Chapter 3.35
Multimedia Technologies in Education

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WHAT ARE MULTIMEDIA TECHNOLOGIES

Multimedia technologies (MMT) are all that kind of technological tools that make us able to transmit information in a very large meaning, transforming information into knowledge through stimulating the cognitive schemes of learners and leveraging the learning power of human senses. This transformation can acquire several different forms: from digitalized images to virtual reconstructions, from simple text to iper-texts that allow customized, fast, and cheap research within texts; from communications framework like the Web to tools that enhance all our sense, allowing complete educational experiences (Piacente, 2002b).

MMT are composed by two great conceptually different frameworks (Piacente, 2002a):

- **Technological supports, as hardware and software:** All kinds of technological tools such as mother boards, displays, videos, audio tools, databases, communications software and hardware, and so on

- **Contents:** Information and to knowledge transmitted with MMT tools. Information are simply data (such as visiting timetable of museum, cost of tickets, the name of the author of a picture), while knowledge comes from information *elaborated in order to get a goal*. For instance, a complex ipertext about a work of art, where much information is connected in a logical discourse, is knowledge. For the same reason, a virtual reconstruction comes from knowledge about the rebuilt facts.

It's relevant to underline that to some extent technological supports represent a condition and a limit for contents (Wallace, 1995). In other words, content could be expressed just through technological supports, and this means that content has to be made in order to fit for specific technological support and that the limits of a specific technological support are also the limits of its content. For

instance the specific architecture of a database represents a limit within which contents have to be recorded and have to be traced. This is also evident thinking about content as a communicative action: communication is strictly conditioned by the tool we are using.

Essentially, we can distinguish between two areas of application of MMT (Spencer, 2002) in education:

1. Inside the educational institution (schools, museums, libraries), with regard to all tools that foster the value of lessons or visiting during time they takes place. Here we mean "enhancing" as enhancing moments of learning for students or visitors: hypertexts, simulation, virtual cases, virtual reconstructions, active touch-screen, video, and audio tools;

2. In respect of outside the educational institution, this is the case of communication technologies such as Web, software for managing communities, chats, forums, newsgroups, for long-distance sharing materials, and so on. The power of these tools lies on the possibilities to interact and to cooperate in order to effectively create knowledge, since knowledge is a social construct (Nonaka & Konno, 1998; von Foester, 1984; von Glaserfeld, 1984).

Behind these different applications of MMT lies a common database, the heart of the multimedia system (Pearce, 1995). The contents of both applications are contained into the database, and so the way applications can use information recorded into database is strictly conditioned by the architecture of database itself.

DIFFERENT DIMENSIONS OF MMT IN TEACHING AND LEARNING

We can distinguish two broader framework for understanding contributions of MMT to teaching and learning.

The first pattern concerns the place of teaching; while in the past, learning generally required the simultaneous presence of teacher and students for interaction, now it is possible to teach long distance, thanks to MMT.

The second pattern refers to the way people learn; they can be passive or they can interact. The interaction fosters learning process and makes it possible to generate more knowledge in less time.

Teaching on Site and Distance Teaching

Talking about MMT applications in education requires to separate learning on-site and distance learning, although both are called e-learning (electronic learning). E-learning is a way of fostering learning activity using electronic tools based on multimedia technologies (Scardamaglia & Bereiter, 1993).

The first pattern generally uses MMT tools as a support to traditional classroom lessons; the use of videos, images, sounds, and so on can dramatically foster the retention of contents in student's minds (Bereiter, Scardamaglia, Cassels, & Hewitt, 1997).

The second pattern, distance teaching, requires MMT applications for a completely different environment, where students are more involved in managing their commitment. In other words, students in e-learning have to use MMT applications more independently than they are required to do during a lesson on site. Although this difference is not so clear among MMT applications in education, and it is possible to get e-learning

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