Chapter 10
Video-Lectures over Internet: The Impact on Education

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ABSTRACT

Recent trends suggest that multimedia (in particular audio and video) will increase their share of Internet traffic, and that users are becoming more and more acquainted with viewing multimedia content on their computers and mobile devices. Scholarly institutions are experimenting since several years with the distribution of video-lectures, which are generally not meant as a replacement of traditional lectures, but rather as a different kind of support of the educational process. After recalling the pioneering ideas, discussed in this chapter is the pedagogical soundness of the idea of using videos over Internet for teaching and learning. Later reviewed are the various directions that research has taken over the last 10 years to support and enhance this modality.

INTRODUCTION

Over the last decade, Internet popularity has been steadily growing, up to a point where the time share spent on the two media is almost equal: according to an IBM survey of consumers "66% reported viewing 1-4 hours of TV per day, versus 60% who reported the same levels of personal Internet usage"[1]. A new trend has been emerging over the last year: watching videos on Internet, plus watching time-shifted TV (which can also happen through the Internet) amounts now at 6.7% of the total time devoted to watching videos (Nielsen 2009), and the figure is steadily growing. It is very likely that these two media, which were once quite separated, will merge in future at least to a large extent. This media hybridization is already evident: short (1 to 5 minutes) video clips on the Web are becoming more and more common – and many TV channels give the possibility to access

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(part of) their traditional TV content through the Web. Producing and distributing (video) content through the web is getting easier and easier, even though there are still a number of open issues.

This fact boosts several research streams, ranging from assuring quality of service to indexing and extracting knowledge from videos, to usability concerns, to the many new applications that can be invented by using this new media combination.

Among the possible applications, those in learning are certainly very interesting. Actually the field of e-learning has been a precursor in using the videos over the Internet. There is in fact little doubt that education in all its forms, but especially in the field of lifelong learning where just-in-time services might be important, will continue taking advantage from this technology. There is in fact an evident trend in the evolution of our society that strongly changes the paradigms of the previous millennia. In the past, learning could be mostly concentrated in the early stages of life. Once one learned a job, the acquired knowledge was sufficient for the rest of the life. In today's society this is no longer true. It is quite obvious in the technological arena, where knowledge obsolescence is quite rapid: in the computer science field, for instance, the known paradigms can radically change within a very short time span. This trend however is general, and all sectors are affected by it. Hence the ability to update one owns knowledge becomes vital to survive in the job market. The need of continuous education and lifelong learning permeate our society, and it will be always more so. Training on the job, just in time training and education update need to find their way into our life. Informal education and the ability to autonomously find and use suitable educational resources will play an important role in this scenario. In this setting, the availability of multimedia-carried educational content is an exceptionally powerful asset.

Today we see a flowering of education-related initiatives ranging from producing podcasts (i.e. audio-streams) and webcasts (i.e. synchronized slide shows + audio) to recording "live" lectures, to producing "how-to" You Tube videos. In recent years several custom made systems aimed at supporting the process of acquiring and distributing video lectures have been developed: some were commercialized, some were put into the public domain, and some others were used locally as prototypes. Each of these systems has a slightly different twist, and some implement new clever ideas to respond to the peculiar needs that may arise in different situations. A review of the requirements for such systems has been compiled by Ronchetti (2008).

In this chapter we shall first briefly review the pioneering ideas, then we shall discuss the pedagogical soundness of the idea of using videos over Internet for teaching and learning. Then we will review the various directions that research has taken over the last 10 years. We shall not attempt to provide an exhaustive review, but rather we shall try to highlight the ideas and the trends.

BACKGROUND

The possibility of using digital video for distance education was envisioned already 15 years ago when F. Tobagi (1995) built in Stanford a prototypical architecture for distributing digital video lectures. Although using (analogical) video for recording lectures had been in use for more than a decade, the digital approach was obviously superior in terms of ease of distribution of the didactic material, asynchronous and multiple simultaneous accesses. Moreover it was promising in terms of possibility for cross-referencing of learning resources.

The first report of actual deployment of an application of video-streaming to teaching we are aware of dates back to 1998 (Hayes). At that time, the main goal was to substitute a VHS based system for delivering lectures to a geographically remote place (from USA to France) with a digital alternative. At the beginning it was limited to