



Better e-Learning for Innovation in Education

Edited by
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Table of Contents

Editors' Introduction.....	5
'Better e-Learning for All' – Contributions on Bringing e-Learning to NGOs and to 'hard-to-reach' Groups	11
José Carlos Bronze APLOAD Lda, Portugal	
Online education beyond distance education: a phenomenon of cyberculture.....	23
Edméa Santos Rio de Janeiro State University (UERJ), Brazil	
New Technologies: from Risk to Resources for the Weakest Participants.....	41
Anita Gramigna and Giorgio Poletti University of Ferrara, Italy	
Media Multitasking: how does it affect learners and learning?.....	59
Cláudia Barbosa, Jailma Bulhões, Yuxiong Zhang and Luís Pedro University of Aveiro, Portugal	
Innovation in B-learning: Feelings Experienced by the Students of the Masters in Educational Technology	79
Bento Duarte da Silva University of Minho, Portugal Ana Lúcia Pereira and Laurinda Ramalho de Almeida Catholic Pontifical University of São Paulo, Brazil	
Competence-oriented e-Learning Design.....	105
Paula de Waal University of Ferrara, Italy	
Video pedagogy and online courses.....	115
Giovanni Ganino University of Ferrara, Italy	

A Multicultural Examination of the Dropout Problem for e-Learning Courses.....	125
Yalın Kılıç Türel, Muhammed Turhan and Mehmet Turan	
Firat University, Turkey	
A Systematic Review of Design Factors to Prevent Attrition and Dropout in e-Learning Courses	135
Sandro Monteiro, José Alberto Lencastre, Bento Duarte da Silva and António J. Osório	
University of Minho, Portugal	
Paula de Waal	
University of Ferrara, Italy	
Sukru Çetin İlin and Gülden İlin	
University of Çukurova, Turkey	
The Regulation of Learning Effort in Online Environments	155
Nuno Queirós Rodrigues and José Alberto Lencastre	
University of Minho, Portugal	
Teacher Training for Online Teaching in Brazil: Considerations on a Case Study	175
Marco Silva and Sheilane Avellar Cilento	
Rio de Janeiro State University, Brazil	
Digital Non-formal Education as an Opportunity to Transform School	197
Joana Viana, Helena Peralta and Fernando Albuquerque Costa	
University of Lisbon, Portugal	
Online Education: A Conundrum in this Contemporary Puzzle.....	215
José Lauro Martins, Liana Vidigal Rocha and Valdirene Cássia da Silva	
Federal University of Tocantins, Brazil	
Author Biographies.....	229

Video pedagogy and online courses

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Introduction

The use of moving images in didactics is not a new phenomenon. Starting from the 1960s, research straddling communication science and education science dealt with the relationship between didactics and images according to the double declination, of education “on media” and “with media”. Reference is made, in the former case, to the semiotic paradigm based on the central role of languages and meanings (media as a subject of analysis and study: education on film, television and images); and in the latter, to a technological paradigm, functional to the use of audiovisual codes in the representation and transmission of didactic contents to support and enrich teaching/learning processes (with scientific films, educational or didactic TV programs, etc.). However, when we go back critically through the use of the classic forms of audiovisual communication *for educating*, we realise how, alongside the initial enthusiasm that accompanied educational film and subsequently educational TV, this did not then lead to their systemic application in schools and universities (Ranieri, 2011).

Due to its characteristics – simplicity of use, low cost, integration with multimedia tools, etc. – digital video seems more suitable for use in didactic processes. Between the 1970s and 1980s in Italy, the debate on the use of the analogue video as an educational resource testifies the interest of the scientific community in this technology (Bettetini, 1979; 1984; Laeng, 1980; Galliani, 1984). Today, potential is clearly higher and there are signs of a change taking place. Our idea is that, if guided with

didactic awareness, videos can fulfil rich and stimulating functions from a pedagogic point of view and provide a valid support for teaching and learning processes.

To ensure that this happens, it is important to be aware of a series of principles and guidelines based on scientific work performed in the area of cognitive psychology and instructional design:

- The cognitive load theory (Sweller, 1988; 2010),
- The cognitive theory of multimedia learning (Mayer, 2009),
- The work of Clark and Lyons (2011) on the communication and psychological functions of the different types of images for didactics, and
- Research by Allan Paivio (1990) on the dual-coding theory, relating to the different coding of verbal and non-verbal information by the human cognitive system.

The theory references resulting from the integration of these areas can provide useful indications for instructional design or for lecturers intending to make use of video and multimedia resources in their work. Aware of the fact that it is not possible to summarise the aforementioned theories, to which reference should be made for necessary in-depth understanding, the chapter will provide a series of useful indications for the *Better-e* project.

Videos and didactics

In current educational practices, the use of video communication has increased greatly from a quantitative point of view. The digital contents for interactive whiteboards, video lectures and tutorials that get millions of viewings on YouTube, the new visual “Esperanto” comprising multimedia presentations, and the students themselves who use videos to communicate what they have learnt, testify the key role of educational videos in didactic processes, in formal and non-formal contexts. The importance of the use of digital videos in quantitative terms must however be supported, as mentioned, by scientific evidence that can also guarantee qualitative use, in order to prevent the disappearance of pedagogy and the transformation of the students into users of online video contents. A series of indications is provided below

If didactic videos are connected to specific learning objectives, unlike popular videos, they must have, on the one hand, less spectacular and more didactic language and, on the other, a thematic and single-concept-based structure. A linear presentation is recommended that steers away from digressions that could lead off the track.

It is also necessary to watch out for the use and combination of different communicative codes: a high cognitive load, determined by high quantities of information presented simultaneously at high speed, could reduce learning potential (Tversky, Morrison & Betrancourt, 2002). Videos are texts rich in meanings, the understanding of which requires observational and inferential skills that depend on personal skills and therefore vary from person to person. The evolution of research on the cognitive load offers clear indications so as not to overload the working memory of the learners (Sweller, 2019; Mayer, 2009). For example, the communicative elements that are used to attract attention on TV could prove to be distracting in a didactic video. The excessive use of spectacular images and animations could attract students, but without giving them any benefits in terms of learning. More generally, in the indications provided in literature, there are various functions of visual communication in the learning processes functional to the construction of the “making of pedagogical meaning”:

- Visually describing facts and experiences;
- Offering diagrams and symbols to shape concepts;
- Guiding the thought process and interpretation to shape principles;
- Replacing mental operations;
- Presenting models to promote performance and skills;
- Providing external stimuli to feed the imagination and creative thought;
- Stimulating intuitions, representing different points of view and the complexity of situations;
- The possibility to simplify abstract and complex concepts through the visualisation of concrete examples, simulations and behavioural models;
- Provoking questions and promoting cognitive processing;
- Varying the degree of formalisation according to the type of message to be transmitted;

- Increasing the degree of attention and participation through: a) contact between students and experts in the subject featured in the video; b) more immediate understanding than that based on the verbal communication that audio-visual language possesses;
- Stimulating perceptive and visual/spatial intelligence.

From a technological point of view, digital videos have a series of characteristics that promote the possibilities in didactic processes:

- Potential for using resources from numerous online databases;
- Digital players allow teachers and students to perform slow-down, pause, and acceleration operations. This allows more analytical and in-depth viewing and a personalised result functional to the understanding capacity of the individual students (Lowe, 2004);
- Editing software allows: a) short video fragments to be isolated containing significant didactic information; b) the most significant parts of different videos to be assembled;
- Potential for personalising self-produced videos or archived with interactive functions (video annotations);
- Potential for self-producing audio-visual didactic resources with the use of accessible technologies in terms of costs and use.

Methodological indications

The didactic potential of the video is naturally only exalted through a clear methodological framework. According to Bell and Bull (2010) pedagogical videos must depend on the relationship between the specific contents of the different subjects and clear methods of related use. The stimuli offered by audio-visual representation to be transformed into the acquisition of significant knowledge and then contribute to the construction of complex meanings must be subject to reporting/reasoning processes through constructive discussion and debate with the class (in face-to-face situations) or in extended groups (in situations open to network logics) (Pontecorvo, Ajello & Zucchermaglio, 2004).

The applications developed over recent years such as the ones that allow *video annotation* are helping to move in this direction. Video annotation is a technology that is widely used in North America allowing the passive and transmissive use of video with an active, participative, reflexive mode, through the addition of a series of hypertext functions,

synchronised in time. Data can be found in literature on the didactic effectiveness of video annotation in the field of training, highlighted by scientific findings (Tsiatsos et al., 2010), and by the commitment of many universities to the development of technologies and tools able to guide observation and promote critical thought (Rich & Hannafin, 2008). Rich and Hannafin have drawn up a critical collection of tools in that area for the purpose of supporting the training of teachers, but there are many fields of application and the phenomenon is in the early stages¹.

Video lecture

A video lecture is a kind of video designed especially for use in teaching and learning settings, as a didactic text to support or replace a lecture. The natural application setting is the e-Learning setting, but these texts are increasingly being used in face-to-face education as extra material or in *flipped classroom* situations. The advantage of this didactic format is immediately clear in that the authoritativeness of the contents due to the presence of the lecturer in the video are combined with the visual exemplification of the concepts covered, which reinforces their communication. The didactic limits of video lectures, unless performed according to clear methodological principles to overcome fashionable technological suggestions, also appear to be just as clear. Video lectures as multimedia texts must not depart from the indications provided by the research activities mentioned in the introduction.

Structure (format) of the video lecture and methodological aspects

In the spirit of the article, functional to supporting the didactic material construction process for the *Better-e* project, we will attempt to provide a series of methodological instructions on the preparation and use of video lectures. The template of the video lecture normally relates to a digital adaptation of the classic didactic setting, providing a picture of the

¹ Some tools for video annotation: dotSUB for subtitling, VideoANT for inserting comments in videos, Vialogues, for launching and managing discussions on a video, TED-Ed Lessons Worth Sharing, for personalising videos and including assessment tools.

lecturer and, alongside him/her, a screen that acts as a multimedia board. Sometimes, the picture of the lecturer may disappear to allow the student to concentrate on the multimedia presentation and the narrated text. Other object enhanced didactic materials may be associated with the video lecture, which allow more in-depth features to be used such as video annotation. The advantages are identified below:

1. *Personalisation of the learning processes.* Personalisation can be two-fold: internal to the video lecture, through different levels of interactivity: pause in the video to think about what is being studied, possibility to see parts of the lecture again, possibility of hypertext and participative methods; and external to the video, through the restricted use of space and time barriers.
2. *Planning by the lecturer* The communication activated through the video lecture (in its transmission part) is one-directional in the same way as a text book. The advantage of this method depends on the possibility to plan it completely, hence allowing repetitions to be eliminated, more objective and synthetic structuring, richer and more appropriate vocabulary and completeness in terms of information.
3. *It reduces exposure times.* Better communication in the presentation of the contents of the lecture, along with better concentration by the student, allow the knowledge transfer times to be reduced: a 45-50 minute classroom lecture can normally be concentrated into about 15-20 minutes. Naturally, regarding the duration of video lectures, alongside the didactic/communication problem there is a legislative issue.
4. *It facilitates memorisation.* The study strategy is based on seeing the video more than once, according to personal requirements; pausing to think, take notes, summarise, research in greater depth by consulting other sources; reviewing for a first and personal self-assessment process. These techniques are strategies to facilitate both self-assessment and understanding of content, and the transfer of information from working memory to long-term memory.
5. *It facilitates concentration.* Video lectures are watched very close up and involve physical involvement (to navigate, listen, take notes, do further research) and a high degree of participation. The screen occupies most of the visual field since the video is watched at a distance of about 50-70 cm. Watching the video at a desk, particularly using headphones, promotes concentration and eliminates many elements of disturbance in the classroom
6. *The simultaneous use of various codes of communication makes the didactic message more effective.* Oral, immediate, spontaneous and transparent language leads to involvement and possible codifications that specify the meaning of a presentation. Visual examples of abstract concepts, visualisation of practical examples through using graphs, photographs, animations, etc. increase didactic communication. Images have such clear didactic potential that no-one can consider doubting (Garito, 2008).

In practice, if well planned, video lectures enable original and special learning methods to be applied by combining the linearity and organisation of the written text, with the subjectivity and personal involvement typical of oral communication (Garito, 2008), and the potential in terms of greater reflection and critical skills determined by the hypertext tools. Below is a series of methodological indications on using video lectures:

A – Video lecture (introductory)

The lecturer introduces themselves to the student and introduces their course, with the aim of:

- Emotionally involving students so that they can promote their interest in the subject and their active participation in the didactic process; for that purpose colloquial language is recommended;
- Providing detailed information on the objectives of the course and any pre-requisites; in this case, it is recommended to use synchronised lettering (lecturer's text and full text or lecturer's text and key words). The communication of the didactic objectives allows the student's energy to be directed towards a defined task, offering the possibility to check the skills acquired through self-assessment tools;
- Contextualising the study of reference texts and/or any more detailed didactic material within a general framework in order to prepare the student's cognitive matrix for the learning process. In a distance learning course, it is important to direct the student towards a correct method;
- Presenting the didactic units that comprise the whole module.

B – Subsequent video lectures

- Introduction by the lecturer of the objectives and contents of the lecture, also indicating the right study method and references to extra materials;
- Covering the subjects of the lecture with the possibility to view the general structure of the lecture;
- Conceptually and graphically highlighting the passage from one subject to another;
- In the conclusions, summarising the subjects covered and presenting any questions for self-assessment of learning.

Finally, it is recommended to use the video lecture, naturally with the classic instruments used in e-Learning situations, but also with some web

conference sessions, for each module. Web conference sessions determine communication processes marked by rich and complete information, thanks to the possibility to reduce the risks of misunderstandings that can arise with asynchronous communication. Its potential for interactivity, use with different types of language, and above all the presence of social indicators, make web conferences a very similar means of communication to face-to-face ones.

The combination between asynchronous video lectures and web conferences in synchronous mode can make the didactic process equivalent, if not superior, to classroom lectures. Face-to-face didactic communication is marked by a series of characteristics that, through feedback and relationships with students, lead to the continuous reformulation of the knowledge construction process. Asynchronous didactic communication typical of video lectures does not allow mistakes to be handled in the absence of discussion at the time of the transmission of contents, therefore, the lecturer moves based on hypotheses. According to some studies (Garito, 2008) what appears to be a didactic limit in media processes can lead to a series of advantages, as long as interactive tools are used alongside the asynchronous use of the didactic materials.

In university classrooms where highly formalised rules of communication are in place, the authoritativeness of lecturers does not stimulate relations, especially for students who are particularly shy. These relations are even more complex in situations where there are numerous students. According to a series of research work (in Garito, 2008) interactivity during a face-to-face lecture is very low – only 5% of the lecture comprises student participation. In a situation where there is no immediate interaction, students, particularly those with fewer skills, can prepare better for dialogue. They can independently study the contents of the lecture and then take part with more confidence and awareness in the relational and interactive moments.

Conclusions

It has been seen in this article how, through the use of audiovisual resources in their different forms – educational videos, video lectures, web conferences – video pedagogy can make an important contribution to the e-Learning sector. This is true as long two conditions are satisfied. The first refers to the production and use of scientific evidence that has been investigated over recent years. The second refers to the lecturing profession: video pedagogy must be accompanied by changes to teaching methods if we want to ensure that the methodology has a significant impact on learning processes. This aims to be the reference context of the *Better e-Learning for All* project.

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