Chapter II

Hypervideo and Cognition:
Designing Video-Based Hypermedia for Individual Learning and Collaborative Knowledge Building

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Abstract

This chapter discusses how advanced digital video technologies, such as hypervideo, can be used to broaden the spectrum of meaningful learning activities. Hypervideo is conceptualized as the true integration of video into nonlinear information structures by means of spatio-temporal links. Based on cognitive-psychological perspectives, the discussion focuses on the way cognitive and socio-cognitive processes relate to the specific characteristics of hyperlinked videos, and how they inform their design. Then, with regard to technology, two approaches are introduced, providing tools for knowledge building and interaction with nonlinear information structures based on dynamic video information. Case studies and research findings are presented and prospects for future research are outlined.
Introduction

New technologies do not only meet existing needs in terms of communication and learning practice, but they can also redefine our educational culture by enabling new learning experiences in resource-rich learning environments (Beichner, 1994). For example, the advent of video technology, including both analog and advanced digital video, has substantially altered some of our traditional paradigms of educational practice in schools and higher education. Film and video technologies can be used to enrich regular lessons and lectures with dynamic visualizations of knowledge that foster a better understanding, to depict concrete real-world problems or cases in authentic ways, or to conduct video projects, a specific kind of media project where students engage in active video production in a motivating and authentic collaborative task (Baake, 1999). However, by itself, video provides a limited support for reflection and it is difficult to relate it to other materials and activities in learning environments.

Hypervideo technology, which refers to the integration of video in hypermedia structures, can provide the additional means to augment video educational capabilities, contributing to learning in several distinct ways: as a presentation medium, it can support self-regulated cognitive processing of dynamic visualizations; as a nonlinear and interactive medium, it allows for interactive learning as well as for reflective and elaborative knowledge building individually or in group (Chambel 2003; Chambel & Guimarães, 2002; Guimarães, Chambel, & Bidarra, 2000; Zahn, Barquero, & Schwan, 2004; Zahn & Finke, 2003; Zahn, Schwan, & Barquero, 2002). These ideas, their underlying assumptions, and the mechanisms for the design and realization of systems that support them in learning contexts will be discussed in more detail in the following sections.

What is Hypervideo?

The term “hypervideo” reflects the idea of true integration of video in hypermedia spaces, where it is not regarded as a mere illustration, but can also be structured through links defined by spatial and temporal dimensions (Chambel, Correia, & Guimarães, 2001; Chambel & Guimarães, 2002). Hypervideo structures may also be defined as a combination of interactive video and hypertext, as they consist of interconnected video scenes that may further be linked with addi-
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