

Video in E-learning Systems

Róbert Szilágyi¹ – György Kovács¹ – Miklós Herdon¹

¹University of Debrecen Centre of Agricultural Sciences Faculty of Agricultural Economics and Rural Development
4032 Debrecen Böszörményi str. 138.

Abstract. The world is changing rapidly in the field of multimedia and it is inevitable to prepare to use and utilize the new teaching method. This is specifically true in the case of the use of educational films both as video and also using such video on the Internet. Our first task is to decide whether the development of material will be an independent film or a part of an e-learning course. In both cases the method of construction is different. The next step is to select the target group of the film. There is a wide scale of possible viewers or participants (who must have a certain level of basic knowledge) and also handicapped people should be able to use the results. The final product ought to be acceptable for e-learning and distance-learning as well. Using the information technology in education is general and the present being of the e-learning is part of this fact. We can use e-learning effectively only if the system is filled up with electronic educational material. The most effective ones are the multimedia-materials. The effectiveness of the multimedia-material can be improved with the application of video.

Keywords. Video, E-learning, multimedia, LMS

Introduction

The first and most important point of view is to describe and define the topic. The video materials in e-learning are scientific films which are elaborating the theme in different profoundness. All topics can be elaborated to an educational film using diverse technologies (from professional film- and videotecnologies to the most common videoinstruments). The value of the educational film is determined by its ability to transfer knowledge.

We have to take the following into account when we decide how deeply we must elaborate the theme:

- **The age of the target-audience, and its education/level of knowledge**
- **How deeply we want the public memorize the planned material.**

These two points should determine the duration of the video installment for a particular topic (or the multimedia object that we would create).

Determine the goal of the video

The first element of creating educational videos is to determine the main goal and the target audience of our video. Even though of the main goal is clear – to transfer certain knowledge with the possibly best rate by utilizing the possibilities of moving pictures -, depending on the level of the educational material's intended teaching/training the importance of the video's length and its narration can be rather different.

Regarding depth of knowledge we can distinguish three different levels:

- **Knowledge-level**
- **Ability-level**
- **Application-level**

Making a video is a very expensive work. Just for this reason it could be very economic and useful to think on further utilising different shots. The same shots can be used again by utilising different postproduction-effects to reach these three scientific levels.

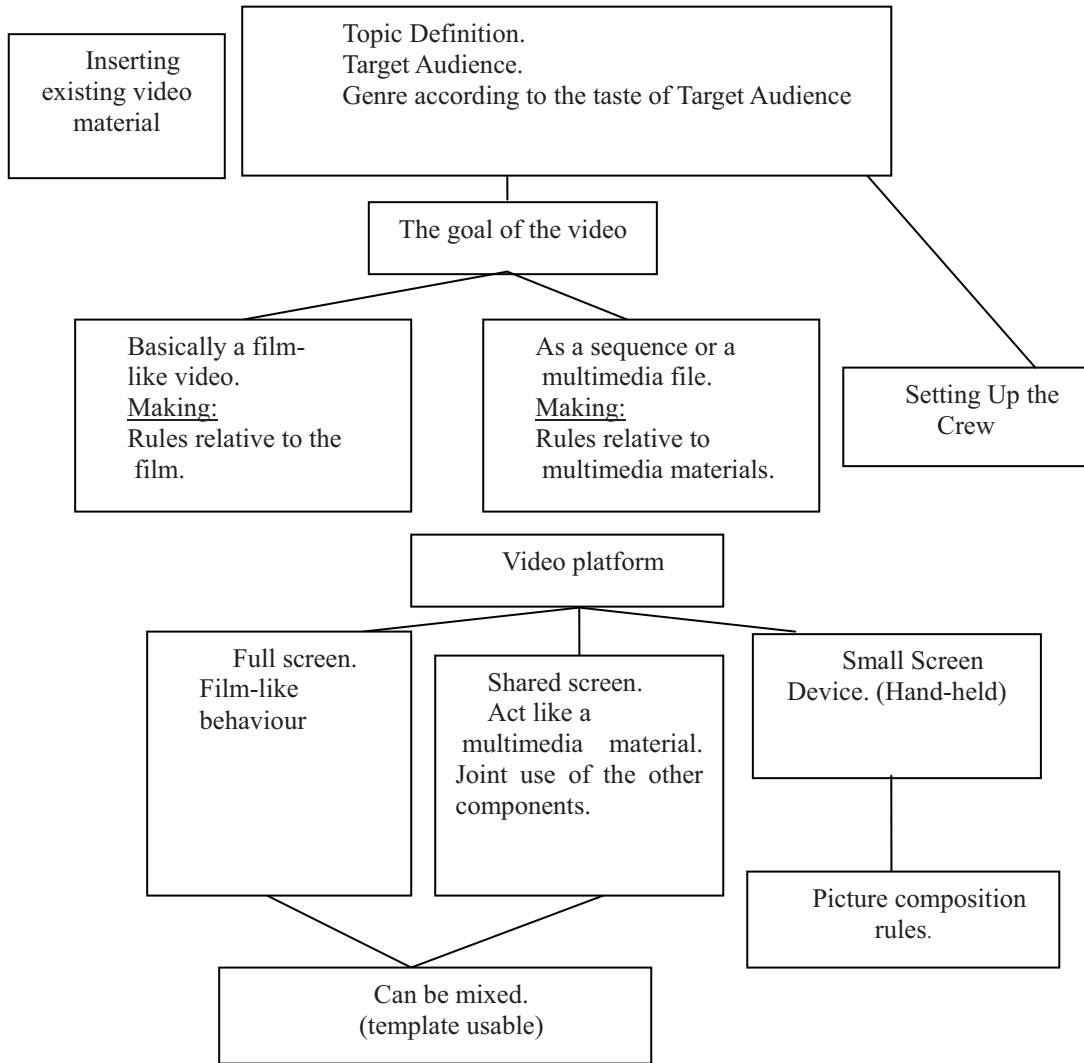


Figure 1. Video making concept

Pedagogical points of view

The organizational forms and the laws that currently separate university-level education, adults education, mass-education and some training of different crafts on higher level are both developing and converging. Thus the use of appropriate content and a well done e-learning topic or simple multimedia materials can be used by many forms of education. Appropriate and well-prepared e-learning material or a simple multimedia material can be used in any part and any kind of the education process.

The psychology of intelligent learning pre-supposes creativity. Creativity is the basic condition of a stable knowledge. We have to prepare videos which will be embedded into an e-learning environment that must be able to creatively enhance them. And it is not enough to just use this in an intelligent way but the user must also be motivated to use it through the application of e-learning techniques.

Using multimedia-materials engages users during their preparation for examinations. It is intended that the audience gain an understanding of the videofilm's material and that there is

self-assessment during this process. Therefore we have to plan when we develop the e-learning material. We have to mark the appropriate parts of the material for self-elaborating and its possible examine-questions.

Genres of the videos in the e-learning system

Using e-learning can be realized basically in three different ways:

- An own, complex educational video, which can reach its goals alone.
- A public film made by other editors with basically different aims.
- In the third case we talk about the part of a multimedia's component.

In the first two cases we can put an appropriate link. We can characterize the former points with the next ones:

- A complex educational film creates phenomenas, opens problems, creates ground for systematizing and summarizing.
- The multimedia's elements can be complete only with the rest of all the added materials

Preparing videos

Before starting any video shooting we have to have a clear image about the e-learning (and multimedia) system's whole presence. It also can determine our decisions: our topic will be rolled in front of a public during a live presentation in an auditorium, during a live lecture or we do it in a studio maybe somewhere in a laboratory or abroad. This is the first main and important point of the screenplay writing before the shooting. Also we can choose a method for elaborating the education material when we record a lecture and fix it into the e-learning environment.

Preparing videomaterials for multimedia applications

- Define the logical elements,
- Cut the DV film into logical parts,
- Release the photos (for the slideshow),
- Create the slides related to the content and mark as navigation points.
- Choose templates (for example: 320x240 fixed video the rest of the screen is resizable),
- Allocate some media on the time-line
- Edit and save in a streaming file.

The teacher's role in the video-material

One of the main attributes of education is that the importance of the human-human reactions is intensifying. The professor on the one hand is motivating and on the other hand manifests and transfers a value (norms, style) through multimedia.

Teachers must estimate the possibilities of utilization and also the limitations of the chosen method. It is important because technology is not able to realize anything. The most relevant element of the new role is to suit the students' needs with the teacher's capabilities. He must explain everything until his students completely understand and help them in any way as much as he can.

This aim is impossible to reach if we base it on only one person.

If we use a complex videofilm as an educational material the most obvious thing to observe is that the professor has "disappeared". It is only facade of course because as the editor of the

material he is presented and his imagination can be viewed on film but his personality can not influence the students directly.

When the teacher/tutor explains something or asks an expert to show something on the film the situation is definitively different. In this case the indirect students-professor relationship presents itself (though the professor's personality can still have some influence through the film).

From the point of view of video materials there are three functions of the professors:

- **Education material developer**

He works in the background as a member of the complex team. He determines the aim of the education: its depth, its content and he is responsible for it. The job of the other members of the team is to realize what the developer declares.

- **The presenter, the "star"**

The teacher/tutor called "presenter" should compensate for the "mechanical" character of the e-learning and supply the emotional bond that the professor-student relationship needs. It is extremely important for him to be an excellent lecturer and he must have a charismatic personality to help the learning process.

- **The "tutor"**

He maintains a constant relationship with the students (personally if it is possible) or through e-learning. His task is to give all the help that he can give to the students to be able to go follow the material. He must be very clear with the e-learning's pedagogical instruments and methods and with their deficiencies because he must compensate it with an appropriate help as well.

Video content digitalisation

Digitalisation of older analogue video records

Analogue video signal should be digitalised with settings depending on the recording system.

The starting format (VHS, SVHS, Video8, H8, Umatic LB, Umatic HB, Beta SP and LaserDisc.)

Digital (capture) format: DV.

- Microsoft DV, Quicktime DV (or a DV that has accelerator hardware-dependant coding, i.e. Canopus DV, etc.) depending on the editing system chosen.
- Digitalisation – if possible – should be made via an external A/D equipment that accepts analogue (composite, component or Y/C) signal input and creates a DV signal output through an 1394 interface.

Capturing and editig formats

- **Capturing format:** Digitally recorded video (raw DV stream) should be transferred to the computer through (in the case of professional tools) the SDI or (half-professional or common tools) IEEE 1394 interface.
- **Editing format:** It is advisable to use the capture format or the own format of the hardware accelerator card for effective use of resources.

For archiving and for further development our goal is to conserve the best possible quality. It is practical to use one of the commonly used DV formats (ie: Microsoft DV AVI, Quicktime DV MOV)

DV cassettes also give good solution for archiving because the edited or pre-edited material can be copied on them without losing quality.

Buying professional software and hardware (ie. Avide Media Composer or Thunder Station) is not necessarily needed for editing video material used in multimedia applications. In fact a modern PC with multiple displays (2 for editing and one for output) with decent software is suitable for this task.

Recommended video editing softwares are:

AVID videoeditors
Adobe PremierPro

Recommended formats:

For Macintosh: QuickTime format

Apple developed it and it can contain any codec (CBR or VBR). Most of the time the files have these extensions: .QT or .MOV. Developers of MPEG-4 chose Quicktime as the recommended file format of MPEG-4, their MOV files have .MPG or .MP4 extensions. Virtually every system supports them.

For Linux

Ogg format (free). Specifications are public and there is no patent licence on either playing or creating these files.

For Microsoft environment: ASF (Advanced Streaming Format)

Audio/video packaging software (container) licenced by Microsoft (later renamed to Advanced Systems Format).

The **ASF** format determines the structure of audio/video content only, not the coding of the audio/video streams. Basically this means that ASF files can contain audio/video data coded with any kind of codec.

Most of the time an **ASF** file contains these formats:

Windows Media Audio (WMA)

- WMA Standard v1,v2,v7,v8, v9
- WMA Speech

Windows Media Video (WMV)

- WMVv7,v8,v9
- Mpeg4 Video

The ASF format can contain metadata modules (like artist name, title, album and genre for an audio recording or director in the case of a video or film) similarly to the ID3 labels of MP3 files. ASF contains expandable, synchronized multimedia data, supports a lot of networks and protocols for data delivery and local playback as well.

ASF has advanced multimedia capabilities – for example expandibility of media types, downloadable components, scalability of media types, determining the priority of data streams by the author, supporting multiple languages, wide range of bibliographical support (document management and content management included).

ASF files containing audio data compressed with Windows Media Audio (WMA) codec usually have the .wma extension. Similarly, ASF files containing audio or video content compressed by Windows Media Audio (WMA) or Windows Media Video (WMV) codec generally have the .wmv extension.

- .wma file extension can be used for ASF file containing WMA audio only,
- .wmv file extension can be used for files containig sound and pictures.
- ASF extension can be used for both file format.

A typical codec-container coupling is when the codec is the compressed format (sound or video) of a concrete signal, and the container only describes the file format.

- AVI container, MPEG4 videocodec, MP3 soundcodec
- MPEG-PS container, MPEG2 videocodec, AC3 or MP2 soundcodec
- Widows Media container, WMV videocodec, WMA soundcodec
- Ogg container, Theora videocodec, Vorbis soundcodec
- FLAC or Ogg container, FLAC soundcodec
- Ogg container, Vorbis soundcodec (software name is false: oggenc)
- MP3 container, MP3 soundcodec
- WAV container, uncompressed soundcodec

Aspects regarding display

The basic characteristic of multimedia applications is displaying several types of medium at once. Synchronisation is very important: information **seen** and **heard** must be synchronized in time. One must hear the soundtrack and see the supplemental picture and written information at the same time.

Solutions that are not based on everyday computer-usage should be avoided during the management of multimedia items. It is advisable to keep this in mind from installation steps to navigation buttons and so on. This way every user – beginner and advanced level alike – can be equally productive.

We also feel that users should not be able to freely choose the parameters regarding the display of video content.

What are the most important functions?

The media's role as a part of a multimedia application is basically determined by the topic. It may influence its presentation on the screen in different aspects. For example: does our video contain any additional information? If not, it is allowed for the film to be only seen on a part of the screen. If the video elements are important for understanding the material, it is suggested to use a bigger sized window for the film. This requirement may be overwritten by the users' limited network speed and bandwidth. It is suggested to optimize both the picture-size and the video resolution (or transfer rate) according to the network's speed. To avoid this problem, it is suggested to prepare different rated variations and store them on the videosever.

In a multimedia application we should try to make the different types of medium complement each other and help „take in” things.

It is important to decide which medium will be the guiding thread and which of its elements could be used for example for navigation as well. It is equally important to decide that in any given part which element should be the most stressed and provide the position and space on the display accordingly.

Conclusion

An excellent video-material can be made if the film's aim is clear, the staff is professional, the audience and all participants are very well determined. The experts and the editors must work together to keep on target and keep up the professionalism. The video making must support the individual learning and must underline the integrated knowledge.

All this should not create the illusion in anybody that it will substitute the professor's or tutor's role. Therefore it is very important to accompany the visual material with – for example - written texts and other sources. It brings the opportunity to use everyone's former video materials in a modern, updated form.

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