply to any outdoor event or situation, typically field trips. Similarly video provides access to events in which it is difficult for large groups of students to participate such as a clinical events and industrial environments. Real life events can be observed, interpreted, and discussed. Access to external experiences can provide opportunities for contextualisation and knowledge transfer.

## **Number 2 - Presentation/performance skills and feedback**

Reflective video self-modelling has been used for many years to enhance practical skills with learners such as diverse as teachers, medical students, theatre students and sales students (Millar, 2005). The aim is to capture, review, and enhance performance of individuals and groups through reflection and discussion. Strathie (2006) notes that this approach promotes self-directed learning, increases motivation, and activates learners to find their own solutions, so increasing self-confidence. Although guided, the learner is an equal partner in this process. These recorded performances can be further used as part of students' e-portfolios.

## **Number 1 - Students create their own video**

So far, we have largely discussed how teachers can make and use video. However, we have put at the top of our list the creation of short videos by students for projects or portfolios. In Dale's terms, 'doing the real thing' can be considered the most effective context for learning. Allam (2006) observes that the creative challenge of using moving images and sound to communicate a topic indeed engaging and insightful, but adds that it also enables students to acquire a range of transferable skills in addition to filmmaking itself. These include research skills, collaborative working, problem solving, technology, and organisational skills. A balance has to be struck between learning about filmmaking, learning about the subject and acquiring other relevant skills. Other than in media studies the main emphasis should be on video production as a process for gaining deep insight about the subject. From the pedagogical perspective, the focus is on the student and expands the idea introduced in the previous application of the student as a co-creator of knowledge. Although Allam reports high quality outputs, it is the process of creating the video, which may be as important as the resource itself. There are limitations. If the students are new to filmmaking there may be a steep learning curve so in general creating videos is more suitable for large group work projects.

### **3.3. CONCLUSIONS**

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The Top Ten is based on Dale's concept that increasingly levels of activity encourage better learning. According to this model students producing a video about a subject may be more effective pedagogically than students passively watching a video. Although we believe this is a useful framework, we would hesitate to suggest Number One is always pedagogically superior to Number Ten. Educational contexts are always complex and inevitably resource dependent. 'Talking heads' at the bottom of our list may be appropriate, useful, and effective in many circumstances. Moreover, as we have seen they may be designed or used in ways that are both interactive and engaging. Similarly archive materials, animated screenshots, instructional resources can be used in a variety of active designs. Expert interviews lend themselves more to reflection and discussion and the entire top five have an increasing focus on student participation.

The intention of the Top Ten, however, is to be descriptive rather than prescriptive, to present a range of both well-known and comparatively novel approaches that may be useful in diverse circumstances. Nevertheless, the participative model provides a useful perspective to consider how we expand the use of video in education in ways that are interactive, integrated, and creative. This participatory model underpins our vision a dynamic visually rich learning environment where moving images and sounds, often sourced from video archives but just as commonly produced by teachers and students becomes increasingly mainstream. Just as importantly by creating and sharing video for assignments, assessment or reflective digital portfolios video is embedded in the everyday activities of the students.

The idea of using video in the classroom is often already a major factor to motivate students to participate actively during the courses. In our own experience, we discovered that students are generally more enthusiastic about the use of new technologies, than traditional teaching methods. This has a great deal to do with the fact that they have the feeling they will need the use of this materials in their own later professional life.

“Videos are available on almost any topic and for all types of learners in all the domains of instruction – cognitive, affective, motor skill, and interpersonal. Video can manipulate both time and space. It can take the learner almost anywhere and extend the students’ interests beyond the walls of the classroom.”<sup>3</sup>

## 4. CASE STUDIES

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The VideoAktiv project website contains a best practice database where a lot of inspiring case studies are presented ([www.videoaktiv.org/index.php?id=97](http://www.videoaktiv.org/index.php?id=97)). Here we will only present one example per case study type.

- Giving and depth to real events (by inclusion of original material)
- Developing and accessing a library of cases or units of learning material
- Capturing and re-using a communication event (e.g. Lecture, presentation)
- Creating and sharing ones own resources
- Supporting a learning process (documentaries, tutorials, interviews etc)

### 4.1. DAVIDEON

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*Type: Giving and depth to real events (by inclusion of original material)*

Davideon is a project carried out by the Rijksuniversiteit Groningen, Universiteit van Amsterdam, and Christelijke Hogeschool Windesheim. It aimed at exploring the technical, pedagogical, and organisational aspects of the use of streaming video in higher education.

Davideon started from the conclusion that video has not yet received full attention in an educational context. The main aim of Davideon was thus the development or adaptation of courses making use of the pedagogical advantages of video collections. This was technically done through the Internet and streaming video. The Davideon pilot is in fact the sequel of the @valon project, a project that focused on the technical issues of streaming media delivery. Within three different programs (journalism, History and Media and Culture), 10 courses were developed, making substantial use of the catalogue of the Dutch institute of image and sound. The results and experiences of the project were bundled in a publication: ‘Davideon, een wereld in beeld en geluid’.

The ten courses each had their own learning objectives by making use of the streaming video fragments of the video archive. In general, the project’s objective was to enhance the knowledge and insight in visual media, and the ability to use visual media as a source for scientific research.

[www.davideon.nl](http://www.davideon.nl)

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<sup>3</sup> Smaldino, S., and others, 2004

## 4.2. DIDICLASS

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*Type: Developing and accessing a library of cases or units of learning material*

Didiclass is a collection of video cases that can be used in teacher education. Each case is built up around an issue mentioned by a student teacher. The student teacher is interviewed about this issue, the situation in the classroom is shown, and the supervisor and pupils of the student teacher are interviewed about the issue. Sometimes also, other lessons with the same situation and interviews with experts are shown. Together these videos are the case. New students can study the case in a group and discuss the case. The benefit of these cases is that there are now cases where different kind of views are available, cases that are very authentic and directly related to student questions.

The aim is to teach students to analyse different situations in teaching and to learn to see the different points of view in education

[www.didiclass.nl](http://www.didiclass.nl)

## 4.3. DIGITAL VIDEO PROJECT

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*Type: Capturing and re-using a communication event (e.g. Lecture, presentation)*

The University of Pittsburgh Digital Video Project enables student teachers, interns, cooperating teachers, mentor teachers, supervisors, and University educators to work collaboratively on real time teaching evaluation and problem solving.

Users of the website can view hundreds of teaching vignettes to use as models, reflective tools, and instructional aids. The digital portfolio contains recorded lessons and presentations; lesson plans and student work samples as well as Professional commentary on the teaching segments, planning documents, and the student work samples. These commentaries serve as self-reflective analyses of teaching. This critique might also serve as theoretical perspective of the student's work.

The purpose of this course was to give student teachers, interns, supervisors, university staff, and members of education departments around the globe the opportunity to view exemplary teaching taking place in the Greater Pittsburgh region.

## 4.4. GRUPO MULTIMEDIA EHU - UNIVERSITY OF THE BASQUE COUNTRY, BILBAO

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*Type: Creating and sharing ones own resources*

This case study is about 27 hours of Lectures corresponding to a full course of Engineering. The complete didactic resources (video, documentation, text, assignments and other resources) are integrated in an e-learning environment. The video model integrates the teacher video with the video activity of his/her computer, allowing to the student to participate in the class with the advantages provided by the computer video information (class presentation, comments, simulations, etc.)

The purpose was to understand and use the concepts of discrete event simulation in solving complex engineering mathematical problems.

[http://multimedia.ehu.es/en/expertise\\_1.htm](http://multimedia.ehu.es/en/expertise_1.htm)

#### 4.5. KEN HEATHER ECONOMICS ONLINE

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*Type: Supporting a learning process (documentaries, tutorials, interviews etc)*

Many people find economics interesting but they also find it a challenge. Ken Heather is exploring ways of helping people to gain insights into the subject. He does this by various means, including lectures, illustrations of economic principles, interactive exercises, and multi-choice response questions. These are presented at different levels, from introductory concepts to more advanced ideas. It is a site in development.

By presenting economics in a challenging and interactive way, the users gain more insight than from simply reading a text. Prof Ken Heather generated this content (assuming on the basis of existing courses) with help from the Media Development Centre at the University of Portsmouth.

<http://stream.port.ac.uk/business/economics/heather/businessandfirms/default.htm>

# THINKING ABOUT EDUCATIONAL VIDEO

## Why and How?

### 1. INTRODUCTION

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The development of digital audiovisual resources for or with your students can be very rewarding. However, it is important to have a clear rationale for what you want to achieve pedagogically. The complex process of designing, developing and using rich media resources is exceptionally engaging for both teachers and students and it is sometimes easy to lose sight of the teaching and learning goals, to focus on the multimedia product rather than the learning process.

As the various aspects of digital media production are sometimes confusing, it is useful to take a structured step-by-step approach and to clearly express what you want to achieve with your students, noting some of the technical and design issues that will help or hinder your progress towards that goal. As resources – especially time – in educational institutions are frequently limited, successful outcomes always require good planning and communication. Not only is a structured approach a useful check for you, providing a sound base for your media project but it helps communication with technical and support colleagues.

Fortunately, a number of groups in this area have produced template-based guides to help teachers. Two of the best ones in English are

#### **The Click and Go Video Decision Tool (2002)**

[<http://elisu.gcal.ac.uk/click/tool.pdf>]

The Decision Tool, produced by the UK project 'Click and Go Video' has been used very productively particularly with newcomers to this area in the UK and the Netherlands for a number of years. It takes the teacher through five stages, firstly by defining the teaching and learning objective then finally adapting it according to technical and design restrictions. The tool uses the 3 'I's model and although the technical aspects are now somewhat dated, remains a useful and easily adaptable approach.

#### **Dialogue Tool for Planning of Video on the Net (2005)**

[[http://www.fsknet.dk/unividpdf/Dialogue\\_Tool\\_Sept.05.pdf](http://www.fsknet.dk/unividpdf/Dialogue_Tool_Sept.05.pdf)]

Essentially an expansion of the above approach, the Dialogue Tool was originally produced in Danish by Uni-C, part of the Danish Research Network. As its name suggests, it is focused on producing a pedagogical and technical specification, which can be communicated with support staff. It uses a three stage approach: pedagogy, form and content; technology and production; and experience gathering.

The message from all of these tools is essentially the same. Before working with video in education, you need to ask yourself how it adds value or will produce better learning results. The tools provide a short list of questions at each stage, but always start by asking you to state very clearly for yourself what it is you want your students to learn, as you would for any class. When you have clarified your goal, you need to think about your audience. Who is your audience and what environment will they be in while learning? This in itself can raise all sorts of technical issues.



When you have the basic concept of what you want to achieve, and you decided that using audiovisual or multi media additions to the program, the next stage is to choose the most appropriate approach. The 'Top Ten' is a useful way of thinking about this, and we give more examples below. Choose the right medium and choose the most effective way to bring it to your students, usually the easiest way is best. Remember that working with these techniques might be very time consuming. The effort that goes into it must be in balance with the effect it has. At the end of the classes, you will want to evaluate your students and possibly the technique used. Look for an evaluation method before you start with the practical use of video.

In our experience, by working in this order (pedagogy then technology) you will have the best chance of a satisfying educational outcome. Where unsupported newcomers sometimes go wrong is to decide to do 'something' with streaming, spend time on technical design and production, and think about the teaching and learning issues later. While this is understandable – new teaching and technical approaches excite us all – it does not always guarantee a good outcome, while a structured approach usually does. Of course, once you have more experience of the medium, and a better idea of how it works pedagogically with your students and in your subject, it is tempting to take a more unstructured approach, but we believe planning and communication remain the keys to success.

An example of this type of process, and the type of questions asked, is given in the next section.

## 2. DEFINE YOUR GOAL

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### 2.1. LEARNING GOAL

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What do you want your students to learn? What are the skills or knowledge you want them to master when finishing the class? How is this subject matter important for students in their learning process and more specific later in their professional life?

### 2.2. FUNCTION OF THE ASSIGNMENT

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What is it you want your students to experience, practice or understand with this specific task? How do you think it helps to reach your learning goal? When giving the task to them, add a paragraph on why you think this practice might be of use for them.

### 2.3. GIVING THE ASSIGNMENT

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Write down what it is exactly you want your students to do and how? Specify what the outcome of their work must be. What kind of feedback do they need to give on the task (paper, oral report, production...) Mention the medium, the quantity, whether it is an individual work, or how many students can work on one assignment. In what form will they be evaluated? Add deadlines and the time you expect your students to spend on their task.

It is important to make up your guidelines with care. Students often end up with the wrong result, just because they did not understand the assignment properly. This will not lead to the intended learning goal. To avoid this you can organise in between evaluations. Plan deadlines for these as well.



### 3. DEFINE YOUR AUDIENCE

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#### 3.1. WHO IS YOUR AUDIENCE?

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If you want the use of video to be effective concerning its educational value, the video should meet some pedagogical requirements. First, it is important to get students motivated to look at the videos in a concentrated way. Because students are still very used to traditional ways of teaching, a video that is played back in class only seems of little importance in comparison with the rest of the lesson. Therefore, it is important that students are made aware of the value of the material they are watching.

Secondly, largely, the motivation of the students and the impact of the material on them have to do with the selection of the material. Showing videos that are strongly related to the living context of youngsters will have much more effect on students than video that treat issues without any relation to their personal life. Showing a video of a popular program out of the youngster's childhood will affect the students more than a video on Chinese pottery for example<sup>4</sup>. You should always be aware of the reference frame of the students to make an appropriate selection of the material.

Next to the issue of drawing the attention of your students to the video, there is also the effectiveness of the video itself that is important. It is a basic fact that the learning process goes faster the more it is related to knowledge that students already gained before. Therefore, education should begin with the initial status of the student's knowledge. The responsibility therefore lies with the teacher, who has to make sure he knows very well what the student already knows and at what point he has to start giving new information. However, "knowledge" can fade away slowly so it is a necessity to activate existing knowledge first before providing new information. Audio and video are strong media to do this, if of course the material is related to this knowledge and if it provokes strong emotions towards the subject matter.

Check the size of your audience. In selected groups, other things are possible than before a big audience.

#### 3.2. THE STUDENT'S LEARNING ENVIRONMENT

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In what environment will the material be shown? Will it be during a traditional lecture in an auditorium or will the students be able to view it on their own computer at home? Will they have supervision or not? Will they see it in a group or individually? Is the viewing tied to a certain time and space or will they be able to view it at anytime, anywhere? Will it be shown on big screen or in a little region on the computer? The distance to the video screen is usually three to eight times the screen's diagonal, while the viewing distance for computer is one to three times the screen's diagonal. This matters for perceiving details or being able to oversee the global image. The resolution of a computer screen is higher than that of a normal television-monitor. In addition, the computer shows much more frames a second than a video screen does. That is why the computer will show fewer flickers and still give a clear image for fast moving and/or small objects. However, when your students will view videos on their own computer, it will probably be through the Internet. Taking into account the bandwidth available, videos need to be compressed for streaming. This will considerably deteriorate the quality of the image. For the same reason videos cannot take too long unless they are sufficiently compressed and streamed. Think about the location to determine the length

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<sup>4</sup> Davideon, 2002

of the video. In a class environment you can expect the students to stay attentive over a longer period than at home. Moving images draw attention; this does not mean that video is able to hold the attention. Avoid passive viewing. In class, you can avoid this by having discussions. On the Internet, make sure the students actively need to handle the material. Give the videos a navigation bar so that they can scroll to the material and look at things again at their own pace. Do not let the video start upon opening the page but make them start it themselves. Make them able to choose.

Do you have an international audience, learning from their home countries? Then take into account cultural differences and maybe provide different language versions.

Will the students be exposed to the video in combination with other media, such as texts? If this is the case, it is best to keep certain continuity throughout the material: the same graphic design, the same chapter divisions.

## 4. DEFINE YOUR APPROACH

This list of approaches can be used alongside the Top 10 list (Section A3.1), which takes a structured pedagogical approach.

### 4.1 CHOOSING THE APPROACH THAT BEST SUITS YOUR GOAL

<b><u>What do you want to do?</u></b>	<b><i>Technique</i></b>	<b><i>Description</i></b>
Show an action that cannot be physically brought into the classroom	<i>Realism</i>	An outdoor event, a performance, wildlife, a medical operation, an action that takes place far away or in the past... These phenomena can still be observed, analysed, interpreted, and discussed by your students through audiovisual work.  Check for existing material.  If you want something more specific, make your own production.
Show an action that cannot be physically observed	Simulation	A situation is staged to resemble the actual event.  Reasons to choose for simulation rather than a real life recording: <ul style="list-style-type: none"> <li>• Safety</li> <li>• The action took place in the past</li> <li>• Rare situations (hard or expensive to shoot in real life)</li> <li>• You want to show alternative versions: a good and bad example</li> </ul> Check for existing material before making your own.
Demonstrate a concrete	<i>Instructional</i>	The video is made chronological and

procedure		shows the different stages in a specific process
Give examples on the subject matter	<i>Illustration</i>	Concrete situations that illustrate the subject matter, makes it easier for the students to understand and memorise.
Record a lecture or presentation	<i>Talking head</i>	The subject speaks directly into the camera.  The point of view is that of the audience. When looking at the tape it feels as if the speaker addresses the viewer.
Record somebody's reflections/ reactions /describing their reflections	<i>Think aloud</i> <i>Video diary</i> <i>Interview</i>	Video diary: subject talks before the camera alone  Interview: reflections triggered by another person
Record an event to observe and analyse later	<i>Fly on the wall</i>	The camera is fixed at one point and registers.  You can use this technique when there's no script prepared. The subject does not change place too much nor needs different focuses (detail – overview).  Afterwards you are able to play back and discuss.
Record an event to archive and consult later	<i>Archive</i>	Depending on your possibilities, the quality you want to obtain and how complicated your seminar/workshop/conference is; you can use several camera angles and/or use personnel for moving cameras.  The event can be edited by direct mixing or the rushes can be organised later in an editing program.
Make students observe their own behaviour	<i>Role playing</i>	Video serves here as a mirror for the students to watch themselves in their professional situation. Through simulation of the work environment, students can experiment with different roles and behaviours. Record and play back. Now the students can analyse and discuss with fellow students what can be better.  If possible, this can also be recorded in a real life situation.

4.2. CHOOSING THE MEDIUM

<p><i>Video</i></p>	<p>With video, you can apply all of the above named techniques.                  We state again the advantages of video as opposed to classical learning.  <b>Advantages:</b>                  High degree of reality and visualisation.                  Can show practices that</p> <ul style="list-style-type: none"> <li>• Take place over a long distance or period.</li> <li>• Are dangerous</li> <li>• Are expensive</li> </ul> <p><b>Disadvantages:</b></p> <ul style="list-style-type: none"> <li>• Students may see video as a less important aspect of the class</li> </ul>
<p><i>Audio</i></p>	<p><b>Advantages:</b></p> <ul style="list-style-type: none"> <li>• The use of audio is advisable when the audio source is the subject matter itself. (Like a music piece, animal sounds, a language course...) Materials that cannot be described properly in words.</li> <li>• Audio is a medium to reach people with a visual disability</li> </ul> <p><b>Disadvantages:</b></p> <ul style="list-style-type: none"> <li>• Audio without a visual cue is a fleeting medium.</li> <li>• An audio recording of a lecture is not suitable for learning.</li> <li>• Audio is only effective when it accompanies other visual information, such as slides, pictures, and animation...</li> </ul>
<p><i>Animation</i></p>	<p><b>Advantages:</b></p> <ul style="list-style-type: none"> <li>• Medium for simulation</li> <li>• Can visualise abstract relations.</li> <li>• To explain concepts and procedures that requires movement that cannot be filmed.</li> <li>• Movements in the universe or within a body.</li> <li>• Figurative movements such as ideas. Economic tendencies can be clarified through moving graphs.</li> </ul> <p><b>Disadvantages:</b></p> <ul style="list-style-type: none"> <li>• Intensive and time consuming work</li> <li>• Animation with a decorative function can distract from the subject. Attention and perception are selective. Irrelevant material might disturb.</li> </ul> <p><b>Recommendations:</b></p> <ul style="list-style-type: none"> <li>• Be realistic: if possible, animations should have the same colours, proportions, shapes, and characteristics as the objects they are</li> </ul>

	<p>representing. This way they are better understandable.</p> <ul style="list-style-type: none"> <li>• Do not add too much detail. Abstract animations are easier to remember.</li> <li>• Present your animation with audio text. Make sure the two media complement each other.</li> </ul>
<i>PowerPoint</i>	<p><b>Advantages:</b></p> <ul style="list-style-type: none"> <li>• To present static images accompanied by a summative text</li> <li>• Possibility to include audio-visual material</li> </ul> <p><b>Disadvantages:</b></p> <ul style="list-style-type: none"> <li>• Compilation of materials can be time consuming and specific rules need to be followed in order to be an effective way of learning</li> </ul>

#### 4.3. CHOOSING THE PRESENTATION METHOD

<b><u>What do you want to do?</u></b>	<b><i>Method</i></b>	<b><i>Description</i></b>
Supporting a lecture with audiovisual material	<i>Carrier /physical medium</i>	<p>Check the equipment in your classroom or auditorium.</p> <p>Most common you find VHS, CD(-Rom) and DVD</p> <p>VHS is an analogue tape. This means you will be able to play, rewind, stop, fast forward and pause your video. However, everything happens linear; you cannot switch from the beginning to the end.</p> <p>CD-rom and DVD are digital, which gives you the extra possibility to easily navigate through your material by means of chapters or folders. In one click, you can switch from beginning to end.</p>
Present the material to your students Independent of time and space (Asynchronous access)	<i>Streaming</i>	The video can be viewed on demand. The student himself has control over the material and can work on his own pace, by navigating through the subject matter.
Work in an international context	<i>e-Learning</i>	<p>Virtual Learning Environments</p> <p><b>Disadvantages</b></p>

Interactivity		<ul style="list-style-type: none"> <li>• Not necessarily less work:</li> <li>• Material has to be produced</li> <li>• Requires a constant feedback and support</li> </ul>
Integrate the video in other learning methods	<i>Multimedia</i>	<p>All these techniques and media can be combined.</p> <p>Information that is being presented both visual and in audio, is better understood and remembered.</p> <p>It is easier to learn through different channels. However, these channels cannot appear separate from each other. It is better to present video and text on the same subject together on the page than to put them in different folders.</p> <p>However, make sure you always think of the material's relevance in order not to overload the senses.</p> <p>The advance of digital television and the key word interactivity as the prerequisite for good educational practice came together in the demand for totally integrated use of videos in education which is already the reality of most young citizens in Europe outside of the official educational system.</p> <p>From the mid nineties, the web reinforced further the ideas of accessibility and interactivity, but added a new element, <i>integration</i>. This refers to interlinking with other web materials including communication and collaborative tools. This trend, in which several types of media in education are combined is called "Multimedia or hypermedia Learning". The streamed video is then part of a whole package of educational material, like for instance printed documents, websites, PowerPoint presentations etc. There are plenty of possibilities of elaborating a simple video by means of other tools and methods. That is one of the real advantages of streaming videos in comparison with an ordinary VHS. In chapter 6 the Hyperfilm tool for example - which allows adding hyperlinks in a digital movie - will be further discussed.</p>

## 5. EVALUATION

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As with any novel approach, it is important to evaluate your own and your students' experience of using rich digital media. This is partly to learn from the experience but also to justify the time and additional effort involved. If we feel using video and audio is educationally effective, this is a way of gathering evidence to support our case.

The structured approach to design described previously is therefore important to articulate the teaching and learning goals for your video project in a way they can be measured. You may be familiar with evaluation methods but understanding the pedagogical impact of using digital audio and video is still a complex task. The UK Click and Go Video project therefore developed a simple methodology for educators including a number of criteria and indicators for evaluation specifically for rich media. Their methodology emphasised the formative nature of evaluation: that it should be a learning process that takes place throughout the design and production cycle and not left until the educational intervention is completed.

Their guide can be found at Hodgson, Zenios and Asensio (2002) Click and Go Video: Chapter 14 Evaluating the educational benefit

[<http://www.edusite.nl/docs/webstroom/s1introduction.pdf>]

# USING EXISTING MATERIAL

Looking for existing material or creating your own material, each have their advantages and disadvantages. When you create your own content, the material will be of optimum use for the teaching and learning goals you have set. You can create just the content that you think is necessary. However this may require a lot of effort and technical skills, not every teacher is a good video maker. Using existing materials has the big advantage that all the creative work is done (and moreover is done by professionals who know how to make good video). However, you still may need to select and maybe edit the material that is related to your particular course.

## 1. ADVANTAGES AND DISADVANTAGES

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One way of using video resources in class is to use existing materials that are recorded from television, available on the web, or even bought or rented at the video store. Many teachers already use video in their lessons, and not necessarily only educational videos. Numerous specialised production companies create high quality educational media for all ages and in every content area: science, languages, literature, politics, etc. Furthermore, there are also the public broadcasting companies, such as the BBC in the UK, TELEAC in the Netherlands, La5 in France, RAI in Italy, etc. as well as certain government or public agencies (the European Commission, ESA, Ministries of Education, Media and Culture, etc.) which make a range of good quality educational videos available.

Whether you use existing material or you create your own, both solutions have their advantages and disadvantages. One of the advantages of using existing material is the cost. There is no need for expensive equipment to shoot and edit the material; there is only the need for a (digital or analogue) video player and the mostly moderate cost for the acquisition of the media. However, when the content of the video you are using is not 100 percent appropriate for the purpose of the lesson, you will need the computer equipment, software, and skills to edit it.

One very important issue with using existing material that is often overlooked is the copyright. Not every video or media can be shown publicly (even to a class) without the permission of the rights holders of those media. This frequently causes complications.

## 2. DIGITAL ARCHIVES

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### 2.1 CONTENT-BASED SEARCHING FOR VIDEO<sup>5</sup>

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The problem with searching for video digitally is that it is a medium with high complexity that is not easily described or interpreted on the computer. The way to find audiovisual material in digital archives and commercial search engines such as 'Google' and 'AltaVista' is text-based. This means that you find your sources through the secondary textual information that is added with the material by the maker or server of the video. This can be the title of the production or one or more keywords that have been assigned to the media by its users: so called 'tags'. Tags can be extremely helpful to find the right material. Tagging however is not yet particularly systematic and the dynamic multi-

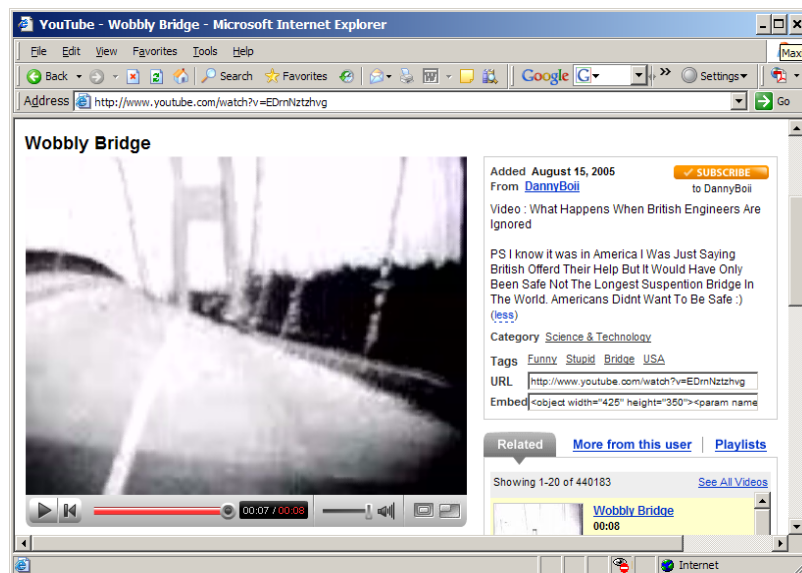
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<sup>5</sup> The Characteristics of Digital Video and Considerations of Designing Video Databases, Chueh-Wei Chang, Keh-leng Lin and Sub-Yin Lee, Institute of Computer science and Information Engineering, National Chiao Tung University, Hsinchu, Taiwan, R.O.C



dimensional nature of video makes it difficult to describe in a few keywords. Users are always dependent on the information assigned by the maker. If it hardly contains any accompanying textual information, it will be very difficult to find the video you are looking for. For this reason, if you are tagging a video yourself, always do it as clear and specific as possible.

Searching on Google Video for the famous film on the wobbly bridge (the spectacular collapse of the Tacoma Narrows Bridge in 1940), using the search term “wobbly bridge” does not give any meaningful results. On YouTube on the other hand, the same search term results in the right movie immediately. The tags assigned to this video (“funny”, “stupid” “bridge” and “USA”) are not immediately revealing.



*Fig. 4 - Searching for a “wobbly bridge” video on Youtube*

Research is trying to find a way to search video archives through content-based retrieval. The moving image has several specific characteristics that can be analysed such as object shapes, motion tracks, colours, and differences in illumination... Through pattern analysis, one could find algorithms for recognising for example a face or a person or a characteristic movement. However, this technique is still in a very early stage and cannot be used for searching for video now. That is why it is easier to use organised video archives.

## 2.2. VIDEO ARCHIVES

Most video archives are located at a specific physical location. This can be the audiovisual collection of your institution or the archives of a television broadcaster or museum. In most cases, data here are stored on analogue or digital videotapes. Like in traditional book libraries, normally text descriptions of the content of the tapes, containing production data as well as content descriptions or key words, sometimes even containing complete transcriptions of the script or of the soundtrack, can be looked up digitally in an analogue of digital registry. These however can only be limited a textual reference to the source materials and because these are inevitably richer by the use of images, sound and dynamic elements (time), a full consultation of the whole content of course requires the physical possession of or access to the material, in order to view it. Its physical representation prohibits it from being consulted at any place, at any time. Moreover, sometimes you will have to copy the video in order to use it. Working this way will often take a lot of time, since you will need to find the tape, retrieve it, view through the material on tape (which means looking through it from beginning to end as

tape is linear) to find the interesting places and maybe edit and copy the interesting parts.

Nowadays, an increasing number of video archives are being made accessible on the Internet through streaming (or download). In some of these databases, you can search for video by theme, author, title, date, or keywords. Increasingly you can find material on the websites of broadcasters or education and commercial organisations, sometimes publicly available, but often also behind some registration mechanism that limits the access or use of the media to registered users.

### 2.3. EXAMPLES OF DIGITAL DATABASES

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The following are just a few samples of digital and online archives (accessible through the Internet) that are organised in one way or the other. These are not all per se educational media repositories, or public repositories, but they give an idea of the wide range of media archival and access provision solutions that already exist and of the direction in which these may develop in the future. The impression exists that video will have an enormous impact on the future of the Internet as a whole. This seems to be confirmed by the number of sites that are dedicated to video and media or that are integrating video to an important extent. The discussion whether video is the future of the Internet goes on. Supporters of this statement point to the fact that most people prefer to experience their entertainment and information as live and directly as possible. Video is the closest we come to real life when it comes to real life experiences. As the bandwidth increases, we can expect that the Internet will become increasingly video-based. Furthermore, with people getting increasingly access to cameras and media software like Windows Movie Maker or iMovie also the content will become more advanced. Next steps for Internet based video will be the automatic analysis and indexing of the media allowing for much more focussed searches for video materials.

#### *Google Video*

[video.google.com](http://video.google.com)

Apart from being a search engine for websites and pictures, Google can also be used to search for video clips on various topics. On Google's video homepage, the most recent and popular clips are presented but if you look for a topic in particular, you can use the keywords based search function. Although useful, as this is an internet-wide facility, it is unlikely many of the search results will be copyright cleared, therefore care should be taken in the re-use of most of these materials. Advantages of Google video over other video resources on the web are the fact that videos can be downloaded without any problem, in a better quality than others and in a format that is compatible with commonly available DivX players. Also the automatic resizing to screen resolution and size is an advantage. The lack of community services that are found in YouTube on the other hand is considered a disadvantage.

#### *Video Data Bank (VDB)*

[www.vdb.org](http://www.vdb.org)

A major resource for videotapes by and about contemporary artists in the USA, searchable by artist, title, and subject. The site includes bibliographies, essays, links, and QuickTime clips from a selection of the videos, as well as interviews with the artists.

#### *NASA's HEASARC video archive*

[http://heasarc.gsfc.nasa.gov/docs/outreach/images\\_vids.html](http://heasarc.gsfc.nasa.gov/docs/outreach/images_vids.html)

The High Energy Astrophysics Science Archive Research Centre (HEASARC) is the primary archive for high-energy astronomy missions, in the extreme ultraviolet, X-ray, and gamma ray wavelengths. The HEASARC provides archival data, multi-mission software and analysis tools, and information about current and past observatory missions

*The Prelinger Archives*

[www.archive.org/details/prelinger](http://www.archive.org/details/prelinger)

A collection of over 48,000 "ephemeral" (advertising, educational, industrial, and amateur) films. Available to be used freely in education

*SURFnet Video Portal*

[video.surfnet.nl](http://video.surfnet.nl)

The SURFnet video portal is the central point to enter streaming material published on Surfnet.nl. This is a computer network for higher education and research issues in the Netherlands.

*Internet Archive*

[www.archive.org](http://www.archive.org)

The Internet Archive is building a digital library of Internet sites and other cultural artefacts in digital form. Like a paper library, they provide free access to researchers, historians, scholars, and the public at large.

### 3. DIGITISING ANALOGUE VIDEO AND FILM

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Video recording generally consists of writing the images and sound in some kind of modulated format directly on magnetic tape. By converting the images and sound into a digital format (which is becoming increasingly the norm now that digital cameras and recorders of high quality have become affordable) before recording, it became much simpler also to record on other storage media such as hard disks. For reasons of efficiency (amount of storage / cost / physical size of media / robustness) tape still is the preferred carrier, not only during the recording phase but also for transport or long-term storage.

There is a large amount of old recordings available within educational institutions and elsewhere, very often in analogue formats such VHS, s-VHS, Hi8, U-matic, Betacam, or Betamax. If they are still usable (these magnetic tapes deteriorate after a number of years), they can be duplicated on digital carriers and even fully digitised for disclosure in an electronic way.

#### 3.1. ANALOGUE VIDEO

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Recordings on analogue tape can easily be digitised by copying them on a digital tape format (such as DV, DVCam, DVCPro, Digital Betacam etc). In the process of the copying, the analogue signals are immediately transferred into a digital signal. This signal can then in turn be imported directly in editing equipment.

Another way of digitising analogue video is by making use of an A/D Converter such as Canopus or ADSTech to capture the images and sound. Very few computers have this A/D Converter on board, or are able to carry out this conversion as this is a demanding process. It may be easier to find a separate converter, which has an analogue input and

a digital output (via USB, USB2 or even better via IEEE 1394 also called FireWire) that then goes straight into the PC. This process is commonly called capturing.

Once in the digital format on the PC, the user can choose what to do next with it: view, store, and edit the materials. Note that these media, when captured with respect of the original quality, and without too much compression in order to be able to edit and reprove these, are quite large in size: 1 minute of video captured in DV quality, takes about 200 MB of hard disk space. Working with video quickly becomes demanding on hardware and storage.

### 3.2. FILM

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Old films often are extremely valuable, but it is not simple to show them or even show parts of them, as it requires the right projector and a dim room. To make these films available for access, it is recommended to have them transferred to a video format and then even better to a digital video format. You may encounter a number of film formats in educational context: mainly 8mm, Super8, and 16mm. Then there are the larger formats Super16, 35mm, and 70mm that are used in the cinema.

An easy solution for transferring film is to project the film onto a screen, capture the image with a video camera while the film plays, and record it with a videotape recorder or directly on to a hard disk. It sounds all a little easier than it is as it does require some care in setting up and selecting the screen and camera to avoid disturbing flicker.

A better way of transferring film is by using a device called 'telecine'. This device incorporates a projector and a camera (or rather the light sensing part of it, the CCD in one unit. This technology is rather expensive. Specialist companies provide this type of telecine services to provide you with one or more video copies of film.

## 4. CAPTURING SCREEN-BASED MATERIAL

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### 4.1. SCREEN SHOTS FROM APPLICATIONS

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When teaching your students how to use a certain software tool, it is easy to give them an insight in the interface of the program by directly using screen views as they are displayed on your own screen. Make a screen shot of the different stages of their task and paste them into a new document or a PowerPoint. You can take a snapshot of your screen or part of it to paste into any type of document, just by pushing the Print Screen button on your keyboard (on Windows-based computers) or by using special software such as SnagIt ([www.techsmith.com](http://www.techsmith.com)). Screen-capturing tools such as Camtasia (see also [www.techsmith.com](http://www.techsmith.com)), the Screen Capture Application in Windows Media Encoder or even better Adobe Captivate effectively record a movie from the activity on your computer screen. With this software you can capture text, pictures, a region on your screen, just a menu or a scroll down page and edit it further, add text, arrows, and effects to it. It is even possible to add a certain amount of interactivity to these screen movies.

With software such as the Windows Media Encoder, Camtasia Studio or Captivate ([www.adobe.com/products/captivate](http://www.adobe.com/products/captivate)) you can record moving images from several applications directly from your computer screen. You can record for example a PowerPoint presentation to stream it later as a video. You can add your comment in a voice-over, while browsing through the material or the videos, both during recording and afterwards. In addition, the sounds from the application itself can be recorded. Important movements or spots can be emphasised by adding highlights or showing mouse clicks in your video, and zooming in and out on the screen. When you make a

presentation video with screen capture, make sure you do not speak too fast and stay to the point. Keep the instructions short. Rather make different movies for different functions in the software. Otherwise it will be too long to memorise and ineffective.

## 5. THE VIRTUAL CUTTER

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The "Virtual Cutter" is an application developed by the University of Groningen. With this tool, you can select a specific fragment from a streamed video on the Internet, without actually editing the video itself<sup>6</sup>. You give a mark in and mark out point and the tool creates a new HTML code for you that you can put as a hyperlink in a VLE, in Word or PowerPoint.

Go to [video.surfnet.nl/virtualcutter](http://video.surfnet.nl/virtualcutter). (The default language for this website is Dutch; you can change the language if you want to Spanish or English.)

Fill in the location of the streamed video in the box. Click 'Open the virtual cutter'. Click Play to start viewing the streamed video.

Mark an in point on the fly by clicking the 'Mark start' button, and an out point by clicking the 'Mark end' button, while playing the video.

Check your selection with the 'Play clip in stand alone player' button. Now you can verify if you selected the correct in and out points. If not, you can still adjust these with the  $-/+0.1s$  buttons or you can choose to start the process over again.

Click on 'Open output window' to open a second window where you will have the possibility to copy and edit the code to re-use the clip you have created just a moment ago.

For example, you can copy the hyperlink 'Play clip' and paste it into any document you want. You can also use one of the html-variants and copy it into an html-document or into a learning environment such as Blackboard.

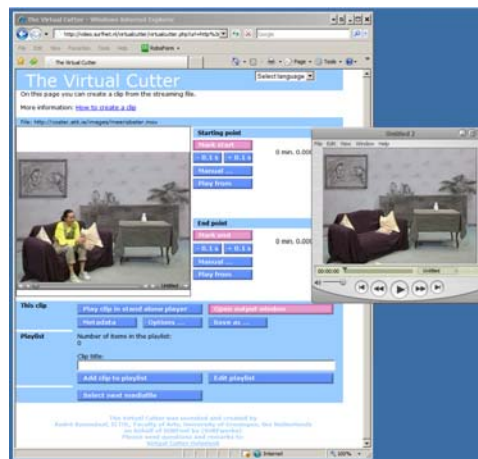


Fig. 5 - The Virtual Cutter

The virtual cutter supports a large number of formats (ASF, ASX, HTML, MOV, MP3, MP4, MPA, MPG, RA, RAM, RM, RMVB, SMI(L) WMA, WMP and WMV) and players (RealPlayer, Windows Media Player, QuickTime Player, Kasenna Broadband Player and the Mediamatics StreamExpress software for MPEG-2).

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<sup>6</sup> Similar functionality is available nowadays in the Windows Media Player 11.

## 6. COPYRIGHTS

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Probably the key issue when using or planning to use existing media materials is the copyright of the materials. It is important to understand how copyrights and Intellectual Property Rights in general affect the use of video, audio, or other materials created by others than the end-user.

### 6.1. AN INTRODUCTION TO COPYRIGHT

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A copyright provides its holder the right to restrict unauthorised copying and reproduction of an original expression (i.e. literary work, movie, music, painting, software, mask work, etc.). According to the World Intellectual Property Organisation, IPR stands for: "Intellectual property refers to creations of the mind: inventions, literary and artistic works, and symbols, names, images, and designs used in commerce. Intellectual property is divided into two categories: Industrial property, which includes inventions (patents), trademarks, industrial designs, and geographic indications of source; and Copyright, which includes literary and artistic works such as novels, poems and plays, films, musical works, artistic works such as drawings, paintings, photographs and sculptures, and architectural designs. Rights related to copyright include those of performing artists in their performances, producers of phonograms in their recordings, and those of broadcasters in their radio and television programs." (See [www.wipo.int/copyright](http://www.wipo.int/copyright))

A broad introduction to intellectual property is available in the WIPO publication WIPO Intellectual Property Handbook: Policy, Law, and Use ([www.wipo.int/about-ip/en/iprm/index.htm](http://www.wipo.int/about-ip/en/iprm/index.htm)). A summary of intellectual property legislation in member States, as well as contact information, etc., is available in the WIPO Guide to Intellectual Property Worldwide ([www.wipo.int/about-ip/en/ipworldwide/index.html](http://www.wipo.int/about-ip/en/ipworldwide/index.html)).

In brief, it can be concluded that in general, all creations are protected by the IPR; it is an individual right of every person that he/she has rights on his own creations. This is part of the Universal Declaration of Human Rights. This copyright protection happens automatically, upon the creation of the work, it is not necessary to mark it with the © sign or to deposit it with a registrar.

There are two types of copyrights: rights on exploitation, as well as moral rights.

**The exploitation rights can be divided into the following types of rights:**

The exclusive right of reproduction (which means that the author or creator has the right to allow or disallow other people to make copies of his/her own work). The author can put conditions on the right to make copies, for example payment of a fee.

The exclusive right to communicate a work to the public. It is the author or creator who can decide if a work can be shown or distributed publicly.

The right to adapt the creation and to exploit it in a different format, for example, the writer of a novel owns the right to allow a filmmaker to make a film scenario of the book.

The right on distribution: again, the rights holder can allow or disallow the distribution (or aspects of the distribution) of his own creation.

Those exploitation rights can be transferred to the "producer" (or "paymaster") of the creative work: for example, the director of a film once the film is finished, normally transfers his exploitation rights or part of them to the production company that invested



in the movie. The same is true for example rights on the works that are created within the context of an institution or company: if a University charges the a director to create a video programme, it is the University that holds the exploitation rights afterwards, be it that in case of dispute, the individual creators will be heard.

Those rights can also be governed by a rights holding company or institution that will defend the creator or author and that will collect the "royalties" or fees that the author claims for one or more of the above uses of his work.

**Moral rights are the following:**

The right of ownership or paternity: once an original work is created, and claimed by the author or creator, then, no-one else but the creator has the right to call that work his own creation. An example: I cannot claim that I painted the Mona Lisa. The creator of the Mona Lisa painting is and will remain Leonardo da Vinci. Adding the © mark does not make a change: even without it, works are fully protected.

The creator of a work has the right of integrity: he/she has the final say if changes or adaptations to the work or creation can be made.

The creator also has the right of divulgation, this means that he/she can decide when a work is ready, when it can be considered finished or "created".

**Some important notes:**

Privacy can be considered part of the IPR: every person also owns his own representation, that means that he/she can object to be pictured in one-way or the other without his permission (filming a class room activity and then publishing this, is regulated by the IPR and protection of Human Rights.) See Annex 10 for a template form to obtain clearance for appearances.

The right to quote (to use a part or a representation of a certain work) is more or less regulated by what is called Fair Use Policy: for example, a teacher can use a photograph of the Mona Lisa in the classroom when he talks about this painting. He cannot use the same picture however in a handbook that he wants to publish or distribute without the explicit permission of the rights holders. The same is true for example, for a piece of music from the Beatles, it can be used in the classroom to illustrate a music lesson, but playing the same song during the school festival is not allowed without dealing with the rights.

Important to know is also that ideas and concepts are not protected, a creation must be sufficiently clear, concrete and unmistakable, in order to be protected. If I have an idea for a reality TV show, with cameras in a house and with participants that live in this house, knowingly being filmed 24 hours per day, then this idea cannot in any way be protected. To make it into a creation, the idea needs to be made concrete and detailed.

In the digital world, it is becoming increasingly difficult to control what others do with one's own work. Copying text, taking bits of movies, adding a photograph etc. has never been easier. In order to fight this "abuse" of original works, various technologies are in development such as DRM, making use of for example electronic watermarks. It is important to note that the same rules which apply to all copyright works (e.g. books, graphics, software, CD-ROMs, videos, music records and films) apply to works found on the Internet.

The first rule for the use of materials created by someone else is to obtain the explicit (written) agreement for use. When it is impossible for you to find the person who holds

the rights over the materials, that you want to use, then demonstrate at least your goodwill to settle the rights by adding some form of declaration stating that you have made all reasonable efforts to contact the copyright holder. This will not protect you against legal action, but it may be considered as a sign of goodwill.

It is also very important to note that there are differences between different countries, but these differences do not take away from the core of the IPR as described above. However in order to make it easy for a creator to manage his/her own rights, an IPR protection scheme such as Creative Commons (see <http://www.creativecommons.org>) could be of great help: this scheme provides the content creator (no matter what type of content: text, media, sound... commercial, non-commercial etc.) with clear and intelligible formulations of various types of rights claims. Simply speaking, Creative Commons helps the creator to publish his/her work while letting others know exactly what they can and cannot do with that work. At present (2006) the Creative Commons approach and terminology is adapted to the legislation in the following countries: Argentina, Australia, Austria, Belgium, Brazil, Bulgaria, Canada, Chile, China, Croatia, Finland, France, Germany, Hungary, Ireland, Israel, Italy, Japan, Jordan, Mexico, Netherlands, Philippines, Poland, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, Taiwan, England & Wales, Scotland.

## 6.2. USING EXISTING MATERIAL

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Although that national laws are often hard to understand, the spirit of the IPR legislation is essentially the same everywhere. Every artistic production, be it a book, photograph, painting, video, audio production or else is automatically copyrighted by the fact that it is created.

If one wants to use existing materials created by someone else, one needs (written) permission to do so, unless it is clearly marked otherwise (by for example a "creative commons" label which allows the free use of the material). In most cases, the conditions for using material are written on the material or on its case.



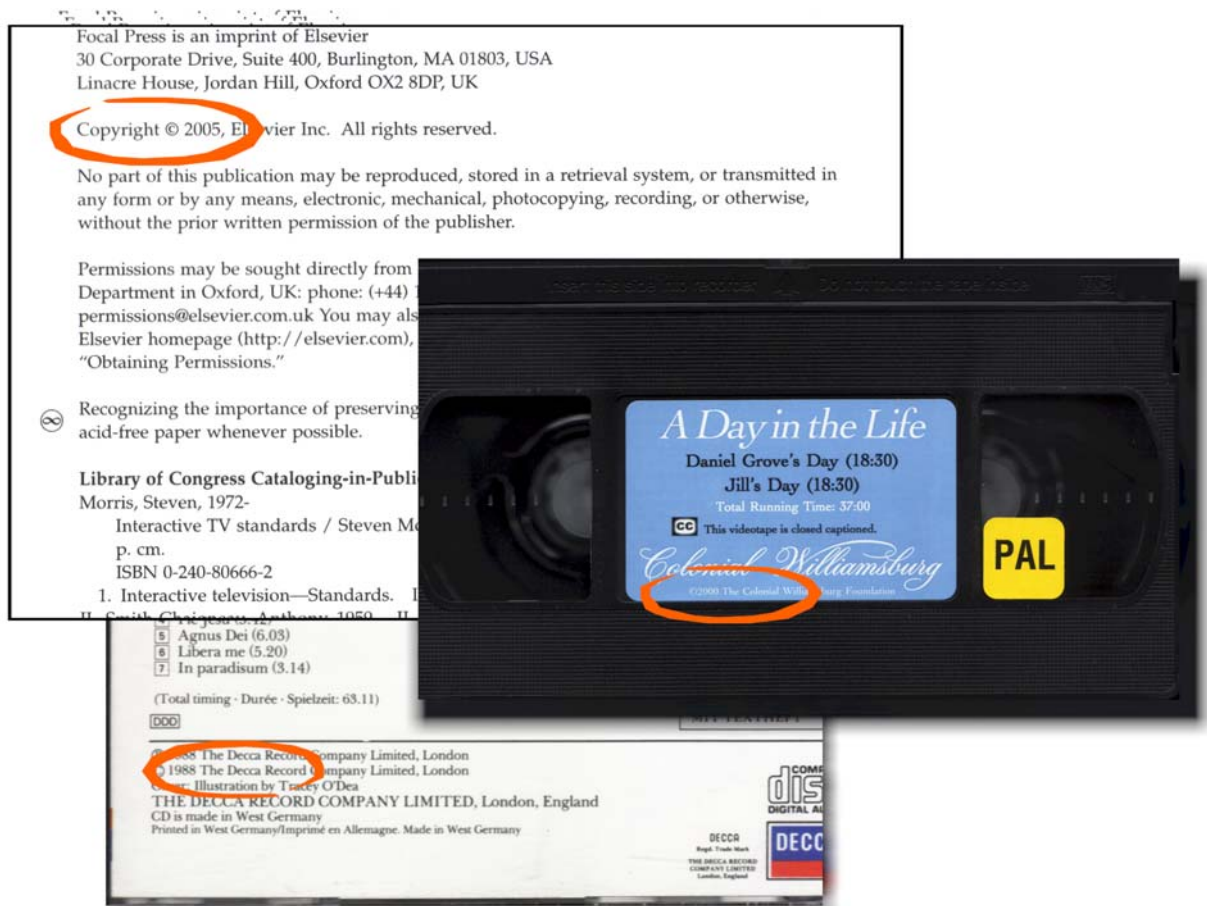


Fig. 6 - Copyright notices on different materials

The same copyright laws are applicable to materials that are found on the Internet even when there is no explicit mention of copyrights.

For educational purposes, the use of broadcast media materials is often accepted without explicit written permission. Some institutions or groups of institutions (for example associations of Institutions for Higher Education, but also Ministries of Education in some countries representing the national schools networks) have signed class or blanket license agreements with some publishers such as the public broadcasters or with the representative organisations of authors and producers in order to be able to exceptionally make limited numbers of copies of commercial videos (broadcast, rented, borrowed, bought) for showing exclusively in educational environments.

In addition to this type of use, in some countries it is sometimes possible under well-specified conditions to use smaller parts of a material under a regime of fair use that is accepted. An example: in the History lessons, a teacher may show a small part of the film Spartacus to illustrate a course about the Ancient Rome, the teacher cannot show the movie in its entirety. The same movie can be shown then again in its entirety in a course on film analysis in a Film and TV Academy.

The right to display these materials does not mean that these materials can be modified/edited into a new product. In case of doubt, it is always best to seek permission from the rights holder.

Therefore, in case you plan to use existing materials, this is what you should do beforehand:

See if what you want to use falls under copyright protection

Identify the copyright holders (author, producer, third party) or their representative agents

Request explicit written authorisation

Pay (and negotiate) any fees if necessary

# CREATING NEW MATERIAL

## 1. RECORDING LIVE EDUCATIONAL EVENTS AND ACTIVITIES

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*“Video is the primary medium for documenting actual events and bringing them into the classroom”<sup>7</sup>*

Several kinds of events can be recorded on video and shown later on or at the same time in the classroom. This is particularly handy when students do not have the ability to attend to the event themselves. The straightforward video recording of a lecture is the first and at first sight the easiest transition from face to face teaching to some form of elearning or distance education, as it does not seem to require a fundamental re-design of the teaching activities. It is however recommended to obey basic rules of good design of graphics and support materials in order to be most effective. If you can, record directly onto a computer. That will save you the time of capturing or digitising afterwards. Recording directly to the computer is easily done using a web cam.

### 1.1. VIDEOCONFERENCES WITH POWERPOINT PRESENTATION

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An increasingly common trend at European universities is the joint organisation of courses and transmitting them live to the partner universities. Often the lectures are accompanied by PowerPoint presentations. The slides need to be visible at all sites at the right time. There are several techniques for accomplishing this.

#### **Traditional videoconferencing**

In this method the video of the lecture and the slides pass through the same line (which can be an ISDN digital telephone line or an IP connection of high quality). This means that the teacher can choose at what time she wants the slides to be seen or the speaker, but this can never be at the same time except as a Picture in Picture.

#### **H.239**

H.239 is a new standard that enables the parallel showing of the lecturer and the PowerPoint presentation or other media on a separate screen beside other.

#### **Customised solutions**

If you do not have the equipment to control the slides from the server's side, you will need to send the slides to the partner universities before the videoconference. You can then show the number of the slide on the served video. Somebody in the partner institution will have to change the slides manually.

In addition, some commercial software conferencing systems enable virtual meetings over the Internet such as MS NetMeeting, Aula, Breeze or WebEx.

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<sup>7</sup> Smaldino, S., Russell, J., Heinich, R., Molenda, M. “Instructional Technology and Media for Learning”

## 1.2. LECTURES AND SEMINARS

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Live streaming of lectures or seminars is not always possible, in that case the option remains to record the conference on videotape or directly onto a computer and to replay the recording afterwards (possibly after editing) to other audiences of students, also on demand via a website or from within a learning environment.

As with videoconferencing, it is advisable to install the camera from the point of view of the audience. It is also recommended to ask the teacher to frequently look into the camera, as if it were a live audience member, as this will enhance the attention of the viewers who will view the images afterwards.

## 1.3. OBSERVATION

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Video is also a very useful tool for the observation of human actions and behaviour. To record, for example, group discussions or role-plays for analysis afterwards; the preferred method is the Fly on the wall technique. The presence of the camera should be as little obtrusive as possible. It may even be recommended to avoid having a camera operator in the room. A small camera on a tripod will be forgotten after a while, so that the students or the subjects act natural, without changing their behaviour because they know they are being recorded. This is a very good method for classroom teaching observation and evaluation.

## 2. CREATING NEW MATERIALS

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Making your own material has advantages and disadvantages. As we saw in the opening sections, one growing approach to self-production is to encourage the students to create their own video resources. This enhances the students' learning process, and can be very motivational. Student-focused production of educational video is supported by the pedagogical theory about the six aspects of meaningful learning. As defined by Duffy and Cunningham<sup>8</sup> learning is an active process of constructing rather than acquiring knowledge, secondly the act of instruction is a process itself of supporting that construction rather than merely communicating knowledge. There are six principles that are generally acknowledged as being necessary for a meaningful learning process. Learning should be active, constructive and individual, collaborative and conversational, contextual, guided and emotionally involving and motivating. We believe self-production of video resources by students is a particularly effective way of fulfilling all of these criteria.

Filmmaking involves many different steps. At each stage, you can choose if you want to do it yourself or let someone do it for you. Maybe you have some audiovisual material on tape but you need somebody to edit it. Maybe you want to write the script yourself, but leave the filming to somebody else. Alternatively, you just want some assistance while editing a video.

### 2.1. GETTING THE MATERIAL MADE

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The choice of getting your material made by someone else, depends on your time, your resources, skills, and the quality you want to achieve with your production. Maybe you want your video to be distributed to other educational organisations afterwards. In this

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<sup>8</sup> Duffy and Cunningham (1996, 171)

case, you might want to call in professional help. In case of animations or specific graphics, you might also need the skills of a trained designer. Make sure you have a clear image for yourself what it is you want. (See the Part “Thinking About Educational Video”.) Then make an appointment for a meeting with a producer. Go through your script together, ask for a budget plan. Locations, shooting days, and deadlines can be planned. The amount of participation from your side can vary, depending on the production and the script. When capturing the material it can be very useful to assist the editor in his task. As a teacher, you probably know best what is pedagogically essential and what is less interesting. You can also assist while editing, but it is easier to make up a plan together and make appointments for interim evaluations. This way you can still adapt the editing to your wishes; where you want to add or cut. After finalisation of the programme, meet with the producer, director or other specialists, to discuss and evaluate the result. Pay attention to whether the form suits your content (with proper preparation, this should be the case). Evaluate if the result is close enough to how the production was planned. Most importantly, does it fulfil your educational goals? If you want to distribute the programme, make clear appointments about the conditions. Who are the right owners, are their rights claims dealt with?

## 2.2. SELF-PRODUCTION

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Since the introduction of the Super 8mm film in 1965, moviemaking became accessible for everybody. In 1983, Sony released Betamovie for consumers, the first camera with built in recorder for the video amateur. Within a few years, the VHS-C format and the 8mm video were also introduced for the home movie market. While the editing of analogue video was still a complicated and often frustrating undertaking in the eighties, it is now much easier thanks to digitalisation. Producing audiovisual films with digital technologies, while still a considerable work, is less costly and much easier than using analogue equipment. Digital video cameras are smaller, cheaper and better, video editing programmes usually have user-friendly interfaces. In the chapter “Tips for Producing Video” you will find more on this subject.

## 2.3. STUDENTS MAKING VIDEO

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Instead of asking your students to write a paper, let them make a video. This can for example show the results of a study they had to perform or the reflection of a group work, where you cannot guide them all the time. These movies are easy for the other students to watch and discuss, during class time or over the Internet.

Evaluation is an important aspect of the process. It is easier to see other people’s mistakes and good points than your own. This way the students can test what they see on their own work. Be aware of time constraints. Producing good video is a time consuming activity and students may not be able to engage properly if too rushed. Nobody gains with mediocre work. A good experience in video production can inspire them to use media in their future professional life.

### **Case study: Recordings of own performance by student teachers**

Students in teacher training were asked to record themselves while teaching. From the recordings, the students themselves selected short fragments that demonstrate how they handle various situations. The fragments were placed in a VLE (Virtual Learning Environment) together with comments on why the students selected specifically those excerpts, on what they think is good about it and on what can be improved. Then a question for feedback is proposed, so that the teacher and the students can discuss it. As a result, the student formulates a plan for the future. The teacher from his part

obtained the students' permission for future use of the fragments in class for instructing other students. The students themselves found it valuable and challenging to observe themselves while teaching.

### 3. COSTS

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Producing videos is not only a time consuming job, it can also rapidly become an expensive task when one is not careful in planning and controlling. The necessary hardware can cost a few thousand euros. What is minimally required is the following:

DV Camera (preferably 3CCD, preferably with manual focus and audio control, with additional batteries)	~500.00 Euros
Directional microphone	~100.00 Euros
Tripod	~100.00 Euros
Editing hardware (powerful PC, good video capacity, quality display, DVD writer)	~1,500.00 Euros
Basic video editing software	~50.00 Euros

Optionally depending on the type of videos you intend to create, you may require one or more of the following:

Lapel microphone	~100.00 Euros
Lighting equipment (safe and sturdy)	~150.00 Euros

When looking at the total cost of producing media, do not underestimate the cost of consumables such as videotapes (DV tapes are expensive) and recordable DVDs. More important is even the cost of learning how to produce good quality images and sound, and how to edit the recorded images into a final product. The equipment and edit software are quite easy to handle, but to produce a video of good technical as well as of good pedagogical quality requires a certain amount of practise, of trial and error. Consider the amount of time you as a pedagogical specialist or teacher may spend in learning how to create media, while this may not be the best use of your time, also because at the end of the learning it may turn out that this is not something you can or will be doing regularly in the future.

When you don't have the confidence, skills and expertise to record and edit yourself, you can always involve others to do this for you. Be aware of the high fees that professionals charge. A good tool to help you estimate the production costs, is the COSTÉR tool, freely downloadable from [www.coster.ws](http://www.coster.ws).

COSTÉR is a database driven programme, allowing you to create your own cost estimate for the multimedia product you want to produce. This is done through a detailed and iterative decision-tree process, whereby you put in certain information and the programme will then provide costing estimates based on real costs and production practice in Belgium, France, or Spain. Prices in other EU countries may differ somewhat, but this outcome will already provide you with estimates.

### 4. COPYRIGHT

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As a producer or creator of your own media, the copyright laws that were discussed before are applicable to you, in both ways:

Your own rights. Who has the rights? (Producer, director, scenario writer, ...). Consider who will be sharing the copyrights and especially the exploitation rights (in case you're making the production for somebody else, your institution for example, they may inherit a part of these rights)

The rights of the persons and locations appearing in the movie (don't forget that even the students appearing in a classroom recording have rights on their appearance, beside the fact that their privacy has to be protected).

Are all elements (contributors, texts, images, sounds, music, quotes...) that are being used in your video cleared for usage? Do not assume that images that are available for use for educational purposes (like showing in the classroom) can be re-used unconditionally in new productions.

### **Creative Commons<sup>9</sup>**

As a producer, you want to claim your intellectual rights: you want users and re-users to acknowledge the fact that you are the creator and that in the making of this product, you have invested effort, creativity and knowledge. You can do this effectively and easily by adopting one of the Creative Commons copyright or intellectual property right schemes.

Creative Commons (CC) provides free tools that allow authors, scientists, artists, and educators to easily mark their creative work with the freedom or restriction they want it to carry. Creators can use CC to select the appropriate copyright scheme for his/her creation: this can range from "All Rights Reserved" to "Some Rights Reserved". Creative Commons covers websites, academic publications, music, film, courseware and so on, but is not designed to cover software.

This obviously applies only to original materials created entirely by you. If you have integrated resources (video, music, photos, text, film) produced by others, then again, the existing copyright legislation applies to those materials and you should contact the copyright holders for authorisation.

It should be noted that Creative Commons is not really an IPR (intellectual property rights) scheme, but merely a comprehensible representation of the existing IPR, for the ease of use of the final user (and by its nature an encouragement to easier and wider distribution of content). The fact is that it is "nationally accepted" means that the national legislative have identified the various Creative Commons schemes and matched them to the existing IPR legislation in your country. In the end, the national legislation still applies, and Creative Commons is simply a user-friendly translation for publishers' and users' sake.

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<sup>9</sup> For more information: [creativecommons.org/](http://creativecommons.org/)



# TIPS FOR PRODUCING VIDEO

## 1. BEFORE YOU START

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Even for creating what looks like a straightforward classroom recording, it is worthwhile to do some preliminary planning. This preparation obviously becomes increasingly important for the success of your production when the concept or scope of your production becomes larger or more complicated. Therefore, it is recommended to start with a scenario. This scenario in its most basic form can be considered as an account or synopsis of a projected course of action or events following a specified production process, in other words, the guidelines for the producer and his team. This is where your skills as an organiser come into play. Even when creating what looks like simple educational videos, the process is the same: from scenario and preparation, via recording, capturing and editing to publishing.

In the next part, we will take you through the process step by step.

## 2. SCENARIO WRITING

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The same term scenario can also be used to describe the concrete content of your production: the story, sequence of events, roles and respective actions that you are planning to display in your video, this is what you hope your viewers will experience. This is where you will be creatively challenged for the first time. This phase may look boring at first sight (lots of think and talk but no action) but bear in mind that good preparation is half the job. Note that when you start from an existing lesson or course, you may well have some kind of elaborated scenario in the form of a lesson plan. This may well do as your guidance throughout the rest of this chapter. Your lesson plan may only require smaller additions or adaptations in order to be ready for production. The steps in the following part can help you with this too.

### 2.1. GETTING INSPIRED

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Every creation starts with an idea. You may have many interesting ideas, but it is very important to formulate for yourself a clear view on the purpose of your idea and the context in which you want to use it, before turning them into scenarios.

You can use the table below to help you formulate your own idea as concrete as possible, so you and the other teachers or teaching support staff who will be collaborating with you, know exactly what the purpose is and what is going to happen. In the left column, you will find apart from each item, also some recommendations (in small letters).



<p>Topic</p> <p>(The topic should be a short description of your vague idea, it will be the working title of your streamed video)</p>	
<p>Purpose:</p> <p>Website</p> <p>class</p> <p>conference</p> <p>private</p> <p>(Here you should fill in what you want to do with the streamed outcome of your idea: do you want to put it on your personal website, do you want to show it to colleagues, do you want to use it in a conference, do you want to show it to pupils/students, ...?)</p>	
<p>Target group</p> <p>(Also, the target group can vary. Video that targets university students requires a different approach than streamed material for secondary students or from employees for example.)</p>	
<p>Type of activity</p> <p>(This can vary from life events, to documentaries or maybe even just some background material to use aside other material)</p>	
<p>Contextualisation/ Place in curriculum</p> <p>(If the streamed material you are about to create is part of a broader frame of activities, you should fill this in here. Maybe your material is part of a course you are taking or part of a series of documentaries on a certain topic.)</p>	
<p>Useful sources</p> <p>(It can be useful for others who help you with creating this streamed material, to know which resources you used for this.)</p>	
<p>Goals and objectives (7)</p> <p>(And as a last part, explain why you want to create this material based on your idea. What are your personal or professional motives for this.)</p>	

*The Idea Table*

Once this table is completed, it should be clear from it to others what your idea and your intentions are. It provides a clear and short summary of your whole project and it provides the anchor for all further steps in the creation of your material.

### ***Task 1: Structuring your idea***

Dream up an idea and complete the form to make it concrete. Show this table now to a colleague and verify with your colleague whether the idea is correctly understood in your opinion.

## 2.2. CONTENT DECISIONS

You have structured your thoughts in the first chapter, so let us move now to the second step, which is deciding about the content. In order to find the appropriate content, always keep in mind your idea table: what is the purpose of your video, what is your target audience, etc. In the following short exercise, we illustrate the differences in approach required for different target groups.

### *Task 2: Same subject for different audience*

Write a short approach for creating the content of a video about a topic for different target groups.

Example 1a: a video on tropical animals for primary school pupils,

Example 1b: a video on tropical animals for Greenpeace activists

Create your own example and write a short approach for this...

Think of all the necessary elements you want in your video. The easiest way to do so is to draw a table where you list all these elements and where you already put some comments on how you want to see them in the video, where you can find materials on them, etc.

This is an example of such an approach: the subject is to create a video to introduce myself on my personal web log:

Idea	Comment/remark
Introduction	Myself, speaking on camera
Where I went to school	Shot of my school (old photographs?) Short interview with my favourite teacher
Preferred music	Use as background material
My portfolio	?
My hobbies	Photographs of mountain climbing, sailing
Where I live	Animated map?
My friends and family	Excerpts from old Super 8 movies
...	...

### *Task 3: Brainstorming about the idea*

Now create your own table based on the idea you created in the first chapter. Fill in all possible elements you can think of that you definitely want to use.

Idea	Comments/remarks

### 2.3 STRUCTURING THE CONTENT

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By now you know exactly what you want to achieve with your video and you have gathered all your ideas. The elements you completed in the above table have to be structured now, so that the concept becomes a logical entity.

Depending on the subject of your video, there are two main ways of structuring your content. You can do it in a chronological way or in a thematic way. If you threat the different types of garden plants, you will of course use the second one. If you describe the life of a scientist or a chemical process, it is probably more obvious to use the chronological structuring. When you are recording a classroom event (a lecture or a seminar for example) the chronological way is the obvious approach. However, consider the alternative approach here too, as the use of streaming or downloadable media now gives the viewers other possibilities in using and learning the contents you make available to them.

Chronological structuring: this means you put all the information in a chronological order, starting from the earliest phase to the latest phase.

Thematic structuring: In this structure you discuss theme-by-theme no matter what the chronological order is.

Both: of course, depending on the content, you can also structure your content combining the chronological and the thematic structuring.

#### ***Task 4: Structuring the content***

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Consider all the things you have written down in the table during the previous tasks, and place them in the desired order. This now constitutes the scenario of your video in its most elementary form.

### 2.4. PLANNING AND WRITING

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Now that you have a first draft scenario, you will need to elaborate it with the practical details of for example the locations, the instruments or equipment and the actors that you want to have in it.

## Locations

To get a clear view of how you want your video to be, it is strongly recommended to visit the locations mentioned in your schedule and to note all kinds of details related to these locations. For example, check out if the auditorium or classroom that you will be using is noisy, or sufficiently lit. Does it have all the equipment that you need for the lecture?

Go and visit location per location and take detailed notes of everything you see and everything you want to get in your video. Look out also for elements in the scenery or in the surroundings that can be used as inserts or cutaways to help during the editing to make a transition from one part to another.

## Equipment and instruments

Before the final scenario is drafted, check if all the equipment, tools, peripherals, props and other objects that you have in mind are available and working in the way you want them to work for your video. If you need for example a working chemistry laboratory, carefully check if the equipment is all present and functioning (and preferably safe as well).

## Actors, contributors and participants

A second important thing is to visit your actors, contributors and participants and discuss with them what you expect them to do or to say, maybe also how they should dress etc. This way you will get a good view on whether your actors, contributors, and participants are able and willing to take part in your video. If your video contains interviews, contact your interviewees and discuss with them the questions you want to ask them. Agree with the interviewee who has the final decision on what comes in the video or not: for example, you may want to give your interviewee the option to decide after the video has been edited to eliminate parts of the interview.

After you have done all these preparations (scouting or surveys), you can start elaborating your final detailed scenario and shooting plan. Take the structured list you made in Task 4 and all the notes you collected during your explorations.

Now divide your list in shots and define the exact location and content of each shot. Look at the example below of an information video about some city.

*Title: "My town"*

Shot	Location	Actors	Text
1. Opening shot	Town square	None	Voice over with introduction text: "The beautiful town of X in Y, blabla... Let us walk into the town hall and see if we can meet the mayor."
2. Cutaway	Town hall	People entering the town hall (not specific)	Voice over: text: "The town hall is located in this beautiful 17 <sup>th</sup> Century Castle etc blabla... "
3. Interview with mayor	The mayor's office	The Town Mayor	The interview: question 1: "Dear Mr Mayor, could you tell us a little bit about the history of your town?"

			Question 2: "How many people live in your town?" Question 3: "..."
4. Panoramic view of the Town	From the top of the Mountain	None	The Town is located in the mountains of XYZ, and is situated on top of the ZYX hill, towering above the surroundings."
5. Map of the region	(Studio recording: animation with graphic software)	Graphics artist	...

Try to be as detailed as possible in your planning, this facilitates the shooting afterwards and makes it easier for the people who will help you with it, to know exactly what is expected from them.

### **Task 5: Completing the scenario**

Finish your own scenario now with all the materials you have gathered up to now in the previous tasks. Use the table above as a template to structure your scenario.

## 2.5. REFINING THE SCENARIO

You have now created a rough scenario for your movie. To further elaborate this rough scenario, you can add several things.

**Music/sound effects:** add a column to your scenario to indicate which background music or sound you would like to use for which scene(s)

**Lighting and other equipment:** indicate whether specific lighting or other gear (travelling material, crane...) is required, this will remind you before leaving for a location shoot to bring the right equipment for this.

**Shot:** indicate if you have special visions on the type of shot. For example long shot, bird perspective, zoom in...

**Notes:** add also a column to put various notes, for example, if electricity is required, to wear special shoes if you go climbing a mountain, to take make-up with you, anything you think of that relates to this particular scene.

As soon as you start shooting, a lot of new ideas and visions will come up, so you can even keep refining your scenario while shooting. Keep a note of all the ideas and alternatives that strike you.

2.6. OVERVIEW: SCENARIO WRITING

Phase	Steps to undertake	Done X
Idea	Check whether the idea is suitable for your target group and for the learning and teaching purpose that you have set yourself. Ask for the opinion as far as possible of both media and instructional design experts.	
	Search for resources and interesting material	
	Brainstorming: Write everything down you can think of	
Structuring	Structure the content you gathered	
Preparations	Visit the locations, scout the props and equipment, search for inserts and cutaways, and take notes	
	Consult the actors (interviewees, experts...) and take notes	
Writing	Put your notes next to your structured content	
	Divide it into detailed shots	
	Define for each shot the location, the persons involved, and the text that has to accompany it.	
Scenario	Rough scenario is complete	
	Scenario is refined	
Evaluation	Show your scenario to a person without preliminary knowledge and check whether everything is clear: consult again as far as possible with media as well as with instructional design experts.	

### 3. SHOOTING

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#### 3.1. FROM SCENARIO TO SHOOTING PLAN

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A scenario is not the same as a shooting plan. In the scenario, you will find the content of your video in the order, as it will appear in the finished video. A shooting plan can differ very much from this plan, since it might be possible that shootings on the same location appear at different times in the scenario. It is obvious of course, that it is more efficient to shoot all the shots at the same location or with the same people on the same day. This requires however a lot of precise planning. The better you plan your shooting, the faster, cheaper, and easier your shooting will go.

The following is a very simple example of what we mean by this:

Shot 1: atmosphere	Brussels	No person	Day A
Shot 2: Travelling	Brussels train station	Traveller	Day A or B
Shot 3: Travelling	Train	Traveller	Day B
Shot 4: Travelling	Paris train station	Traveller	Day B
Shot 5: Interview	Travel office Brussels	Head of office	Day A

Take into account the people involved as well as the locations, to plan on what day the shooting will happen. As you can see, for the second shot, there are two possibilities: the scene is in Brussels, so you can put it together with all the 'Brussels' shots, but on the other hand, that would mean that the actor has to be available at that time as well as in the 'Paris' shooting. You have the choice to record this shot for example while on the way to Paris.

So, practically:

Number all the shots in your scenario. If your video is divided in different sequences (chapters) and scenes, indicate the sequence, the scene, and the shot (e.g. "sequence II, scene 3, shot 4" is noted down as "2.3.4".)

Mark all the shootings that take place on the same location in the same colour.

Re-order your scenario now according to the shot numbers and print them on different sheets, which will indicate the different shooting rounds.

Take each sheet separately and try to divide it again according to the required actors, equipment, accessories, etc.

Construct your planning according to these subgroups. Try to be realistic on the quantity of work that can be done in one day.

For your day-to-day planning, several things have to be taken into account: the days that your actors, experts, interviewees are available, the days that certain places are open for public, the days you have the necessary transportation, the days that your crew and the equipment is available, the weather, etc.



### **Tips**

If your schedule is too tight, you can get into trouble when certain things do not go as you wish them to go. For example, it rains when you planned an outside shooting scene, your equipment breaks down all of a sudden, one of your actors is ill, etc. So, it is recommended to have back up plans in case these things happen.

Leave enough time in between the shootings for preparation beforehand and cleaning up afterwards. Indicate this also in your shooting planning.

To keep track of all your shots, number them and use this numbering consequently. It will facilitate the editing when you see immediately which shot belongs to what scene. Longer and the more complicated scenarios require more and better structuring of your shooting schedule and scenario. Make sure you and your fellow producers can keep track of the recordings.

### ***Task 6: Detailed planning***

Make your own detailed planning according to all the above-mentioned steps. Use the schedule above as a template.

As soon as your planning is ready, check with all people who will contribute to your video (technical as well as content and acting), if they are happy with this schedule and if they think the timing is realistic.

Once your planning is approved, make sure all the contributors have access to the shooting plan, make copies for them and keep them updated in case of changes. Also, make sure that there is one main shooting plan that is taken to the recordings where notes and remarks can be written on. This can be very useful afterwards during the editing.

You now made your planning for the shooting that you will try to follow as close as possible. Do not forget however, that your scenario is still the most important document, the "master" document of the whole video you are creating. In the scenario, you find the detailed description of how you want to scene to be shown on video, details on lighting, camera angle, music, personages etc. It gives you the information why you need to record something in a certain way. You might wonder why a shooting plan is needed then. This is obvious, using a shooting planning makes you use your time and other people's time more efficient. The shooting plan serves as a manual where you can indicate exactly which shots have been recorded and which have not.

**Tip**

Always take your shooting plan AND scenario with you for the shooting.

### 3.2. EQUIPMENT

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You cannot shoot without the appropriate equipment. Here is a list of the things you definitely have to bring with you:

Camera (camcorder like DVcam or a camera connected to separate recorder, this can even be your PC)

Microphone (can be part of your camera or connected separately)

Headset (for monitoring the sound quality during the recording)

Cassettes (to record on) or enough hard disk space when recording on your PC

Tripod (in order to have stable camera-shots, this is really an essential part of the equipment). The use of a tripod pays off at all occasions and cannot be emphasised enough. The quality of the image will improve, the comfort for the viewer increases, the compression into web video or DVD video will be more effective and better. It also works more relaxing for the cameraperson.

Lights (for filming inside or with bad weather, extra lighting is if not essential, quite handy)

There are many other things that you can take along additionally that can make your life easier or that will make you look more professional, for example:

Clapperboard (this is a little black or white board on which you write the shot number and which is shown at the beginning of the shooting of each separate shot. It is a very convenient tool to find your shots in the editing, in case you keep note of the shots that are recorded on each cassette)

Wheelchair (this a wonderful tool for doing tracking or travelling shots)

Notebooks, pens, tape

Stickers (to label certain equipment, especially when this equipment is borrowed it can be very useful)

Plastic bags (to cover material in case of rain and also to collect the garbage you create during the recordings)

A video monitor (so you can check straight away your framing)

These are just some tools that you may find handy. Each video maker has his or her favourite toys, tricks, and tools.

### 3.3. THE IMAGE

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#### **Types of shots**

Not only can you choose to do static or moving shots, but also to zoom in, zoom out, take a close-up, a wide shot or something in between. You will spontaneously experience that one shot is more suitable for certain scenes, than another. For an interview for

example, it is not recommended to take a long shot of the interviewee. The image will come across much more natural if you take a medium close-up or mid-shot of your interviewee, the distance you would also have in real life to your interviewee. It is a good idea to try and look how professionals do it: when watching television programmes, see how they compose their images, which image compositions work and what doesn't. Choose the format in function of what you want to tell.

These recommendations are just as valid for portable camcorders as for web cams, except that the latter or somewhat restricted in their mobility.



*Fig. 7 - Close-up*

When filming an object, you can show details of the object by means of close-ups. When filming a person, you can show the person's feelings or psychology much better. Being too close with your camera can be overwhelming for the subject as well as for the viewers.



*Fig. 8 - Medium close-up*

When you need to give the subject more space to move, you can move the camera out a little bit. This allows the person to move his/her head and even to give an impression of more freedom to move. Images like this are more restful. The camera does not need to be manipulated so much in order to track the subject.



*Fig. 9 - Mid-shot*

This is an image that allows a static subject to move arms and body, to carry out tasks for demonstrations. This type of shot also allows more than one person to be in the composition, for example during an interview.



*Fig. 10 - Long shot*

Long shots are establishing shots; they show the subject in its environment. In a traditional narrative, one would start with the long shot in order to show where the action takes place. It shows the room or the space, the position of the actors and the set elements within that space. Long shots are used to allow for transitions from one place to another.



*Fig. 11 - Wide shot*

Wide shots are adding a dramatic element by showing the place of the action within the larger environment. The wide shot shows where the action is set: for example in a house on a hill, in a building on the campus...

The basic rule is to start wide and then go closer. For example: first show the house with surrounding fields and then a closer shot of the house, the two people standing in front of the door of the house shaking hands, then their smiling faces.

### **Zooming in or out**

A zoom lens allows you to change from one image size to another without interrupting the shot: the shot starts with a wide image of a car stuck in the snow, the lens zooms in on the wheel that's slipping. Depending on the scene, zooming in or out on a subject would add nice effects. However, be careful: do not use the zoom function all the time, it can be disturbing for the spectator.

### **Tracking**

A tracking shot uses a fixed lens. Tracking shots are moving shots. You can track forward or backwards, or you can track sideways. Here a wheelchair or other equipment on wheels can be very convenient. Moving towards or away from your subject compares somewhat to zoom in or zoom out. Experiment with both to discover the different effect it has on the subject and its background.

**Tips**

Use a tripod to have a stable image

Tracking shots come across more natural as zooming shots

Replicate what your own eyes do

Learn from watching TV (especially documentaries and news broadcasts)

***Task 7: Practice***

Take a camera and try all the different shot sizes.

**Checklist**

Before shooting, check whether you have all the necessary equipment with you. It is also recommended to start with a few test shots to test the lighting and the settings of your camera. In any case before you go out to make an important recording, check if you have all the necessary equipment, enough tapes, are there enough batteries and are they fully charged... Also, test the equipment before you go out to see if all works as expected, especially when the equipment is rented or borrowed. Remember: you may only have one chance to do this recording: when you are filming the foaling of a mare, when you have a chance to do an interview with the President of Madagascar...

***Task 8: Make a list***

Make for your self a list with all the equipment you need to take along for the recordings of your own scenario. Test the equipment before you leave.

**Shooting**

Now you are ready to start shooting. While shooting according to your programme, keep looking for shots that can be interesting to use as cutaways or as "wall-paper", this is industry jargon for all kind of shots that are used to fill up your video or to illustrate certain things that are said for example during interviews. Keep note of all the things you record so you can easily find it back afterwards. Make sure that you do not forget to note what has been recorded on which cassette.

**Some basic interview tips:**

Put your interviewee at ease to make sure the information comes out in a natural and relaxed way, before the interview. Avoid giving the interviewee all your questions beforehand, don't "rehearse" the questions beforehand if you want the answers to come out more spontaneously.

Avoid answers like "yes" or "no" in interviews. Always put your question in a way you get full sentences as answers. One of the techniques to do this is to use a W-word, who, what, where, when or why. Change your question into a W-question to avoid too short answers.

Choose whether you want the interviewer to be seen and/or heard in the result. If you cut out the questions afterwards, make sure the answers are given in a way that they speak for themselves without needing to know what has been asked.

### 3.4. LIGHT

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#### **Shooting on Location**

When shooting outside the studio (which will be probably always your case), you will find yourself confronted with two kinds of light: natural light and artificial light. When recording outside, you will notice that the image you recorded might turn out blue. When filming in an environment with artificial light, it will get orange, or in case of TL-light: green. This is because every light source has a different colour temperature. The human eye adapts to it quickly, but video cameras do not always adapt automatically. Especially in cases of changing light (going from inside to outside, for example) this may result in too dramatic differences in colours.

To get rid of these colour changes and to get an image that resembles how we perceive the scene with our own eyes, we need to adjust the colour temperature of the camera. This means that we see white objects as white (not blue/ green/ orange). That is why you can find a function in most cameras, called White Balance. With this, you can adapt your camera to the light before filming. You can do this by choosing one of the standard buttons in your menu: for example 'daylight', 'cloudy', 'artificial light'. However, you will get the best result when you set your white balance manually. To do this, keep a plain, white object (e.g. sheet of white paper) under the present light and use the manual white balance button. Every time you change a lighting situation, you should adjust the white balance again. Pay attention when you are shooting outside: clouds getting in front of the sun give a different colour again.

By avoiding these disturbing colour differences while shooting, the edited movie will show a greater continuity on screen.

In a situation with different light sources (for example: an artificial lit room with light coming in from the window), you could theoretically correct the colours with filters that are placed in front of one of the light sources (daylight- and artificial light- filters, each with different intensities). All this may require professional help. If you don't have expert help at hand, always carefully verify the quality of your images on a reliable TV monitor. Although that it is attractive to think that image (and for that matter also audio) problems can be resolved in the editing phase, and thus postponed until then, it

is strongly recommended to try and solve the problems at the time when they appear, that is during the recording. Badly recorded images can almost never be improved; incomprehensible sound at the time of recording can almost never be recovered. The best guarantee for a quality video programme is in the care for quality video and audio at the recording stage.

Next to the present light, you may sometimes want to add some additional light, for example to better show the subject. When a face of a person is only lit from one side, it may become too dark in other parts of the face, which may be a particular effect but not necessarily an effect that you would like to see.



*Fig. 12 - Backlit close up*

Unlike the human eye, video does not automatically adjust itself to high levels of contrast and therefore video might show shadows that are acceptable to the eye as black. In addition, when it is too dark, the quality of your image can deteriorate. The video camera may automatically amplify the image to a level that will render subjects visible but the picture may get too coarse or grainy.

### **Shooting in a Studio**

When shooting in a Studio, you will most probably use spots to illuminate your subject.

The classical lighting-situation exists of three light-sources. The main light, you call the key light. This spot is placed on one side of the camera. The closer you place the lamp to your camera, the flatter your image will be. By placing it a bit more to the side of your subject, you will be able to 'model' it better. An angle of 30 to 45 degrees from your camera is standard. Also, make sure the light comes a bit from above.

By putting this light, you will create strong shadows at the other side of your subject. To avoid black areas, put a less strong spot on the opposite side (although not in a straight line). This is called fill light. Sometimes, in a close-up, it can be enough to place a panel that reflects the key light on the other side of, for example, the face.

By placing these two lights, you will create different intensities on the face, which will help to shape your subject. Now you can put up a backlight, to give the subject a clear outline. This spot, you place behind the subject, in an angle coming from the left (or right).

There exists hard light and soft light. Hard light will create strong, outlined shadows. It brings out details strongly and shows textures clearly. Soft light is diffuse and will eliminate too dark shadows or heavy contrast. It will smoothen surfaces and wipe out detail. The larger the lightsource in lighting surface, the softer the light.



### 3.5. SOUND

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#### **Good recording practice**

Most video cameras have a built in microphone (sometimes even stereo microphones). However, their quality is not always as you would expect. Moreover these microphones record all the sound in the surrounding without any distinction: the movements of your hands on the camera, the instructions you were trying to give somewhere in the background, the noise of traffic passing by etc.

Unlike the microphone, our ears work selectively. Our ears continuously filter out those sounds that are not important, and focus on those sounds that you need to hear, for example the words of your friends during a conversation in a disco where loud music is playing. A microphone cannot select by itself, which sound is important and which is not. That is why it is recommended to start with a silent environment in the first place. Before starting the recording, listen carefully to the sounds of the room where the recording takes place: are there planes flying over, trucks passing near by, people running noisily through corridors... Especially when you plan a recording in an environment that is familiar to you, this will prove very useful, also for example when you are participating in a web conference or a videoconference. The sounds that are so familiar to yourself that they are unconsciously filtered out by your brain may be so loud that they disrupt the conversation via microphone. Another recommendation is to use a microphone placed close to the sound source you want to focus on. For example in an interview, it is better to have a microphone close to the speaker's mouth, so that you won't be disturbed by distracting sounds that come from further away. Little microphones with a tie clip can be helpful in this situation.

When recording an orchestra you probably would prefer to use a microphone that covers the whole width of the sound source. For capturing the sound of a birdsong, you may want a long distance microphone that isolates one particular sound from its environment.

Choose the type of microphone that serves the purpose best. This requires you to have a range of microphones at your disposal. If you are only recording one type of videos (for example interviews only) then one single microphone type will suffice.

When recording outdoors, the wind can disturb the input of the microphone. To avoid this, put a wind cap over it.

Always control the sound during the recording through headphones. Make sure that these block the sound from outside sufficiently so that you really can hear exactly what is recorded. For videoconferencing, a headset that combines headphones with a microphone that is worn close to the mouth, is ideal: it captures the speech at best, blocks off outside noises, and on top of that prevents sound to feed back into the conversation with a risk for unwanted sound loops or echoes.

#### **Microphone types**

The standard microphone is the omni-directional microphone. This means that they record sound coming from all directions (yes also from the back of the microphone) all at the same level.

When the sound source is hard to reach, for example when making a wide shot, one can use uni-directional microphones. These focus on the sound that you direct your microphone to and ignore environmental noises to some extent. (With a perch or boom, you can get even closer to your subject, without the microphone getting in the image.)

You can use tiepin microphones that are attached to the clothing of your subjects. Disadvantages are that they are often visible, and that a piece of clothing striking against the microphone creates a lot of noise.

Another type of microphone is the bi-directional microphone. This is a rarely used but handy microphone for recording dialogues with one person sitting on each side, or in some cases stereo-sound.

Microphones can be handheld or mounted on a tripod or a boom. They can be wired (connected by cable to the recording device, which is the best option when cables are not disturbing in any way) or they can be wireless to transmit the sound. Wireless microphones can bring all kind of little nuisances: interferences, distortions, low batteries...

### **Types of recording devices**

You can connect the microphone (also external) to the camera, so that the sounds are recorded directly onto the videotape, together with the images. However, in some cases you may want to record the sound on a separate device. For example for adding sound to an existing video or to an animation video, or if you want to add ambient sound, an additional voice over or certain sound effects. Many devices can be used:

Audiocassette (an analogue format that gets less and less popular)

DAT (Digital Audio Tape)

Mini-disc (a disc based digital recording system that compresses audio, which means some loss of quality).

Direct to file (on PC): when your PC has an audio input and audio card with some recording software (for example the Free Open Source Software Audacity), you can record directly to disk. Normal analogue audio comes in two types of signal level: microphone level is rather low and may need some amplification. Audio devices such as radios, cassette players etc are on a much higher output level (called LINE level).

### **Sound conventions**

As with images, there are some ground rules or expectations regarding sound that have become part of the way we interpret the media. When we see a subject far away, we expect its sound to be somewhat quieter and without too much detail. When somebody is speaking close, we can hear it very clearly. If you want the video to look and sound realistic, you have to imitate this sound perspective.

On the same level, when someone walks from right to left, you can hear the sound go from right to left. With a stereo microphone you can record this directly but it is easier to adapt it while editing using the pan control in the audio section of your editing tool.

The space or the environment that you see on screen will also create a few viewers' expectations about the acoustics. A large empty room can sound somewhat having a lot of echo, a place with a lot of curtains or sofas will absorb the sound, and metal and glass have their own sound resonance. Especially when you plan to treat the sound during the editing phase, this can be worthwhile to keep in mind.

## **4. CAPTURING**

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Capturing is the phase in between the shooting and the editing. If the source footage is analogue, "capture" refers to the act of digitisation (conversion to a digital format) to

make the video usable on a computer and, usually, the simultaneous application of compression to reduce the video to a manageable data rate for processing, editing, and storage. If the source video is digital, "capture" typically refers to the simple transfer of video from an external device, such as a digital camcorder or digital tape deck, to a computer hard drive. To put it simply, it means that you transfer all the recorded materials to your computer.

#### 4.1. REQUIREMENTS

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For the processing of the video (capturing, editing and publishing), you need a decent video editing workstation. To be suitable for capturing and editing video the workstation should at least contain the following elements.

##### **CPU**

The heart of a video-editing workstation is its processor. This is the most important system component for video editing. Most current systems have enough processor power, but it is always recommended to get the fastest processor you can afford, because the faster the CPU the faster the video editing software will run.

##### **Capture Card**

Most computers nowadays have the IEEE 1394 (or in Apple terms also called FireWire) card standard on board. This is sufficient for capturing video from a DV camera. To capture from an analogue source, it is necessary to install an analogue video capture device.

##### **Random access memory (RAM)**

Random access memory (RAM) is the data store used in computers at the heart of its operations. When there is insufficient RAM, the computer slows down and is less performing. Increasing RAM improves the performance of the video-editing functions. Considering how inexpensive RAM got over the years, we recommend installing as much as you can afford or as your PC can take.

##### **Hard Drive**

Digital media and especially video take up a lot of hard drive space. Here we recommend getting the largest drive you can afford. The speed of the hard drive should be 7,200-rpm IDE drive or faster. Using more than one hard drives, physically separating source files from temporary video files, is also recommended.

##### **Graphics Card**

The video editor software charges the graphics card of your PC. A card with at least 64MB of RAM is recommended.

##### **Sound Card**

Check if the sound card is capable of the audio processing you require. If for example you want to produce surround-sound tracks, your sound card needs to be equipped with this capability.

##### **Monitor**

To keep an overview of the many parallel tasks you will be carrying out while editing video, it is certainly recommended to invest in a large monitor (19 inch or larger).

Remember also that you may want to check the quality of the video on screen, so your monitor needs to have sufficient display quality as well.

### **DVD Burner**

Once the videos are completed, they will need to be stored somehow: a DVD recorder is the appropriate solution, CDs are not large enough. DVDs moreover have the benefit of producing discs can easily be distributed.

## 4.2 DIGITAL CAPTURING

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There is a difference between capturing from digital video and capturing from analogue video. To capture from digital device, a simple IEEE 1394 or FireWire card is needed. These cards are inexpensive and readily available. They allow a direct transfer of the video data from the digital video recorder to the computer without any loss of quality.

## 4.3. ANALOGUE CAPTURING

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This can turn out to be more complicated. Depending on the output quality that one requires, the process of converting an analogue source to digital requires more processing power than digital capture. If your main reason for capturing is to send the stream out immediately for example as a live web stream with low resolution, then the input quality does not have to be as high and the effect on the final output quality will be limited.

The two basic ways to capture an analogue video from tape (for example VHS) are firstly copying the video to your digital video recorder and then transferring it as usual or secondly capturing it straight to your PC via an Analogue to Digital Converter (A/D). The first approach has the added advantage that it provides you with a digital tape for archiving. The second method is quicker but you will need a suitable capture card or A/D device.

### ***Task 9: Test Capture***

Record a few shots and try to capture them. Check which cables and equipment you need for this.

## 4.4. SCENE DETECTION

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As video capture proceeds, the edit software will detect natural breaks in the video and divide it into scenes. Scene detection can be completely automatic and based on shooting time and date (only available when capturing from a DV source).

Scene detection can also be based on video content, but this is less reliable as the detection may react to extreme light changes for example within the single scene.

Scene detection can also create new scene at a fixed interval of your choice.

If you want to monitor the entire capture process and decide for yourself where scene breaks should occur, you can also insert manual scene breaks during capture.

**Some basic capturing tips:**

Make sure you have plenty of disc space before capturing and keep in mind that you will also need space for the editing afterwards

Before capturing, specify the folder where you want the video to be stored

## 5. EDITING

Editing is the act of altering, shortening, or joining together video and/or audio sequences to form a more suitable sequence. Raw video footage is the video you take directly from the camera. This footage usually contains unusable video, including mistakes, video with bad camera movements, etc. Video editing allows you to extract only those parts of the video that you want to retain from the raw video.

### 5.1. PREPARATIONS

As we discussed in chapter 3, all material has to be captured on your PC before you can start editing. Sit down and view your tapes. Double check the shot list against the notes you have taken. Mark the shots you want to keep, delete those that you certainly don't need.

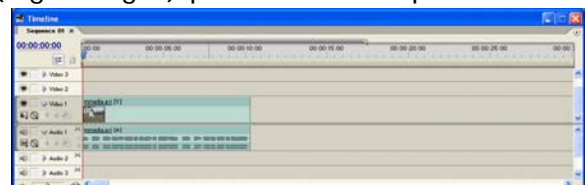
### 5.2. STORY BOARD VS. TIMELINE EDITING



There are two approaches to representing the layout of video shots in your project: the storyboard and the timeline. Most editing software applications offer both options.

Storyboards (Figure left) present your shots as thumbnails, which you can drag around to place in the desired order. Once you have put your clips in the right order, you switch to the timeline view, where you can trim scenes when necessary and add transitions, effects, titles, and background audio. Timelines (Figure right) present a more precise view

of your project, displaying the shots and events over time. You get separate tracks to use for various elements of your project. For example, most timelines offer multiple tracks for video and audio.



**Some basic editing tips:**

Get acquainted with the navigation controls and short cuts in your editing software as quickly as possible, since you will be using them frequently. Mastering them, will speed up the editing process enormously.

### **Task 10: Test Edit**

Do not start editing straight away on your first critical project, try the programme first with some test materials. Figure out for yourself how much time you need in getting used to the editing software so that you can effectively plan your critical work later.

Try out the storyboard method against the timeline method as well as the combination of both.

## 5.3. EDITING PICTURES

### **Less is better: Splitting and trimming**

The first step to making your movies more interesting is showing less of them. Even if you have a highly motivated audience, getting anyone to sit down and watch more than 15 minutes of a movie is a stretch. Identifying the most important scenes and eliminating all the rest is a critical process.

A number of tools in your edit software will assist you to edit like a professional:

Trimming is the process of adjusting the in and out points of a clip to remove unwanted footage. This is a fundamental editing operation.

Split editing allows you to trim a clip's audio and video separately so that the transition to one occurs before the transition to the other.

Splitting the clip makes it also possible to deal with the two tracks independently for operations like insert editing, which typically means replacing part of a clip on the video track while the original audio track continues uninterrupted. For instance, in a sequence that shows a teacher giving a lecture, you could insert a shot of a student taking notes without breaking away from the main audio.

#### **More editing tips:**

Cut out all the bad camera work, such as fast pans and zooms, and eliminate all the footage that is not essential to your story.

Use a pace that fits the content. Give each section a different mood by using a different pacing and applying a different set of effect.

Transitions or visual effects smoothen the change from one clip to the next. The most common transition is a dissolve, where the first scene blends into the second. Don't use effects too often, use them for what they add to the video. When used with care, transitions can reinforce the meaning of the video without being noticed. Observe the way transitions are used in TV programmes or films.

Basic transitions are:

*Cut:*

A cut is an instantaneous change from one scene to the next. It is normally the default transition. A cut is mainly used when there is a strong inherent connection between one clip and the next; for instance, when the camera changes position or angle within a scene. Within the same sequence of scenes, it is the intention of the editor to keep the pace going and to avoid jumping from one action to another in a distracting manner. This can be done by carefully adjusting (trimming) the timing of the transition and the succession of acts or movements.

*Fade*

A fade is usually used at the beginning and end of a movie; it makes the transition from a blank screen into the video and vice versa.

*Dissolve*

The dissolve is a fade between two scenes where the second scene begins to fade in while the first one is fading out. Dissolves are normally used to indicate a time lapse.

*Wipe, slide, and push*

In these transitions, the new scene is gradually revealed behind an edge that moves across the frame in a certain direction. The push transition pushes the first scene out of the frame while the second scene enters. Wipes and slides are often used to indicate a change of location ("meanwhile in this other place...").

Thanks to innovative TV producers such as MTV and creative filmmakers such as Quentin Tarantino, audiences are no longer traditional in their understanding of the semantics of video and film. Jump cuts and visual effects are often used without any other reason than to shock the viewer or to be innovative. This has led to a greater flexibility in what the viewers accept. It should however not encourage the video maker to become careless in trying to support the narrative of the video with appropriate effects and tools.

Other special effects that can be useful are for example image correction and adjustment (brightness, contrast, colour and tone). Most video-editors offer some form of automatic colour correction functions that can fix problems caused by improper white balance to a limited extent. In addition, you can usually correct the brightness and contrast of your video to improve its appearance, or turn the video into black and white, which can give an elegant effect to your video. Other commonly used effects are the slow motion (by doubling each image) and fast motion (by leaving out images in between).



**Effective tips:**

Whatever effects you use, try to use a uniform set of effects and transitions. A consistent style will come across more professional and will contribute to a better understanding of the content you want to convey.

The kind of transition you use should correspond to the nature of changes that takes place between scenes. A modest change only requires a very subtle transition. For a drastic one you can use a more obvious one.

As for the transitions, try to match the effects with the nature of the video

Do not overuse effects. It can distract the viewers from the video.

**Adding titles**

All video Editing programmes include tools for producing text titles, displayed either full-screen or on top of the video background. Titling tools let you control the font, size, colour, and other properties of the text. Alignment controls let you position your text in the frame. Most video editors also allow you to add transition tools to your titles, fade in or out, scrolls, reveals, tumbling, warp, etc. This often looks more attractive than simply having the title instantly appear and disappear.

**Titling tips:**

Make sure your text size is large enough and your font is clear enough to be ensure legibility

As a rule, titles should appear for about twice as long as it takes to read the text. For subtitles, the basic rule is that you should be able to read them three times before they disappear.

Make sure the title is easy distinguishable from the background. If not, change the font colour or add a shape or drop shadow behind the text to make it stand out better

**Slide shows**

All video editors can produce slide shows using digital images, such as pictures taken with a digital camera. Most let you produce some complex projects, using pan and zoom effects, transitions between pictures, and background audio.

This is a very easy and effective way to producing video with very simple tools. Creating a slide show can be a good exercise before producing a full-featured video.

### **Task 11: Test Image Editing**

Make a short scenario and shooting plan, with which you can experiment for all the above-mentioned editing possibilities.

Split and trim shots. Try for yourself the different transition methods.

Add a title.

Add some special effects.

## 5.4. SOUND EDITING

In some cases, the audio recorded together with the video is essential and has to stay connected to the images (for example with an interview) in order to understand the video. In other cases, the audio can be quite disturbing, for example: background noises. It may be worthwhile trying to replace that noise by music or a narrative voice. Music can be a way to engage your audience and create the right atmosphere for your movie, while narrative can provide valuable context or even content. Most editing programmes provide multiple audio tracks, so you can add narrative and music to your video. Most editors allow you to fade music in and out, so that a song does not stop abruptly at the end of your movie.

### **Audio tips:**

An audio mixer is a handy tool if you use more audio tracks at the same time.

### **Task 12: Test Sound Editing**

Use the little experimental movie that resulted from Task 4 and add some sounds to it. Mix a voice over with the original sound of the recording and add background music.

## 5.5. VIDEO EDITING FOR STREAMING USE

Making a video for streaming purposes requires some extra attention to certain things. There are a few important things to keep in mind when producing streaming videos:

**No Background sounds:** Keep in mind that many people will be listening through a computer's mono speaker. Avoid background sound as much as possible and test the sound in mono.

**Do not use too many special video effects:** this will create extra work for the encoder (see module 4) or it may deteriorate the quality of your video.

**Picture Size:** When saving your work, consider your streaming output. If you are working with Premiere, it automatically adjusts the picture size to a suitable streaming format. If you are using a simpler package like Real Producer, you may manually have to adjust the picture size. The lower the connection speed that your users have, the smaller the output movie should be.

**Archive a high quality original:** It is recommended to save preferably an uncompressed copy of your movie, should you ever have to amend it, in module 4 you can find more information on the different storage formats

**Keep clips short.** Clips should be kept short for the web to keep the viewer's attention span and to aid navigation.

### ***Task 13: Adjusting for streaming***

Compress your video to the right dimensions in order to make it usable for streaming

## **5.6. EDITING PROGRAMS**

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Here is a list of well-known editing software programmes. Depending on your level and computer skills and the complexity level of the video you are about to produce, some programmes are more suitable than others. The following is only a rough selection of some of the available editing tools, to give an impression of the variety of tools on offer.

Adobe's Premiere has long been the industry standard for the Mac and PC video market, due to its combination of cost and capabilities. It can be confusing for the beginner but for the advanced video maker it contains a multitude of features

AIST's MovieXone 1.0 is a complete software suite for video production. It has tools for editing, titling, and animation, as well as for audio processing.

Apple iMovie 2 software comes pre-installed on the iBook within the iLife software suite. It integrates the capturing of video clips from your digital camcorder to your hard disk, and furthermore it allows for editing and arranging clips into stories, enhance them with transitions, animated onscreen titles and even music and visual effects.

Microsoft Windows Media Encoder is a production tool that enables content developers to convert both live and pre-recorded audio, video, and computer screen images to Windows Media Format for live and on-demand delivery. It does not allow for editing but some functions are possible: adjusting sound/colour levels and adding author details. A more elaborate but still quite basic video-editing tool that is freely available in the Windows OS is Windows Movie Maker.

Pinnacle Studio 10 is a full-fledged editing software with extensive features for editing and processing. Studio Basic for RealVideo is one of its free software download companions, that lets you edit digital video files and export RealVideo. It supports FireWire cards but limits the resolution to 320x240 pixels and only a target audience of 2 streams.

Microsoft Producer for PowerPoint 2003. A free add-on for Microsoft PowerPoint version 2003. It helps you capture, synchronise, and publish audio, video, slides,

and images - resulting in rich-media presentations viewable on demand in Internet Explorer. Editing and processing are limited.

RealSystem Producer Plus is for live or on-demand content and will convert most common audio and video files to RealAudio and RealVideo. Unlike the free RealProducer Basic, it includes RealMedia Editor which is a timeline-based graphical editing tool lets you change start and end times of your media, paste files together, view stream properties, and preview your content

Ulead's VideoStudio 5.0 is quite an intuitive interface that allows scrolling titles, 3D effects, filters, motion overlays, and extensive audio options. Ulead's MediaStudio Pro 6 appears to be a powerful package with the flexibility of adding vector graphics directly onto frames. It has FireWire capture capabilities and appears to have a save option to the Internet

## 5.7. EDITING FOR EDUCATION

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Largely the tips and suggestions stay the same for the editing of all types of video. However, for making an educational video requires some extra attention to certain editing aspects.

Start with a well thought through scenario, in which you already indicate what you need to tell and show, and how you intend to do so. Consider at that stage carefully what can be told in images, and what cannot. Divide the different types of content over the media that you have at your disposal when composing a video: moving images, still images, animation, photographs, graphics, titles, text, sound, voice, etc. Keep the scenario at hand during the whole process from concept to recording to editing.

Cut out all the footage that is not relevant to the topic of the lesson. If the content does not really match with the rest of the information that is taught to students, it could be confusing and students will have even more difficulties to keep their attention to the video.

Adding titles at important parts of a video provides some sort of structure (signposting) to the video, which makes it easier to understand for the students. If the titles correlate with the headings in other related lesson materials such as handbooks or workbooks, the video will become much more structured and easy to follow.

Important images within your video can be emphasised by for example repeating them (for example in still images for a few seconds more) or by for example showing same subject and action again from closer or from a different angle.

An educational video should be filmed as realistic as possible. Be careful with the use of special effects, they may distract the viewers and the video may lose credibility.

If in doubt, test your video with test users before the final edit stage. See if your users react the way you expect them to react and check if they retain the contents you want them to retain.

## 6. STORAGE

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Before you eventually encode your video – this is the process of resizing and adjusting your video so it's suitable for streaming or other distribution purposes – you should store your edited video in the format that is most suitable for future processing if necessary.

There are different formats in which you can store your video on your hard-disc (or on some format of archival).

<b>Format</b>	<b>Advantage</b>	<b>Disadvantage</b>
Uncompressed AVI	Perfect reproduction of digital video and sound (Microsoft)	Requires large amounts of hard disc space (12 GB per hour of footage)
Uncompressed MOV	Perfect reproduction of digital video and sound (Apple)	Requires large amounts of hard disc space (12 GB per hour of footage)
MPEG-1	Small file size, compatible with most computer systems	Poor quality reproduction in comparison to other formats
MPEG-2	Very high quality reproduction, as used on DVD. Manageable file size.	Although the bit-rate can be adjusted, MPEG-2 video quality suffers somehow as a result. While MPEG-2 is the core of many digital formats, it does not specify them entirely. Instead, it uses Profiles and Levels to allow for different applications of the same standard.
MPEG-4	Best all-round solution. Depending on the bit rate, it can produce almost uncompressed AVI quality at much smaller file size. Audio can also be compressed with little or no loss	Many standards for MPEG-4 are emerging, such as solutions from Apple (QuickTime 6) and the open source DivX. Both are very high quality and highly configurable. Their compatibility however remains a problem.

***Task 15: Store your video***

Keep in mind the amount of hard drive you have available and choose the best solution by adjusting quality and size.

# DISTRIBUTING THE MATERIAL

## 1. PHYSICAL CARRIER

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### 1.1. VHS (ANALOGUE VIDEO)

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This was until a few years ago, the traditional system for distributing and watching videos. The tape was put into the video-player, which is connected to the monitor or to the beamer, and the rest was press the play button and watch. An advantage of this method is that students in class watch together and that the teacher can point out certain things on it while it is playing. The teacher can also simultaneously give comments and write information on the blackboard. But all in all, this does not really allow for interaction (even browsing through the materials is not easy), or for individual viewing and on top of that, video players and video monitors never got into the classrooms and lecture halls to the same extent as PCs have done.

VHS was until the mass adoption of DVD the format of choice for distribution of videos, also of those videos that were produced at home (based on Hi8 or Video8) or in institutional media production centres (produced in Betacam or comparable).

The type of video materials usable in class, varies a lot, here are only a few examples:

- News-bulletins for classroom discussion

- Documentaries or (educational) movies

- A TV programme or movie in another language to support language courses

- Images of events and places

### 1.2. CD-ROM

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The Compact Disc – Read Only Memory is a version of the CD that allows the information to be stored and retrieved. CD-ROMs look like music discs, but they can only be used on computers equipped with a CD-ROM drive.

A CD-ROM has a limited storage capacity and is therefore not an appropriate carrier to store play back entire movies in an acceptable quality, but this does not exclude the fact that media placed on a CD-ROM can be made highly interactive and suitable for educational purposes. The viewer can interact almost at every moment of the playback and is often supposed to find his/her own way through the programme on the disc. Countless educational CD-ROMs are available in libraries and stores. Producing them is a task that is within possibilities of the skilled computer user and of most media production centres within Higher Education Institutions. CD-ROMs are very much a personal media, also thanks to their very low cost and the high penetration of CD-Rom players.

### 1.3. DVD

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DVD, introduced in 1996 and initially baptised as Digital Video Disc, soon became known as Digital Versatile Disc. It is the next generation of optical disc storage technology, which shares the same overall dimensions of a CD, but with significantly higher storage capacities - holding from 4 to 28 times as much data. Single sided DVDs can store 4.7GB

for single layer and 8.5GB for dual-layer disks. Double-sided DVDs can store 9.4GB for single layer and 17GB for dual-layer disks.

Today most DVDs are used to display full-length commercial motion pictures, plus additional material such as outtakes, director's notes, movie trailers, etc. A DVD-player can as well be connected to a television screen as to a computer screen, which allows the teacher to choose whether he or she wants the students to look at the material individually or in a group.

## 2. STREAMING

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The introduction of streaming media on the Internet has introduced also another way of learning with moving images and media. The learning process is much more individual since everybody looks at his/her own screen and can work on his/her own tempo. Streaming media furthermore offer many possibilities that are impossible with the media mentioned above. The major advantage is that streamed video can be integrated in a larger learning environment. Video can be linked in that way to web pages and supported by texts and documents.

The following are a range of examples of how streaming media is being used in various educational or research related situations.

### 2.1. LIVE WEB CAMS

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#### Animal Planet Live Cams

[animal.discovery.com/cams/cams.html](http://animal.discovery.com/cams/cams.html)

On this website the viewer can look at any moment of the day at animals in national parks or zoo's in different parts of the world. In some cases, researchers are in fact operating the cameras during the observations.



Fig. 13 - Live streaming: the life of the Panda Bear

#### Leonard's Cam World

[www.leonardsworlds.com/camera.html](http://www.leonardsworlds.com/camera.html)

On this page you can choose from thousands of web cams at different locations all over the world

#### BBC Web cams:

[www.bbc.co.uk/webcams](http://www.bbc.co.uk/webcams)

The BBC has a wealth of information on all kinds of topics. Many subjects are extensively documented with streaming video materials.



## 2.2. VIDEO CLIPS ON A SPECIFIC TOPIC

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Countless websites offer streaming media on historical, scientific, political, ecological and much other topics. Here are a few examples.

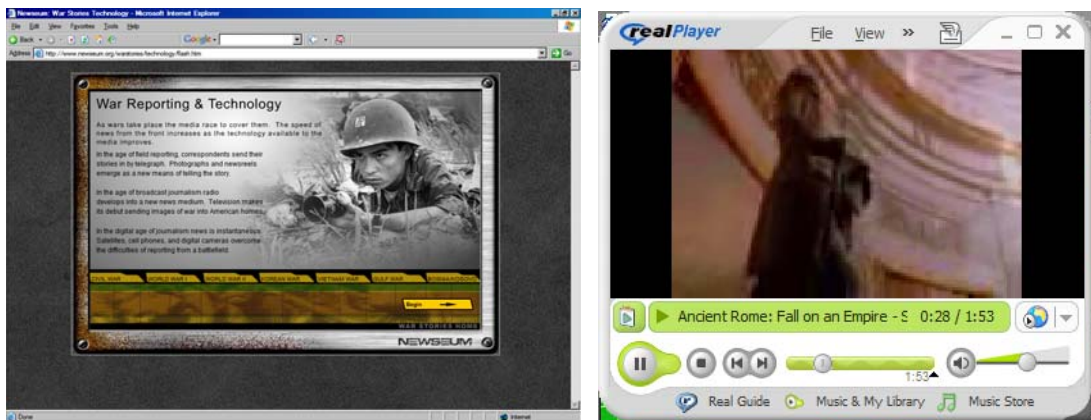


Fig. 14 - Newsroom: war stories (left) and Video clip from Discovery Channel (right)

### Holocaust Movie Clips

[www.fcit.usf.edu/holocaust/resource/movies.htm](http://www.fcit.usf.edu/holocaust/resource/movies.htm)

Several movie clips about the holocaust

### Newseum: War stories

[www.newseum.org/warstories/](http://www.newseum.org/warstories/)

Interviews and video clips about wars

### Video clips from Discovery channel

[school.discovery.com/ontv/videoclips.html](http://school.discovery.com/ontv/videoclips.html)

The discovery channel offers several educational videos for schools

## 3. ENCODING

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Encoding is the process of optimising your file for the speed of the connection of the viewer. This consists of two aspects: the compression of the file for web delivery, and saving it in a suitable video file format.

### 3.1. COMPRESSION

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The first step in the process of delivering the video content via streaming is the compression. Raw or original digital audio and video files are very large. One second of uncompressed video is more than 20 Megabytes. This means that a CD would be able to hold less than a minute of uncompressed video. To get the video down to a size that works for transmission over a modem or a LAN, files need to be compressed. During compression, data that are redundant or unnecessary are removed. This makes the file size much smaller, but it also degrades image and sound. Smaller files require less hard disk space, less memory to run and less bandwidth to play over networks such as the Internet.

### 3.2. KNOW YOUR AUDIENCE

If you know your audience, you can specify an appropriate compression rate that is adapted to the prevailing type of Internet connection your viewers have.

Number of people on the LAN (Local Area Network)	The more people on the LAN, the slower the connection → more compression necessary
High bandwidth / low bandwidth	Higher bandwidth = faster connection → less compression necessary
Dial-up connection	Slow connection → More compression necessary

The consequence of compression is loss of quality. If you do not know your audience, then keep the weakest link in mind while compressing or make sure you offer different sizes for different Internet speeds.

### 3.3. TYPE OF STREAMING TECHNOLOGY OR APPLICATION

A second thing you need to consider when compressing is the type of application you wish to use for distributing your video.

Streaming	Progressive Download or Pseudo-Streaming
Streaming keeps your computer in contact with the server while running the movie: the digital media is transferred, displayed, and then discarded. If the client's connection is of poor quality, the server will reduce the data transfer rate in order to preserve continuous playback. However, this can cause stalling or break up the image.	Progressive download dumps the entire video on the local computer's hard disk. Once a large enough part of the file has been transferred and buffered at the client side, the media automatically starts to play.  Once downloaded (which takes longer with a slow connection of course), the clip will have exactly the same quality on slow or fast computers.
<b>Use:</b> <ul style="list-style-type: none"> <li>• For live events</li> <li>• For long media</li> </ul>	<b>Use:</b> <ul style="list-style-type: none"> <li>• For short media</li> </ul>
<b>Quality:</b> The quality depends on the compression rate and the computers speed	<b>Quality:</b> High quality at any connection speed.
<b>Conclusion:</b> The larger bandwidth you have, the	<b>Conclusion:</b> The larger the file, the more download time

less it matters how large the file is. In case you do not have a lot of bandwidth, the file should not be small enough in order to prevent the image from stalling or breaking up.	it will require; however, quality is assured.
<b>Required:</b> <ul style="list-style-type: none"> <li>• Optimal connectivity</li> <li>• Sufficiently compressed video</li> </ul>	<b>Required:</b> <ul style="list-style-type: none"> <li>• All types of connectivity</li> <li>• Compression suitable for the end-users computer in order not to demand too long download time</li> </ul>

**Tips:**

Always save an uncompressed version as a back up. Store for example the original movie on tape to have an archival copy. Keep in mind that in the future when network, compression and hardware conditions change, you may want to recompress and redeploy the video.

Most editing programmes support multiple output formats with presets tailored for specific purposes, such as e-mail attachments or CD-ROMs. Unless you really know what you are doing, you should stick with these presets. These will usually offer the best results especially if you are not sure in what you are doing or when you don't have the time to experiment.

The following are some recommended (standard) video dimensions appropriate for different types of use:

Purpose	Resolution (Pixels)	Data rate	Format
E-mail attachment	240 X 180	100 kbps	Windows Media RealVideo QuickTime
Web site for dial-up connections	160 X 120	30 kbps	
Web site for broadband connection	320 X 240	300 kbps	
Hard drive playback	640 X 480	2 Mbps	
DVD	720 X 480	Varies	MPEG-2

### 3.4 METHODS FOR COMPRESSION

#### Display size

During the encoding stage, there is often the option to specify the display (window) size of the final video. This is something that already can be done during the editing stage.

In a sense, this is a first stage of compression. One rarely sees video over the web at the same display size (or resolution) as when it was captured. Reducing the window size reduces the amount of data in the video dramatically and consequently also the file size. It is for this reason that video produced for slower connection speeds usually has a smaller window size (post stamp or thumbnail video) than video for faster connections. Many video editing software packages offer default frame sizes when you choose different connection speeds.

### **Codecs (compressors/decompressors)**

The main method of compression within encoding is by applying a codec to the video and/or audio data. Codecs generally work by removing unnecessary temporal and spatial visual and audio data from the file to reduce the amount of data sent. A codec is designed to recognise changes in image and sound and to only save the parts of the image that change, this way, file size can be reduced up to 100 times, but not without loss of quality of course.

Nowadays, tools are available that are easy to use and require no in-depth knowledge of the complexities of compression technologies. They are as already mentioned before often integrated in the editing software.

## **3.5 FILE FORMAT**

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Encoding files also means that files are being saved in a file format that is suitable to be played back by the chosen player (architecture). Different multimedia architectures offer different features and options, but all with comparable quality, and store data in different file formats. QuickTime, RealVideo, and Windows Media are examples of streaming media architectures where clients and servers are matching each other's formats. RealNetworks, Microsoft, and Apple use their own proprietary format for encoding and serving media as well as for the related media players. While ideally speaking one would expect to view any content on any player, content generated by one supplier's encoder is only viewable through that supplier's player.

Both RealNetworks (SureStream) and Windows Media (Intelligent Streaming) offer the opportunity to encode just once for multiple connection speeds (multi bit rate). This is as an alternative to producing individual encoding for each speed and leaving the selection of the quality to the client. To open and view these file formats, the users (viewers) must have the correct player installed on their computers.

Nowadays, the Adobe Flash Player is increasingly being adopted as the multimedia and application player to display SWF files created with for example the Adobe Flash authoring tool, Adobe Flex or a number of third party tools. The Flash Player runs as a browser plug-in, which makes it quite easy to embed Flash Video in web pages and view the video within a web browser. FLV files can be delivered in several different ways:

1. As a standalone the .FLV file is fully functional and it can be played or converted to other formats from local storage such as a hard disk or a CD.
2. Embedded in an SWF file. The entire file must be transferred before playback can begin.
3. Progressive download via HTTP (supported in Flash Player 7 and later) as for example in Google Video.
4. Streamed via RTMP to the Flash Player using the Flash Media Server

The choice of encoder/server and by consequence the related player can have an impact on the viewer's experience. Each player has benefits over the other, and there is seems

to be no best option as it depends on costs, the material itself, how your viewers are connected, and how you want to integrate material in for example your learning environment. (See annex at the end of this module)

These are the different streaming formats for encoding files

Purpose	File extension	Full name	Supplier	Viewable through
Streaming	.asf	Advanced Streaming Format	Microsoft Windows Media Server	RealPlayer, Media Player
	.wmf .wmv	MS Windows Media File MS Windows Media Video		RealPlayer, Media Player
	.avi	Audio Video Interleaved		RealPlayer, Media Player
	.ra .rm .ram	RealNetworks File	RealNetworks	RealPlayer
	.mov	QuickTime Movie	Apple	RealPlayer, Media Player
	.flv	Flash MX video	Macromedia	FlashPlayer
	.fla → .swf	Flash file → ShockWave Flash		FlashPlayer
Storage	.dv	Digital Video		
	.mp4	The Moving Pictures Expert Group (MPEG)		

**Tip:**

Store the video in different sizes and formats in case you decide to use it for different purposes. Mark clearly which file is in which size and format.

**Task 16: Store encoded versions of your video**

Store two versions of your video, one suitable for a slow (dial up) internet connection and one suitable for a fast broadband connection.

## 4. SERVING

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### 4.1 STREAMING VERSUS PSEUDO-STREAMING

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Now that you have your streaming media files, you require a server to deliver them. Your current web servers are most probably able to store and send audio and video files but only in a standard download manner.

Also, end user applications such as RealNetworks player or Windows Media Player will pseudo stream (the progressive downloads as we explained in the former chapter), or start to play the partially downloaded file on detection while it is coming from a web server. This is an acceptable way to begin testing streaming media but if you intend to use it more reliably and on a larger scale, the use of dedicated streaming server application is recommended.

A streaming server adds reliability and additional functionality to the media: the ability to fast forward the streaming media and more importantly the ability to automatically adjust the stream to the available bandwidth.

There are other reasons to use a streaming server:

- The ability to protect your intellectual property (the file is never downloaded and can not be copied easily by the user)

- Users can interact with the stream (fast forward, rewind immediately into the stream)

- Live broadcasting becomes possible (transmission of one to many) as well as the streaming of very long programmes

- Full control over access rights to the media

### 4.2 REQUIREMENTS

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#### Hardware requirements

<i>1GHz+ processor.</i>	A dual processor based system would provide the best performance and increase the computers multitasking abilities which will be put to the test in this type of application, especially when multiple programmes and streams will be made available.
<i>1GB+ RAM.</i>	In most cases, multiple services such as FTP, Web server, and live stream handling will need to be running from the same machine. More memory will ensure that the server runs efficiently and reliably.
<i>Large storage capacity.</i>	It is recommended to use a RAID system for several reasons: it allows smaller drives (e.g. 100GB) to be linked as one single drive and mirrored for backup very quickly within the server. This represents a huge cost saving when storage is concerned. RAID systems have a very fast drive access and throughput, which is in turn a huge benefit on servers dealing with multiple tasks involving video and other media.
<i>Network connectivity</i>	There is no point having a fast server if your connection will not support it. Depending on your location, choosing the fastest option you have available as bandwidth is vital. For

	example: 10/100Mbps Ethernet, Gigabit Ethernet within the LAN, the VLAN, or the MAN. For publicly retrievable media, the connection to the public Internet is crucial: the upload speed from the server to the public Internet will determine the number of concurrent streams.
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**Software requirements**

All the major streaming formats offer server side software that controls access and distribution. This software will need to be run on a server platform with the appropriate choice of operating system, i.e. Linux, MS Server.

<b>RealNetwork</b>	
Advantages	Disadvantages
<ul style="list-style-type: none"> <li>• This is a very stable, fast, and user-friendly platform. It has full remote administration capabilities and is very secure.</li> <li>• It supports MS Windows, Linux, FreeBSD, and Solaris.</li> <li>• Installation and configuration of RealSystem Server is straightforward and very customisable, allowing it to fit within an already existing service, i.e. a web server or other streaming service. It also supports streaming of Apple QuickTime, both archive and live streaming.</li> <li>• It offers multiple bit rate encoding. This is the ability to encode a single file that can be streamed out to clients at different data rates according to their access bandwidth. The server will automatically select the appropriate encoding suited to the client's bandwidth when the connection is made</li> </ul>	<ul style="list-style-type: none"> <li>• The major disadvantage to using RealSystem Server is cost. You can download a free <i>basic</i> version of the Helix Universal Server software that limits you to 10 simultaneous users viewing streams. This free licence lasts for 12 months. For testing purposes, this is more than adequate and will allow you to run various stress and compatibility tests on your server</li> </ul>
<b>Microsoft Windows Media Server</b>	
Advantages	Disadvantages
<ul style="list-style-type: none"> <li>• Media Server is not a standalone product, but comes bundled with Windows 2000/.NET Server. If you already have either of these servers in place, the cost of implementation is minimal and is a worthwhile investment of a small amount of</li> </ul>	<ul style="list-style-type: none"> <li>• Media Server will only run on a Windows Server.</li> <li>• Your media files are not quite as secure as with other solutions, your server, its services, and files are protected and cannot be tampered with. However, applications have</li> </ul>



<p>time</p> <ul style="list-style-type: none"> <li>• It has the ability to stream to over 3,000 users per Media Server without incurring licensing costs</li> <li>• It's a fast and efficient platform</li> <li>• It offers multiple bit rate encoding. This is the ability to encode a single file that can be streamed out to clients at different data rates according to their access bandwidth. The server will automatically select the appropriate encoding suited to the client's bandwidth when the connection is made</li> </ul>	<p>been written that allow users to record the stream as it comes down from the Media Server but these are not widespread and relatively rare in use</p>
Flash Media Server	
Advantages	Disadvantages
<ul style="list-style-type: none"> <li>• Supports Flash Player, probably the player with the largest customer base.</li> <li>• Supports live video (videoconferencing), streaming media, real time communication (for example for chat or multiplayer games)</li> <li>• All OS support clients. Server runs on Windows and Linux.</li> </ul>	<ul style="list-style-type: none"> <li>• Cost is a disadvantage (~2000 Euros, educational licenses available)</li> </ul>
Apple QuickTime Streaming Server	
Advantages	Disadvantages
<ul style="list-style-type: none"> <li>• QuickTime Streaming Server is a Macintosh-only based solution. For Macintosh infrastructures it offers a wide range of streaming file compatibility, including standard MOV, MP3, MPEG-4 and Shockwave Flash, to over 4,000 users per server.</li> <li>• QuickTime's major selling point is the quality of footage that can be produced using its Sorenson encoding protocol. For example, most major film companies will release movie trailers onto the Internet in this format due to its high quality reproduction.</li> <li>• At high connection speeds of 1000Kbps or greater QuickTime's</li> </ul>	<ul style="list-style-type: none"> <li>• At low bit-rates, Apple QuickTime does not fare well against Windows Media or RealMedia. At 512Kbps and below, both the other solutions look and sound far superior</li> </ul>

quality is superior. This is due to the design of the codec and its intended target audience.	
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### **Bandwidth requirements**

Bandwidth and the capacity of your network are vital for effective video streaming. The quality of the output stream will depend greatly on your own and your viewers' bandwidth. Your server must have enough bandwidth towards the outside world available to cope with the demands made on it or else your viewers will experience a very poor quality playback i.e. fragmented or jerky images, broken sound and possibly total loss of connection.

For use within campus networks (LANs and VLANs) there may not be so much of an issue as the internal bandwidth may well surpass the requirements of the application. Bandwidths of 0.5Mbps and higher are becoming commonly available within institutions for Higher Education.

The end users at home on the other hand may have two main options for broadband Internet connection at home:

A cable modem

An ADSL modem (which uses the telephone network)

Typical commercial download speeds may well be sufficient to play good quality streaming media at transmission rates of 0.5Mbps. The bottleneck in this transmission chain may be the connection of the streaming server towards the public Internet.

#### **Tips:**

If you are posting a file to a Web site, check to see if the site specifies which format and encoding parameters to use. Always remember that not everyone has a broadband connection. If you want the widest audience possible, you should play it safe and post a few videos with different formats and encoding options.

There are some specific web sites where you can store and share your video. Some video editing programmes even offer an option to upload your video automatically to sharing sites as the concluding step. Some institutions offer services to their students or to the teaching staff to post their videos or live streams, see for example the SURFNet Video Portal [video.surfnet.nl](http://video.surfnet.nl).

## **5. EMBEDDING**

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### **5.1 MULTIMEDIA OR HYPERMEDIA LEARNING: VIDEO IN THE LEARNING ENVIRONMENT**

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With "Multimedia or hypermedia Learning" we mean the combination of several types of media in education: streamed media can be part of a whole package of educational

material, like for example printed documents, websites, PowerPoint presentations etc. There are plenty of possibilities of media supported learning in learning environments. Commercially available platforms such as BlackBoard, Open Source platforms such as Moodle and Plone or institutional platforms such Toledo and DiViDU, are increasingly being used with embedded video by means of metafiles (.asx or .mov) that refer to streaming media that are streamed from servers outside the learning environment. The video will playback virtually from within the learning environment.

The following chapter describes another particular application that can serve to add interactivity to video.

## 5.2 ADDING INTERACTIVITY TO STREAMING VIDEO

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Hyperfilm is an example of how interactivity can be embedded within streaming media: it allows users to introduce hyperlinks into video materials, and it creates a whole new way of using video by easily turning linear video and media into hypermedia. Hyperfilm manages and organises digital video, creating a new model of interactive document, with different types of information (web pages, text, sound, other videos...) all synchronised to the main video. With Hyperfilm, users can create, with minimal effort, a complex multimedia document based on a video clip and with different content organised around it. The enriched video and the interaction with the content create an innovative way to conceive and produce multimedia content.

## 5.3 MODELS

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There are many examples of how video can be embedded in learning applications or learning environments, from simple and with limited interactivity to multidimensional and interactive.

### Model 1: Video and slide show

The combination of a slide show and a streamed video forms the basis of an online course. User-friendly software programmes have been created for this purpose (for example: MS Producer for PowerPoint 2003 which allows easy synchronisation of a video with a slide show) [www.d-lecture.de](http://www.d-lecture.de)

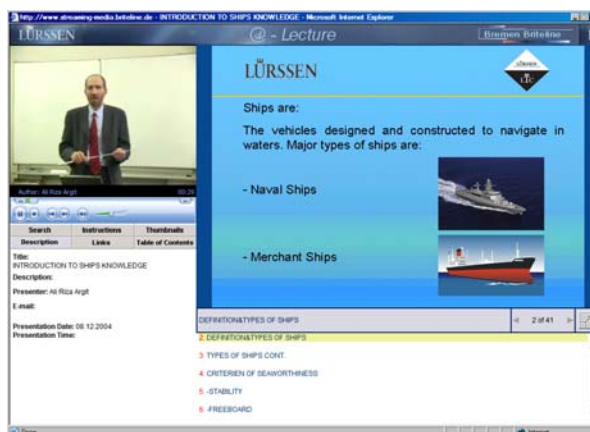


Fig. 15 - Synchronised streaming video and slide show

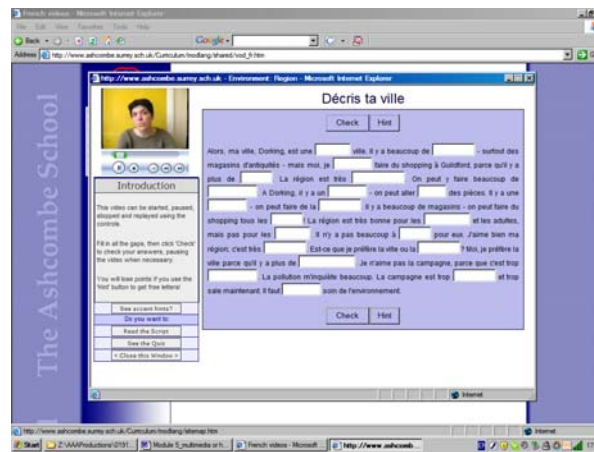


Fig. 16 - Streamed interview, with online task

### Model 2: Video and documents

A second option is simply to provide a streamed video and to accompany it with documents on the same web page. This is again a very basic and easy way of providing hypermedia courses. You can make it more advanced through installing a search engine or a file sorter.

Streamed interview, with online task. Text of the interview available when clicking on link [www.ashcombe.surrey.sch.uk](http://www.ashcombe.surrey.sch.uk)

### Model 3: Video and chat

To put the emphasis more on interactivity, you could insert a chat box in the website where the viewers can discuss immediately with others what they see on the streamed video.

### Model 4: Video and Webquests

Webquests are questions that need to be answered through searching the web for information. It is often used in education to teach students to learn search engines and other ways of searching the Internet. A web quest can be incorporated in the web page together with other questionnaires or documents.

### Model 5: Live streaming of lecture and audio-conference

If the images shown through streaming are not accompanied by sound, it is perfectly possible to have an online audio discussion with it at the same time. (In case the video contains sound, there will be a loss of quality in sound and transmission will not go as fast and clear). There are several audio tools available (Skype and MSN are the most famous one).

### Model 6: Blog

A blog is very popular now because it allows people with little Internet experience to create their own website through prefabricated pages which you can personalise up to a certain level. On a blog, there is also a certain level of interactivity since people can post reactions to it. Posted messages follow each other up chronologically. The combination of using a blog together with streamed materials is rather basic and does not really offer that many possibilities.

### Model 7: Library

If you have a lot of streamed material and you want others to use it rather as background materials for other materials, you better organise them as some kind of a “virtual library” where people can go and find the relevant material.



Fig. 17 - Image database: images are stored in different themes [beeldbank.schooltv.nl](http://beeldbank.schooltv.nl)

### Model 8: Integrated Learning environment

No above-mentioned possibilities exclude one another. Several variants and combinations are possible these days and the more you are a computer expert, the more sophisticated websites you can create.

### Model 9: Video Computer

This model uses the computer as the main teaching tool, and the video lecture is created enhancing the conceptual and graphic aspects of the lecture topics. This video model includes the activity of any computer application accompanied with the oral presentation of the professor and his/her written hand notes. [multimedia.ehu.es](http://multimedia.ehu.es)

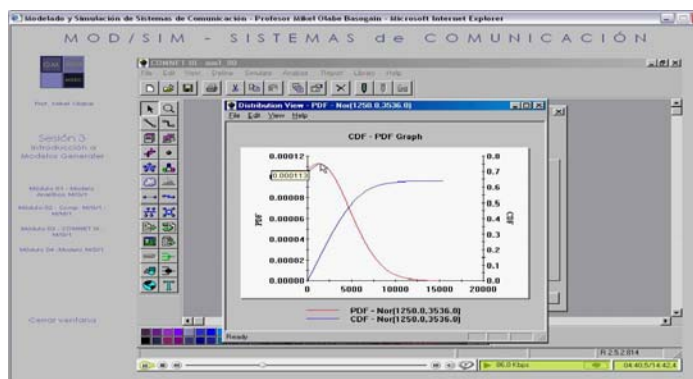


Fig. 18 - Video Computer [multimedia.ehu.es](http://multimedia.ehu.es)

### Model 10: Video Teacher - Computer

This video model integrates the teacher video with the video activity of his/her computer, allowing the student to participate in the class with the advantages provided by the computer video information (class presentation, comments, simulations, etc.). [multimedia.ehu.es](http://multimedia.ehu.es)

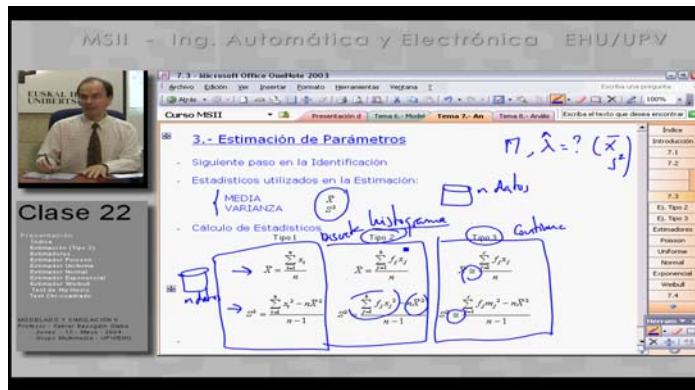


Fig. 19 - Video Teacher – Computer [multimedia.ehu.es](http://multimedia.ehu.es)

See sections 3.2 and 4.1 for more ideas.

## 5.4 USING VIDEO IN THE CLASSROOM

The experience with the use of hypermedia in schools shows how the process of realising a video and the publishing of it can be even more important than the final product itself. Students can execute several different tasks: analyse the film, catch the right moment to enrich the video with a link, look for the additional contents and/or create them, create a community site around to collect feedback etc.

Insert photo

## 5.5 VIDEO BLOGGING: VLOGGING

In 1997, the first weblog appeared on the Internet. Since then, the creation of a personal Blog became easier. Nowadays, many Internet Service Providers provide free blog hosting. That together with the ease with which users can create their won blogs, has lead to an explosion of the number of blogs.

Within the educational system, blogs are relatively new and so far mainly used for courses in which 'reflecting' plays an important role in course objectives.

A next step in this development is the addition of video to a Blog, to create a Video Blog or "Vlog". <http://www.freevlog.org/index.php/category/tutorial> explains how to start a vlog. The number of Vlogs is increasing rapidly.



Fig. 20 - Videoblog



## 5.6 MOBILE VIDEO

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While mobile devices still have a number of problems to solve (quality, availability, cost and reliability of the wireless connectivity; battery life; limited display size; multiple Operating Systems; physical limitations of the user interface; limitations of the hardware platform), they are considered the future of video. 3G networks in UK, Italy, and Belgium amongst others are already offering TV broadcasts to the smart phone. Experiments in Sweden in Vaxjo University during the MUSIS project, have already demonstrated that also multimedia based learning content can have its place on the mobile phone. Possibly even on the portable game console or on the mp3 player or iPod.

Meanwhile mobile phones with built in digital video or still cameras provide tools for scientific data collection and documentation, allowing students to gather evidence, collect, transmit and share images.



## 6. ACCESSIBILITY CONSIDERATIONS

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### 6.1 INTRODUCTION

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The issue of accessibility of web-delivered digital media to everybody, regardless of disability, has been important since Tim Berners Lee first developed the concept of the World Wide Web. As the WWW has grown, providing us with a vast amount of information for commerce, entertainment and education, so too has the creativity and the variety of web content, giving us access to information in a stimulating and engaging way.

Yet, as the richness of web content increased, evolving from the original network of text-based, highly technical documents to an ever-increasing amount of graphical, video and audio content, there was a marked decline in the inherent accessibility of web content. This was exacerbated as browser capability increased to deliver rich web content, and browser conformance with agreed HTML standards declined.

This led to a situation where web content providers, encouraged by authoring tools that paid little attention to the principles of semantically marked-up documents, increasingly ignored standards in pursuit of delivering visually rich content that looked good in the most commonly used browsers. These principles and standards are the foundations of accessible web content and the result was a decline in accessibility. This particularly applied to users:

- Unable to see web content and who rely on a text-to-speech device or Braille display,

- With a visual impairment that affects visual acuity or colour perception, and may need to change the display of the page in order to be able to read it,

- With dyslexia or other specific learning difficulty,

- With impaired manual dexterity or a severe motor impairment that prevents them from using a mouse, or requires them to use an alternative assistive device to control their computer, and users

- With a cognitive impairment that affects their ability to locate, understand and process information.



Thankfully, the tide is now turning. This has been driven by a number of factors, not least an increased moral obligation to realise the potential of the web to widen access, so as to ensure that information and services are equally open to people who traditionally encounter exclusion because of their disability. Developments in disability-related legislation in the UK and elsewhere have raised awareness of the importance of web accessibility, albeit with uncertainty over what is required to achieve legal compliance from a technical point of view [see sidebar].

Web developers are increasingly viewing standards compliance and accessible design as a professional requirement - compatible with graphic design and creativity. This is underlined by the popularity and influence of organisations such as the Web Standards Project and publications such as *Designing with Web Standards* (Zeldman, 2003). In the UK, initiatives such as Accessify ([www.accessify.com](http://www.accessify.com)), charities such as the Royal National Institute for the Blind (RNIB, [www.rnib.org.uk](http://www.rnib.org.uk)) and TechDis, ([www.techdis.ac.uk](http://www.techdis.ac.uk)) have all helped raise awareness of the issues and provide information and resources on accessible web design.

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## 6.2 ACCESSIBLE DESIGN THAT BENEFITS ALL

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A change in attitude may also have resulted from a realisation that accessible design principles not only help people with specific physical or cognitive impairments, but also can benefit many other groups of web users, including:

- Users of emerging technology such as mobile Internet devices (mobile phones or Personal Digital Assistants) and in-car audio browsing devices.
- Users accessing the web with restricted bandwidth connections, with limited hardware capability or with legacy browsing/operating systems.
- Users of statistically less common browsing technology, including 'minority' browsers such as Mozilla and Opera, or non-PC/Windows based browsing set-ups.
- Users for whom English is not their first language.
- Older users, who may have particular combinations of impairments, which cause access difficulties.

Research has indicated that following principles of accessible design frequently results in an interface that is easier to use by people not considered the primary beneficiaries of the accessibility feature in question. A classic and often quoted example of this is the use of captions (subtitles) for television programmes – the number of people who benefit from this accessibility feature when watching TV in a noisy pub significantly outweighs the number of deaf people watching at home.

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## 6.3 STANDARDS

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The World Wide Web Consortium or W3C (who set international standards) has taken a lead in promoting accessible HTML development, through the development and publication of the Web Content Accessibility Guidelines (WCAG), and supporting guidelines for browser developers (User Agent Accessibility Guidelines (UAAG) and web authoring software guidelines (Authoring Tool Accessibility Guidelines (ATAG)).

When we consider how to make web based streaming media accessible to people with hearing and visual impairments, there are many precedents already widely used and accepted in more traditional media. Clark (2002) compares techniques for making television and cinema with what is required to develop accessible streaming media on

the web: suggesting that the techniques remain broadly the same for both channels, and provides an insightful overview of the challenges awaiting the developer.

Yet, while the principles of accessible web development have been generally agreed for some years now and integration of these with development procedures and philosophies should take relatively little effort; the issue of creating streaming multimedia that is accessible to people who have visual or hearing impairments is more challenging. It requires more thinking, more time, more expertise, and more consideration of the circumstances under which the media are being accessed, including the purpose, intended audience and access environment.

## 6.4 IN PRACTICE

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### **Creating online courses with hearing deficits in mind**

The use of sound in online education, as used in video clips or sound files, is a problem for students who are hearing impaired. Offering them a non-aural equivalent for all aural components can help these students. Examples include adding subtitles, illuminating graphics and text, and recording faces in such a way that it is possible to read someone's lips.

Example: Peter studies History. He is deaf. In the past, this often led to problems in his communication with teachers. The use of e-mail and a Virtual Learning Environment has substantially improved this. Instead of oral feedback on papers and assignments, he gets feedback by e-mail. By using a VLE it is easier for Peter to communicate with fellow students and teachers, e.g. via the discussion board. Watching a historic movie, however, was difficult because it had no subtitles. A fellow student created sheets using PowerPoint and Producer, so Peter could read an explanation of what he saw in the movie.

#### *When to use*

Essentially this is something a teacher should always do, because it is always possible that one or more students with hearing disabilities join a course. It is much easier to plan this beforehand, than to change things later.

#### *How to do this*

Check if sound is used in the online course (video, music, oral instruction in PowerPoint presentations, other short sound clips such as applause or warnings).

If a lecture is filmed, make sure that the teacher/speaker is clearly visible, so the student can lip-read. Preferably, film the speaker's head and not the whole body.

If a site contains music only for entertainment, add a textual note explaining that this has no educational goal. This is also true for any 'fancy' sounds.

If a 'fancy' sound does have a meaning, such as a warning, or to indicate an error, this sound must be accompanied by text or an image with the same meaning.

If video is used, the speaker's mouth should be clearly visible, the movie should be subtitled, or a text explaining the contents of the movie should be displayed synchronously. Subtitling can be done by movie editing software or special subtitling software. It can also be done with a combination of PowerPoint and Producer.

If an oral instruction is given, make this available in text-only format as well.

## **Creating online courses with visually deficits in mind**

Online courses use more text and images than traditional lectures. This can lead to problems for students who are visually impaired, but teachers can use a number of means to minimise these problems.

Example: Annemarie studies Psychology. She is blind. Teachers at her faculty use a Virtual Learning Environment. At first, this caused problems for Annemarie, who used to retrieve much information during lectures. However, at present, the VLE offers a number of advantages for Annemarie. She uses text-to-speech software that reads articles from electronic magazines for her. Links to these articles are added to the VLE; other students use the links to print and read the articles. The teachers also put PowerPoint sheets in the VLE, and Annemarie uses the same text-to-speech software to reads these sheets.

### *When to use*

Essentially this is something a teacher should always do, because it is always possible that one or more students with hearing disabilities join a course. It is much easier to plan this beforehand, than to change things later.

### *How to do this*

Check where text and images are used in the online course.

Check for coloured images whether the colour-blind can use them. A useful website for this is [www.vischeck.com/vischeck/vischeckURL.php](http://www.vischeck.com/vischeck/vischeckURL.php). Here you can check whether a website or an image is acceptable for a number of colour deficits.

Add 'alt'-text to images, so text-to-speech software can 'read' the image to the student.

Add titles to images (such as 'Figure 1: histogram of ...'), so that text-to-speech software can 'read' the image to the student.

Make sure characters are scalable. Use styles in html, text, and PDF files. The reader can then easily increase the size of the characters. Styles can also be recognised by text-to-speech software that can e.g. distinguish between a title and plain text.

Be sparsely when using text boxes and menus. Text-to-speech software will have problems to put these in a logical order. This, by the way, is true for people as well.

## **Creating online courses with motor disabled people in mind**

Online courses can increase accessibility to education for motor disabled people. A number of preconditions must be accomplished.

Example: Due to a car accident, Esther is multiple handicapped. She sits in a wheelchair and can only move her right arm. She is able to attend lectures and seminars, because she can see and hear normally. She uses special computer equipment to type. She can read the text teachers have placed in the Virtual Learning Environment, and she can use this environment and e-mail to communicate. One teacher used footnotes that could be opened by clicking on small numbers (e.g. footnote). These hyperlinks were too small for Esther, because she cannot control her mouse very well. The teacher replaced the footnotes hyperlinks by larger texts that are easier to click on (see examples footnote 2).

Half a year after she started her study, Esther was in hospital for a long period. While she was in hospital, she received material through the VLE, and she was able to

communicate with her teachers. This made it possible for her to continue her study, although with some delay. She could also communicate with her fellow students. An attempt to use video conferencing software failed, because at that time the available bandwidth was too low.

*When to use*

Essentially this is something a teacher should always do, because it is always possible that one or more students with motor disabilities join a course. It is much easier to plan this beforehand, than to change things later.

*How to do this*

Place texts, articles, and sheets in the VLE as much as possible. Students who are motor disabled may have problems to attend lectures, and benefit from being able to use online material.

Offer the possibility to use digital communication if a student cannot attend all lectures. This can be done by e-mail, but - provided the communication does not contain private information - using of a discussion forum in a VLE has the advantage that other students can benefit from this communication and even contribute to it.

Using video conferencing can help if the student cannot attend (all) face-to-face meetings.

Do not create small anchors (such as footnote numbers or small icons) for hyperlinks in a document. It may be difficult for people who cannot control a mouse or other pointing device very accurately to click on such a link.

### **Creating online courses with dyslexic people in mind**

Online courses are very often text oriented. This can be a disadvantage for dyslexic people, but supporting them can be done with only small adjustments. At the same time, an online course can be used to help dyslexic people.

Example: Marc studies economics. He is dyslexic. His faculty helps him in a number of ways. He gets more time to take his examinations, as he has difficulties in reading. The advent of digital means in education was partly positive, partly negative for Marc. A lot of feedback on papers is now given through e-mail, so it takes Marc more time to read and understand. Most teachers however, are willing to give Marc oral feedback instead. As most articles and other texts that are printed in readers are also available in digital form in the Virtual Learning Environment, Marc can use text-to-speech software. This includes PowerPoint sheets that were presented during lectures. Marc can also increase the font size or change the font in these documents, so it is easier for him to read them.

*When to use*

Essentially this is something a teacher should always do, because it is always possible that one or more dyslexic students join a course. It is much easier to plan this beforehand, than to change things later.

*How to do this*

Make sure that the font size of documents in an online course can be increased (e.g. by adjusting the browser settings). Use style sheets instead of hard coded font sizes.

It is disputed whether dyslexic people would benefit from serif (e.g. Roman Times) or sanserif fonts (e.g. Arial or Verdana). Therefore, make it possible that the reader chooses his/her favourite font. Using styles in documents and web pages can do this. More information about a font that is especially designed for dyslectic people can be found at [www.readregular.com](http://www.readregular.com).

Do not use justify (align on both sides) to format text. This means that there will be irregular white spaces between words, which will make it more difficult for dyslexic people to read the text. If you do want to justify the text, use style sheets, so the reader can adjust the alignment to his/her own desire.

Use styles for (sub)titles in documents. Text-to-speech software recognises these elements and can inform the reader about them.

Make documents digitally available as much as possible. Dyslexic students can use text-to-speech software to read them.

# HOW TO ACQUIRE THE NECESSARY SKILLS

## 1. THE VIDEOAKTIV FACE TO FACE WORKSHOPS

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### 1.1 AIMS

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The initial workshops aim at the beginner or little experienced practitioner who is enthusiastic about using digital video and sound for teaching. The workshops introduce the basics of video and audio creation, streamed and other (e.g. DVD, CD-Rom) delivery for educational purposes. The aim is to support the participant to acquire the basic skills, subject jargon and process understanding to be able to initiate their own video and audio projects. It is not the intention to train academic staff to become audiovisual professionals but to give them an insight into the practices of production to enable them to design course materials making the best possible use of these technologies.

### 1.2 THEMES

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Themes include: educational value; introduction to existing local and international media collections and archives; technology for developing resources (e.g. shooting, digitising); reflective practice (combining educational needs and technical aspects); accessibility requirements for the sensory impaired; legal, ethical and copyright issues. The emphasis will be in designing learning events that can be supported by web-based video and audio material.

### 1.3 WORKSHOP 'VIDEO IN HIGHER EDUCATION'

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#### **Content of the workshop**

Video may enhance the learning process in many ways. A number of VideoAktiv practical workshops were organised in the UK, in The Netherlands, France, Spain, Belgium, Ireland, and Italy, helping teachers to use video in their own courses. Different uses of video have been dealt with, such as incorporating video as a learning resource in a digital learning environment, using video during lectures or giving students the task of producing videos themselves.

During these sessions, a number of examples were highlighted, illuminating the value of video in higher education, followed by a brief introduction to the technical aspects of streaming video. Participants could decide for themselves how they wanted to use video in their own courses, and choose those modules that best fitted their interests and needs, and that enabled them to carry out their own video project.

Among the modules offered are:

- How to design assignments related to video materials
- Making assignments and videos available in a Blackboard environment
- Digitising analogue video materials
- Legal issues concerning privacy, copyrights et cetera
- Searching for video materials on the Internet
- Using video in PowerPoint

Produce your own video materials or hire professional expertise

Producing instructional videos on computer applications

Recording lectures.

Workshop participants work at their own pace. The equipment at their disposal enabled them to learn how to digitise analogue videos and record and edit videos. Training materials were designed to help realise video projects. The workshop session trainers provided pedagogical as well as technical advice. Some of the workshop course materials remain available via the VideoAktiv website, where interested institutions can also express their interest in organising a VideoAktiv workshop.

### **For whom is the workshop intended?**

All teachers, those without prior experience in the use of video in education as well as those who want to extend their competencies, are welcome to apply for participation. Technical knowledge about streaming video is not required. Participants should, however, be familiar with the basics of the digital learning environment (e.g. BlackBoard) used in their institution.

*VideoAktiv Workshop (June 2005) at the Engineering School of Bilbao.*

## **2. THE VIDEOAKTIV VIRTUAL WORKSHOPS**

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For those who do not have the opportunity to attend one of the VideoAktiv workshops, or for those participants who want to study more of its contents after participating in one, the VideoAktiv website provides access to virtual workshops.

Partners created an online version of their workshop, called the Virtual Workshops. The format of each of these Virtual Workshops reflects the way the partner thinks is most suitable for its specific target group. The Virtual Workshops therefore are also a collection of different approaches in presenting online study material.

All virtual workshops are available at [www.videoaktiv.org](http://www.videoaktiv.org)

### **2.1 EHU - UNIVERSITY OF THE BASQUE COUNTRY, BILBAO**

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This Virtual Workshop includes the whole video/multimedia contents used in the face-to-face workshops.

Languages: The virtual workshop is available in Spanish and English.

Navigation: The virtual workshop can be used in two ways:

- A. Follow the complete Workshop,
- B. Select and follow individual Modules.





*Fig. 21 - VideoAktiv Workshop (June 2005) at the Engineering School of Bilbao.*

### **Part 1. – Introduction**

A. Video-clips of the Face to Face part (Synchronised streaming video and slide show):

Workshop Presentation (14')

Hands on participants (7')

Workshop conclusion (2')

B. Documentation

Program (pdf)

Workshop Manual (pdf)

Photographs (pdf)

Resources & participant's work (link)

C. Visual Guide: Video Computer (Flash 6')

### **Part 2. – Day I Using Video/Multimedia in Education ((All modules are Video Computer in Flash format)**

Module 1: Academic World and use of video (12')

Module 2: Academic Disciplines (2')

Module 3: Hands-on: Video resources use in the class (4')

Module 4: Technical, Pedagogical, and Organisation Analysis (28.5')

Module 5: Method integration video in the class (13.5')

Module 6: Guided Hands-on Project: Integration of the video in the class (4.5')

Module 7: Hands-on Project: Integration of the video in the class (2.5')

### **Part 3. - Day II: Creation Video/Multimedia in Education (All modules are Video Computer in Flash format)**

Module 8: Models of video in the classroom (15')

Module 9: Analysis Video Recording and Production (13')

Module 10: Hands-on: Models of video in classroom (2')

Module 11: Analysis of Integration and Tools (9')

Module 12: Methodology of creation of video lecture with video (19')

Module 13: Guided Hands-on: Creation video lecture (6')

Module 14: Hands-on Project: Creation video lecture (1.5')

## 2.2 VIDÉOSCOPIE

The French virtual workshop has been designed to reflect the structure, the content and the spirit of the face to face workshops, covering both the pedagogical applications of digital media and the production techniques required to design, film, edit and deliver digital media online.

The rich media approach - combining video material, photographs, synchronised slides and downloadable supporting documents - gives participants a feel of what it is like to design and produce digital media for teaching and learning and provides them with the opportunity to complete their own practical work. The virtual workshop can be consulted and followed as autonomous study material, or can be integrated into a tutored online course.

The virtual workshop reflects the linear structure of the face-to-face workshop, enabling participants to work through each stage in the process or to access individual 'modules' according to their area of interest and in the order they wish.

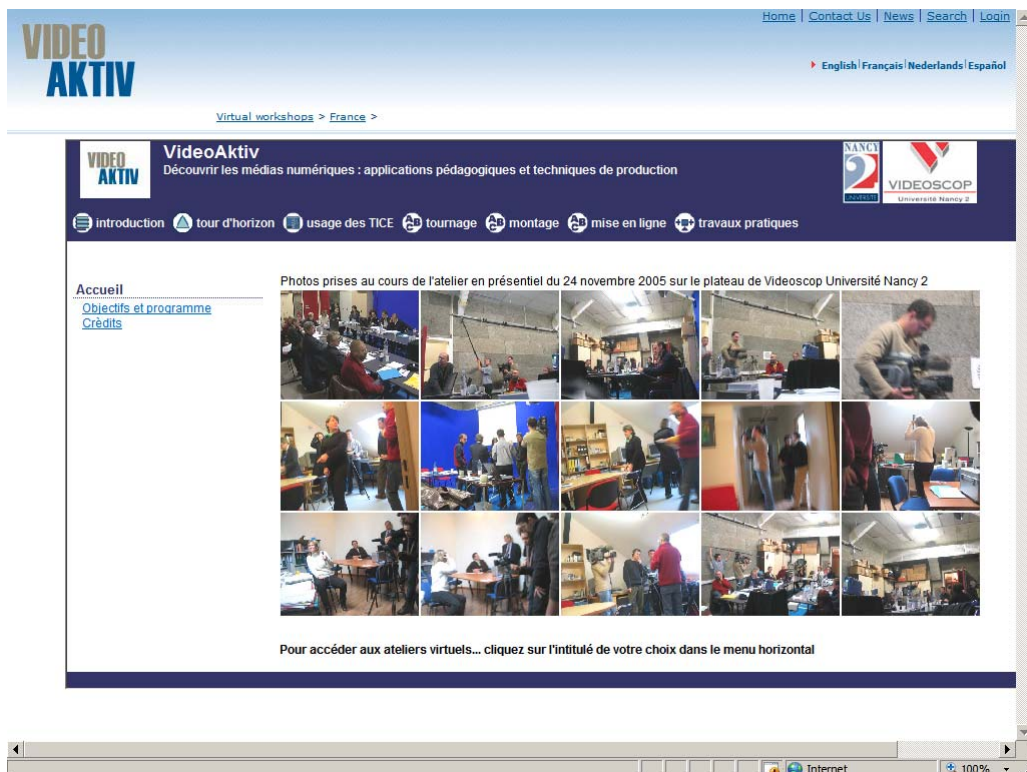


Fig. 22 - The Vidéoscop Virtual Workshop

The virtual workshop was produced using SMIL (Synchronised Multimedia Integration Language) to synchronise content with the video presentations. The advantage of using SMIL is that it is compliant with W3C Web Accessibility standards. (See also [www.w3.org/AudioVideo/](http://www.w3.org/AudioVideo/) and [www.w3.org/TR/WCAG10/wai-pageauth.html](http://www.w3.org/TR/WCAG10/wai-pageauth.html))

SMIL will enable a fully accessible version of this workshop to be developed should this be required, synchronising a textual transcription with the audio track. A further

advantage of SMIL is that each media, while combined in a single environment, remains independent, thus offering a high level of flexibility both in terms of form and temporal organisation. This virtual workshop can thus be considered on another level and be seen in itself as an example of the pedagogical application of rich media.

The different modules cover:

- An introduction to the VideoAktiv project and the workshops in general
- A panorama of examples of how digital media and video in particular can be used for teaching and learning
- An in-depth study of the various pedagogical concepts behind the use of digital media
- Useful tips for filming, from preparing a storyboard to handling a camera
- The basics of editing digital media
- Publishing your video online
- Practical exercises: supporting documents to help participants define and realise their project, illustrated with extracts from the face to face workshop showing participants working in groups on their own projects.

The workshop language is French.

### [2.3](#) [VRIJE UNIVERSITEIT AMSTERDAM / UNIVERSITY GRONINGEN](#)

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The basic principle of the Dutch Virtual Workshop is that the teacher, inspired by the examples in the workshop, composes her own course programme by choosing different modules.

Following the link “Voorbeelden bekijken” (‘Browsing through examples’), you can look at a large number of examples of the use of streaming video in higher education. For each of these examples, the question is answered how video was used in that specific course. An illustration is given, the number of students signed up for the course, an evaluation by students and teachers, and an example of an assignment.

The Virtual Workshop is modular. Each of the modules discusses one of the aspects of using streaming video in education, such as searching for existing material or uploading a video file to a video server. In the Guided Tour (Internet Explorer required), an instructor presents the different types of using video in education.

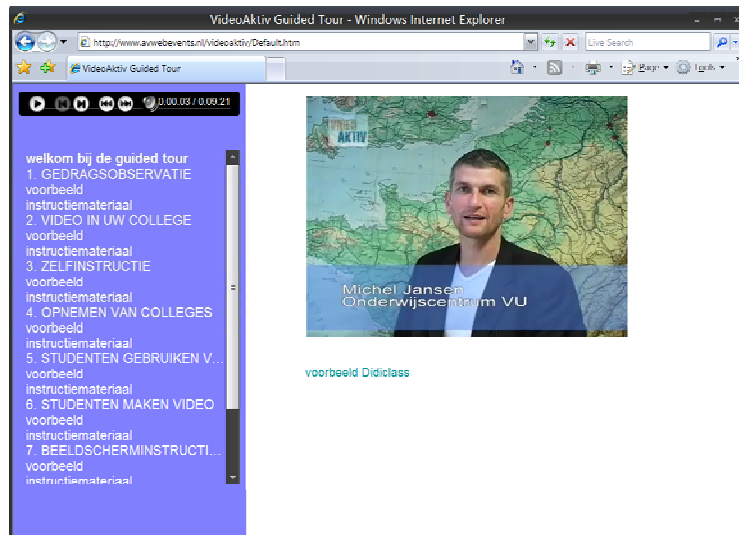


Fig. 23 - Dutch Virtual Workshop

Throughout the module, corresponding modules are presented to the visitor: when the example is useful for the visitor, he or she can choose to follow the modules to get more information on the subject. Each module is described shortly in an introduction, and contains links to study materials.

Visitors can also 'Compose their personal programme' by asking the Virtual Workshop to recommend a set of modules, and the order in which to do them, based on the user's profile or knowledge.

The workshop modules are currently only available in Dutch.

## 2.4 GLASGOW CALEDONIAN UNIVERSITY

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The UK Virtual Workshop is designed to complement rather than replicate our highly successful series of face-to-face workshops across the UK. We feel that the value of a face-to-face workshop comes from the immediacy of interaction with peers and facilitators and through the passing on of enthusiasm and ideas through teamwork and peer facilitation. For us, this was somehow lost when we translated our workshops to the web. With the wealth of engaging instructional materials already available on the web, we decided not to try to reinvent the wheel but to capitalise on our experience as educators and the body of pre-existing materials available to us by cataloguing the materials and giving them structure.

We wanted the virtual workshop to primarily capitalise on resources that are already publicly available on the web and the future resources that will be developed. This required an extensible database driven site be developed and a basic taxonomy be applied to help give meaning to the resource listings. The virtual workshop begins with a simple series of questions which help the application decide upon which of the 27 possible routes through the materials offer best fit. Certain types of learning resource can be excluded at this stage (such as video, text based, pdfs...) The application sets a cookie and stores your route in a database so that on your next visit, your route can be pulled from the database and presented to you. Once the cookie has been set, the application will present the modules that are part of your learning path and these will be ordered by theme, level, and type. The presentation can be switched to a simple list layout where the modules will be ordered in terms of their theme. Each module can be discussed in a wiki, removed from the list of modules in your learning path, or rated to help guide other users.



Fig. 24 - The GCU Virtual Workshop

## 2.5 ATiT

The ATiT virtual workshop reflects the real life workshop as much as possible but leaves room for flexible individual access to the content and supportive resources. Participants normally start with module 1 and finish with module 10. However there is always the possibility of moving from one module to another in a different order, where for example certain modules are familiar to the participants. All pages can be viewed at any time of the workshop.

ATiT chose for this linear approach because it follows closely the structure of the workshops. This way, teachers participating in a real face-to-face workshop can use the virtual workshop as a handbook in which they can easily follow the content and which they can use to revisit the content afterwards. For those people who have not been able to participate in a workshop, following the virtual workshop from start to end appears to be the most effective approach in order to get all the basic information. Participants, who already have knowledge about certain aspects of the content of this module, can easily move from one section to another and only use the parts they need for their purpose.

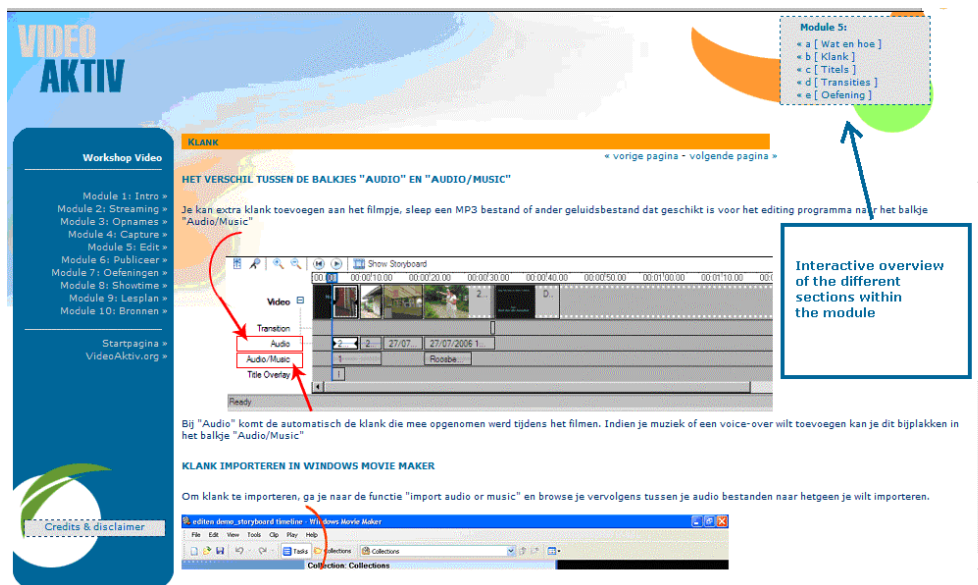


Fig. 25 - ATiT Virtual Workshop

The following modules are included

Intro – What are the relevant materials for producing an audio-visual production?

Streaming – What is this and how can we use this?

Recordings – How to prepare and how to start

Capture – How to capture the recordings into the editing programme?

Edit – How to edit the recorded material?

Publish – How to publish a movie?

Exercises – Some exercises to put the theory into practice.

Showtime – Useful examples and templates.

Project plans – Examples for some courses with video materials about different topics.

Sources

This virtual workshop is available in Dutch only.



## FURTHER RESOURCES

### 1. ON PRODUCTION OF (STREAMING) VIDEO

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#### **Digital Video in the Classroom**

[www.tsof.edu.au/resources/video/](http://www.tsof.edu.au/resources/video/)

This is a guide for teachers and students that explains the benefits of video in the classroom, the different production stages, shooting guidelines, camera information, etc.

#### **Using video in PowerPoint**

[www.presentations.com/presentations/creation/article\\_display.jsp?vnu\\_content\\_id=1258067](http://www.presentations.com/presentations/creation/article_display.jsp?vnu_content_id=1258067)

A how-to guide for PowerPoint presenters who want to take the plunge into digital video.

#### **Desktop-Video-Guide**

[www.desktop-video-guide.com/index.html](http://www.desktop-video-guide.com/index.html)

This website contains systematic guides and reviews so that you get only the most essential information you need. You will learn how to select and buy quality video equipment, as well as techniques for shooting and capturing digital video. It also covers the video editing process and how you can share your video with others.

#### **Shooting good video**

[www.powertolearn.com/articles/teaching\\_with\\_technology/shooting\\_good\\_video.shtml](http://www.powertolearn.com/articles/teaching_with_technology/shooting_good_video.shtml)

This article contains guidelines for lighting, composition, audio, and retakes to get you started in the right direction.

#### **Web Video Guidelines**

[www.utexas.edu/web/video/index.php?e=0](http://www.utexas.edu/web/video/index.php?e=0)

Guidelines for creating Web Video. It goes through all the stages involved in creating streaming video (pre-production planning, production, post-production, captioning, publishing, accessibility, compression, glossary)

#### **Television Production Course**

[www.cybercollege.com/tvp\\_ind.htm](http://www.cybercollege.com/tvp_ind.htm)

This is a detailed online course in video production and contains good information on audio, lighting, editing, colours, etc.

#### **The Reporters Toolbox**

[www.snn-rdr.ca/snn/nr\\_reporterstoolbox/multimedia.html](http://www.snn-rdr.ca/snn/nr_reporterstoolbox/multimedia.html) and [www.snn-rdr.ca/snn/nr\\_reporterstoolbox/editingvideo.html](http://www.snn-rdr.ca/snn/nr_reporterstoolbox/editingvideo.html)

This contains comprehensive information on video techniques, editing, interview techniques, storyboarding, log forms, audio guidelines, etc.

#### **Digital Video Production**

[www.kent.k12.wa.us/KSD/IT/TSC/managing/hardware/vidprod/](http://www.kent.k12.wa.us/KSD/IT/TSC/managing/hardware/vidprod/)



Guide on digital video production.

### **How to Shoot for Streaming**

[www.streamingmedia.com/tutorials/view.asp?tutorial\\_id=36b](http://www.streamingmedia.com/tutorials/view.asp?tutorial_id=36b)

This is an article entitled "How to Shoot for Streaming, Tips and tricks for creating streaming media that looks good on the net".

### **The Video Guide**

[pblmm.k12.ca.us/TechHelp/VideoHelp/VideoGuide.html](http://pblmm.k12.ca.us/TechHelp/VideoHelp/VideoGuide.html)

The Video Guide is a resource for both students and teachers to use as they explore the world of video. We hope you'll find these advice sheets, activities, glossaries, and more, useful whether you're just getting started or have already been using a video camera for a while.

## **2. ARCHIVES OF EDUCATIONAL VIDEOS**

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### **Nobel eMuseum**

[search.nobelprize.org/search/nobel/?q=video&i=en](http://search.nobelprize.org/search/nobel/?q=video&i=en)

This is the site of the Nobel Museum and offers the Prize Announcements, Ceremonies, and Lectures in streaming video. Although it is very interesting, it is also not suitable for the type of scenario we are developing.

### **PIVoT: The Physics Interactive Video Tutor**

[ceci.mit.edu/projects/pivot/index.html](http://ceci.mit.edu/projects/pivot/index.html)

This site is suitable for university students and introduces the subject of Classical Mechanics.

### **HERMES**

[www.bufvc.ac.uk/databases/index.html](http://www.bufvc.ac.uk/databases/index.html)

HERMES (offered by the BUFVC – British Universities Film and Video Council) is an online database providing details for over 25,000 audio-visual programmes, and their distributors, available in the UK. It also includes a comprehensive listing of the paper materials held in the BUFVC library.

### **Videos for Teachers**

[www.teachersnetwork.org/media/Index.htm](http://www.teachersnetwork.org/media/Index.htm)

Videos for Teachers: Streaming videos highlighting the work of exemplary teachers.

### **Film Education - Free Resources**

[www.filmeducation.org/resources.html](http://www.filmeducation.org/resources.html)

Film Education is a registered charity funded by the film industry in the UK. Our aim is to encourage and promote the study of film and cinema within the UK National Curriculum. In supporting teachers, Film Education aims to give pupils the opportunity to analyse and evaluate a wide range of Media, including film.

Study resources include film specific CD-ROMs and educational online resources, study guides, generic study guides and videos, plus new materials in digital video editing.

### **ARKive ... wildlife videos**

[www.arkive.org](http://www.arkive.org)

ARKive is leading the 'virtual' conservation effort - finding, sorting, cataloguing and copying the key audio-visual records of the world's animals, plants and fungi, and building them into comprehensive and enduring multi-media digital profiles. Using film, photographs and audio recordings, ARKive is creating a unique record of the world's biodiversity - complementing other species information datasets, and making a key resource available for scientists, conservationists, educators and the general public.

### **Learning Curve: Film Archives**

[www.learningcurve.gov.uk/onfilm/archive.htm](http://www.learningcurve.gov.uk/onfilm/archive.htm)

Here you can view twentieth century films ranging from life in Britain, the Berlin Wall to conflict in Vietnam.

### **The Moving Image Gateway (MIG) is**

[www.bufvc.ac.uk/gateway/index.html](http://www.bufvc.ac.uk/gateway/index.html)

The Moving Image Gateway (MIG) is a new service that collects together websites that relate to moving images and sound and their use in higher and further education.

The sites are classified by academic discipline, some forty subjects from Agriculture to Women's Studies, collected within the four main categories of Arts & Humanities, Bio-Medical, Social Sciences, and Science & Technology. Each site has been evaluated and described by the BUFVC's Information Service, which regularly checks and updates the database.

Sites are highlighted which have video or audio streaming. There are some 600 sites on the MIG database at present, and it continues to grow at the rate of ten per month.

### **Research Channel**

[www.researchchannel.org](http://www.researchchannel.org)

The Research Channel provides online videos for higher education and research. It offers video programmes from leading American research institutions, using high quality, high-speed delivery of video (via Internet2) with lower bandwidth options available. There is an on-air constant web cast with a month's schedule of programmes, and a video library covering a wide range of subjects in the arts and sciences, searchable by title, subject and institution, and each available in a variety of bandwidths, using Windows Media Player.

### **Louvre**

[www.louvre.fr](http://www.louvre.fr)

The Louvre art gallery's site, available in French, English, Spanish and Japanese, has a 'Visite virtuelle' section where the user can select any point of the gallery and view all of the works from that viewpoint via a 360 degree QuickTime animation. Still images of the art works are given separately from this, searchable by period but not by title or artist.

### **ArtSigns**

[www.artsigns.ac.uk](http://www.artsigns.ac.uk)

ArtSigns is an online sign language glossary for terms in art and design, funded by the Department for Education and Skills. It contains over 2,000 signs, demonstrated with streaming video (QuickTime or Windows Media Player), which are categorised under 3D Design, Applied Arts and Design, Art History, Digital Media, Fine Art, General Art & Design Terms, and Visual Communications. Each term comes with a useful written definition, and there is a good system of cross-referencing to related terms, making it a handy guide to art and design in general as well as to the hearing-impaired.

### **BBC - Audio Interviews**

[www.bbc.co.uk/bbcfour/audiointerviews/](http://www.bbc.co.uk/bbcfour/audiointerviews/)

Hundreds of audio extracts from the BBC archives can be accessed here using Real Player, and feature a wide range of personalities, including Siegfried Sassoon, Alfred Hitchcock, Roald Dahl, George Bernard Shaw, Stevie Smith and dozens of others. It is possible to search alphabetically by name or by professions such as: actors, architects, cartoonists, composers, dancers, film directors, musicians, painters, photographers, poets, religious thinkers, sculptors, sports and writers.

### **ArtMuseum.net**

[www.artmuseum.net](http://www.artmuseum.net)

ArtMuseum.net is 'an Internet-based art exhibition and education resource that is both recreational and instructional in nature'. It includes online exhibitions, including 'Art in Technological Terms', 'Bill Viola: A 25 Year Survey', 'The One-Stop Warhol Shop' (a comprehensive multimedia resource on the artist), 'Art & Culture 1900-2000: The American Century' and 'Refresh: The Art of the Screenshot'. Video content (using Real) includes interviews with artists, and film of art works in installation.

### **Showcase**

[showcase.commedia.org.uk](http://showcase.commedia.org.uk)

The Community Media Association runs the Showcase, a 'streaming media archive' of radio, television, Internet projects, and training materials from the community media sector. This free, not-for-profit site offers "access to both fiction and non-fiction programmes in a variety of languages, made by individuals, community groups or organisations from all over the UK and beyond. Issues covered include: war and peace; the arts; disability; black and ethnic minority perspectives; gender issues; local history; human rights; health; storytelling and many more". The site uses Real Media for low bandwidth and broadband connections, and all video and audio materials are available for streaming or download. A welcome educational feature is the option to search under National Curriculum subject headings. The Showcase is funded by the New Opportunities Fund and the European Union Social Fund community Initiative EQUAL Programme. The site is clearly designed, and provides good supporting information for all titles. It is a high quality resource.

### **Moving History**

[www.movinghistory.ac.uk](http://www.movinghistory.ac.uk)

Moving History is an online guide to the UK's public sector moving image archives, designed to encourage the use of such archives for scholarly research. The South East Film & Video Archive has produced it for the AHRB Centre for British Film and Television Studies. The site contains 100 film clips, arranged by archive or by theme, in-depth descriptions of the archives, and guidelines for researchers. The themes include Arts and Culture, Coastal and Waterways, Drama and Entertainment, Family Life, Gender and

Cultural Diversity, Industry, Leisure, Rural Life and Urban Life. The clips, each around sixty seconds, require Windows Media Player, and run at high, medium and low bit rates. The site is clearly arranged (including a useful map of the key public sector moving image archives in the UK), and serves as an excellent introduction to moving image archives in general, as well as encouraging their use in specialised research. All of the featured archives are members of the Film Archive Forum.

### **Nova Online**

[www.pbs.org/wgbh/nova](http://www.pbs.org/wgbh/nova)

Nova is an American television series on popular science, produced by WGBH Boston. The main website links to sites for each individual Nova programme, including such subjects as GM crops, anorexia, Giving Birth, UFOs, the Maya, El Niño, the Leaning Tower of Pisa, AIDS and the Loch Ness Monster. The sites vary in their content but generally contain background text, teacher's guides, resources, links, and video clips - the programme Cracking the Code of Life on DNA is available in its entirety. The design is consistently imaginative and the content stimulating in a model site of its kind.

### **Vega Science Trust**

[www.vega.org.uk](http://www.vega.org.uk)

The Vega Science Trust aims to support and promote the science and technology communities using television and the Internet. It produces television programmes, many of which have been broadcast on BBC2's Learning Zone. The site contains details of the programmes, searchable by series, subject and speaker, which can be ordered online. There are also video clips (in QuickTime and MPEG formats), complete audio lectures (using RealAudio), complete video lectures by Harry Kroto, and a useful set of links to science video and related sources.

### **European Space Agency (ESA)**

[www.esa.int](http://www.esa.int)

The ESA's site includes a section devoted to its television service and video availability. The 'Video on the Web' section offers a good selection of video clips for download or streaming on various aspects of space travel.

### **Virtual Chemistry**

[www.chem.ox.ac.uk/vrchemistry/](http://www.chem.ox.ac.uk/vrchemistry/)

The University of Oxford's Virtual Chemistry site links to its Chemistry Film Studio (using QuickTime 4) illustrates popular experiments, mainly for use in schools, including 'The Non-Burning £5 Note' and 'The Properties of Liquid Oxygen'. A second moving image resource, Chemistry QuickTime TV, is only for use on the University of Oxford campus.

### **Natural History Museum (NHM)**

[www.nhm.ac.uk](http://www.nhm.ac.uk)

The Natural History Museum has a vibrant online presence, with several interactive exhibitions available, primarily aimed at schools and the public. These includes: Antcast, a compelling live web-cam to a colony of ants; a virtual reality fossil exhibition; a meticulous database of information on dinosaurs; an elaborate multimedia demonstration of the voyage of James Cook in the Endeavour; as well as links to individual NHM departments and a wide range of information resources.

### **Astronomy Movie Database**

[www.mysteries-megasite.com/mysterymovies/space-1.html](http://www.mysteries-megasite.com/mysterymovies/space-1.html)

Part of Dreamscape, a huge website linking to all manner of websites that cover 'mysteries' (everything from Acupuncture to Zombies), this section offers an exhaustive listing of over 3,000 links to astronomy sites with streamed video clips.

### **FirstFlight**

[firstflight.open.ac.uk](http://firstflight.open.ac.uk)

Ingenious use of Shockwave to simulate the flights of pioneer aircraft, including the those of the Wright Brothers, Samuel Cody, Santos-Dumont and Horatio Phillips, and the glider of Otto Lilienthal. The FirstFlight web site is part of a research project concerned with the development of virtual science environments developed at the Open University.

### **Findsounds.com**

[www.findsounds.com](http://www.findsounds.com)

Findsounds.com is a search engine for sounds. Sounds can be accessed via a simple search or by searching from sound types. Audio files can be downloaded as AIFF, AU and WAVE. Sound types are divided into various categories, including Birds, Animals, Mayhem and Nature. The sound files within these are extensive: for example, there are eight volcano sound files, twenty-five sound files of didgeridoos, eleven examples of thunder, and five kookaburra recordings. All searches link the user to audio files hosted by external websites.

## BIBLIOGRAPHY

- Allam, C.**, "Using filmmaking to teach students about Shakespeare, urban regeneration and other stuff", DIVERSE Conference, Glasgow, 2006
- BBC 2005**, "Good Shooting Guide" [www.bbctraining.com/onlineCourse.asp?tID=5914&cat=2781](http://www.bbctraining.com/onlineCourse.asp?tID=5914&cat=2781) (accessed 1 June 2006)
- Bijmens, H., Bijmens, M., Vanbuel, M.**, "Streaming Media in the Classroom", Education Highway, Linz, 2004
- Bijmens, M., Vanbuel, M.**, "An overview of IPR issues in MultiMedia", ATiT, Roosbeek, 2005
- Chang, C-W., Lin, K., Lee, S-Y.**, "The Characteristics of Digital Video and Considerations of Designing Video Databases", Institute of Computer Science and Information Engineering, National Chiao Tung University, Hsinchu, Taiwan
- Dale, E.**, "Audio-Visual Methods in Teaching", Holt, Rinehart and Winston, New York, 1962, 1969
- Duchastel, P.C., Waller, R.**, "Pictorial illustration in instructional texts", Educational Technology, November Issue (20-25), 1979
- Duffy, T.M., Cunningham, D.J.**, "Constructivism: implications for the design and delivery of instruction", 1996
- Duke, J.**, "Interactive video: implications for education and training", Council for Educational Technology, London, 1983
- Evans, R.**, "Practical DV Filmmaking", Focal Press, London, 2006
- Fletcher, J.D.**, "Effectiveness and cost of interactive videodisc instruction in defence training and education. Institute for Defence Analyses", Alexandra, 1990
- Galbraith, J.D.**, "Active viewing: and oxymoron in video-based instruction?", Society for Applied Learning Technologies Conference 2004, [designer.50g.com/docs/Salt\\_2004.pdf](http://designer.50g.com/docs/Salt_2004.pdf)
- Gladwell, M.**, "Blink: the power of thinking without thinking", Allan Lane, London, 2005
- Goegebeur, A.**, "Audiovisual training in Flemish education", iak – Canon cultuurcel, Brussels, 2004
- Goodyear, P., Steeples, C.**, "Creating shareable representations of practice", Advance Learning Technology Journal (ALT-J), Volume 6 Number 3 (16-23), 1998
- Hempe, B.**, "Video Literacy Series: What video does well in education, and what it doesn't. Syllabus Magazine 13(1)", [www.syllabus.com/syllabusmagazine/aug99\\_magfea.html](http://www.syllabus.com/syllabusmagazine/aug99_magfea.html), 1999
- Hoban, C.F., van Ormer, E.B.**, "Instructional Film Research: 1918-1950. Technical Report No. SDC-269-7-19, NAVEXOS P-977" Special Devices Center, Port Washington, N.Y., October 1951
- Jacques, A.**, "The Image", British Film Institute. London, 1997
- Jonassen, D.H. (Ed.)**, "Handbook of Research for Educational Communication and Technology", Simon & Schuster/MacMillan, New York, 1995
- Kearsley, G., Shneiderman, B.**, "Engagement Theory: A framework for technology-based teaching and learning", Educational Technology, September/October, pp 20-37, 1998

- Koopman, P., Sanderink, R., Verschoor, W., "DigiCol - Stappenplan voor het hoor- en werkcolleges", Digitale Universiteit, 2002
- Koumi, J., "Pedagogic design guidelines for multimedia materials: a mismatch between intuitive practitioners and experimental researchers", *European Journal of Open, Distance and E-Learning*, 2005 [www.eurodl.org/materials/contrib./2005/Jack\\_Koumi.htm](http://www.eurodl.org/materials/contrib./2005/Jack_Koumi.htm) , 2005
- Kulik, J. A., Kulik, C. C., "Review of recent research literature on computer-based instruction", *Contemporary Educational Psychology*, 12, pp 222-230, 1987
- L**aurillard D., Stratfold M., Luckin R., Plowman L. and Taylor S., "Affordances for learning in a non-linear narrative medium", *Journal of Interactive Media in Education*, 2000 (2) [www.jime.open.ac.uk/00/2/laurillard-00-2-paper.html](http://www.jime.open.ac.uk/00/2/laurillard-00-2-paper.html) , 2000
- Laurillard, D., "Rethinking University Teaching: A Framework for the Effective Use of Educational Technology", Routledge, London and New York, 1993
- M**ayer, R.E., Gallini, J.K., "When is an illustration worth ten thousand words?" *Journal of Educational Psychology*, 82(6) (715-726), 1990
- Millar, S.M., "Video as process and product", *Educause Quarterly*, 58-61, 2005
- Moreno R., Mayer E., "A learner-centred approach to multimedia explanations: driving instructional design principles from cognitive theory", *Interactive Multimedia Electronic Journal of Computer-Enhanced Learning*, 2000 (2) [imej.wfu.edu/articles/2000/2/05/index.asp](http://imej.wfu.edu/articles/2000/2/05/index.asp), 2000
- Moss, R., "Video, the educational challenge", Croom Helm Ltd, London and Canberra, 1983
- N**elson, T., "Computer Lib/Dream Machines. Revised edition", Tempus Books (Microsoft Press), Richmond, Washington, 1987
- P**almer, R., "What is CBT interactive video?", NCC Publications, Manchester, 1987
- Parsloe, E., "Interactive video", Sigma Technical Press, Wilmslow, Cheshire, 1985
- R**osenberg, M.J., "E-learning: strategies for delivering knowledge in the digital age", McGraw Hill, New York, 2001
- S**hepard, R.N. and Cooper, L.A., "Mental images and their transformations", MIT Press/Bradford Books, Cambridge, MA., 1982
- Smaldino, S., Russell, J., Heinich, R., Molenda, M., "Instructional Technology and Media for Learning" 8th Edition, 2004
- Strathie, C., "Promoting Collaborative Learning and Development through Video Enhanced Reflective Practice" (VERP) [escalate.ac.uk/2363](http://escalate.ac.uk/2363) (accessed 1 June 2006), 2006
- U**skov V .,"Technology for advanced e-learning", E-Learn Conference, Vancouver, Canada, 2005
- V**anbuel M., Bijnens M., "Transnational exchanges of streaming material", Education Highway, Linz, 2006
- Vygotski, L.S., "A Formação Social da Mente: o desenvolvimento dos processos psicológicos superiores", São Paulo, Martins Fontes, 2000
- Vygotski, L.S., "Pensamento e Linguagem", São Paulo, Martins Fontes, 1998
- W**allace, I., Donald, D., "Project Pad: An open source, browser based video animation tool", DIVERSE Conference, Glasgow, 2006



West, J., Donald, D., "Clydetown: The use of audio and video resources within a virtual community learning resource", DIVERSE Conference, Glasgow, 2006

Wetzel, C.D., Radke, P.H., Stern, H.W., "Instructional effectiveness of video media", Lawrence Erlbaum Associates, Hillsdale, NJ., 1994

**Y**oung, C., Asensio, M., "Looking through Three .I's: the Pedagogic Use of Streaming Video", in: Banks, S., Goodyear, P., Hodgson, V., McConnell, D., (eds), "Networked Learning", Conference Proceedings, pp. 628-635, Sheffield, 2002

Young, C.P.L., Meldgaard, H., "Top ten uses of video in education", eStream Conference 2006, Patras, Greece, 2006



# VIDEOAKTIV: THE PROJECT

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Video and audio offer educators new opportunities to expand the ways they capture students' attention and engage them in rich, meaningful, and vivid learning experiences. Web-delivered 'rich media' not only provides on-demand access and high student interaction, but can also open up new ways of representing, delivering, and sharing a subject discipline. Digital audiovisual technologies such as video streaming can assist in visualising for example a chemical process or show how an engine works, how animals move or show theatre performances live, beyond the limits of text descriptions. With these technologies, students are 'present' without the constraints of time, cost, space, and safety.

Then there is also a growing interest in encouraging students to develop their own video. The creative challenge of using moving images and sound to communicate a topic can be as engaging and insightful for students as well as teachers enabling them to acquire a range of transferable skills in addition to filmmaking itself.

Visually literate students learning in a media-rich environment: this is the inspiration of the Socrates Minerva project VideoAktiv (2004-2006). From a learning and teaching perspective, the challenge for educators is to recognise the value and opportunities of digital media technologies, and understand video and audio resources as powerful, innovative, and creative elements to enlighten teaching and learning.

VideoAktiv is a programme of face-to-face and virtual staff development workshops on digital media use for higher education. During the course of a VideoAktiv workshop, participants receive training and support in their practise of developing and delivering pedagogically sound media materials in their own teaching.

The aim of VideoAktiv, and this handbook, is to support practitioners in becoming visually literate using this exciting range of technologies and to learn to effectively use and develop audiovisual resources with new digital technologies in ways that are aligned with what they want to achieve educationally. VideoAktiv's higher goal is to support individuals in becoming pioneers and advocates in their own institutions, and to strengthen their passion for visual literacy with the formation of a solid European community committed to innovative media enriched education.

VideoAktiv is a collaboration between Glasgow Caledonian University (UK, coordinating institution), ATiT - Audiovisual Technologies, Informatics and Telecommunications (Belgium), The Vrije Universiteit Amsterdam (The Netherlands), Université Nancy 2 (France), University of the Basque Country (Spain), and the University of Groningen (The Netherlands) supported by the European Commission DG Education and Culture Socrates/Minerva Programme (Socrates ref.: 114169-CP-1-2004-1-UK-MINERVA-M).

For more information about the VideoAktiv Project, visit the website:

[www.videoaktiv.org](http://www.videoaktiv.org)

