INFORMATION SCIENCE PUBLISHING
701 E. Chocolate Avenue, Suite 200, Hershey PA 17033, USA **ITB10980**
Tel: 717/533-8845; Fax 717/533-8661; URL-http://www.idea-group.com

This chapter appears in the book, *Technology Literacy Applications in Learning Environments* edited by David D. Carbonara © 2005, Idea Group Inc.

Chapter III

Computing and ICT Literacy: From Students' Misconceptions and Mental Schemes to the Monitoring of the Teaching-Learning Process

Antonio Cartelli
University of Cassino, Italy

Abstract

Three main questions guided the author in the writing of this chapter: Is there the need for a widespread and in-depth ICT literacy in mankind? What has to be meant for ICT literacy? And are there special problems in students' learning of ICT topics? And last but not least: How can ICTs themselves improve teachers' work and students' learning on ICTs? The introduction answers the first question and shows how difficult the search can be for solutions to the problem of the digital divide. The answer to the second question comes from a short survey of the experiences that some institutions made for the introduction of basic computing skills and ICT literacy in school curricula. In the meantime the problems that the students usually meet while attending computer programming and ICT literacy courses are described. Finally the author reports the results of some experiences involving the use of ICTs in teaching and describes how he

arrived to hypothesize the adoption of action research strategies, of Web technologies and data mining techniques for the monitoring of the teaching-learning process and its improvement.

Introduction

In today's society, often defined the knowledge society, the mastery of ICTs (information and communication technologies) is considered very important for future citizens. It is well known, in fact, that computers and communication are everyday more and more present in human life, and that mankind has to be skillful in its use to win the challenge of contemporary and future complexity. As an example of the above remark, lifelong learning and the number of rights everyday needing the basic ICT skills can be considered: in the former case the continuous update of personal knowledge and skills is more and more, depending on the cleverness in ICT use; in the latter case e-government, e-commerce, e-learning, and so forth are good examples of the relevance that ICTs will have in the exercise of the citizens' rights, both today and in the future.

The importance of ICT influence on mankind has already been analyzed in various contexts, and the term *digital divide* has been adopted to describe the gap existing between developed and underdeveloped countries. As an example, the words of Malloch Brown (2001), of the UNDP (United Nations Development Program), are reported here:

> *"…Now, the Internet has become both the fuel and the vehicle for a dramatic spread in democracy, intensifying demand for and supporting the spread of genuinely transparent and participatory and more efficient systems of government at both the national and global levels. The number of democracies worldwide has doubled in little more than a decade. But in too many countries, institutions remain fragile, services are weak, officials unaccountable. And the lack of a democratic dividend—in terms of jobs and better services—has been undermining public faith in these new systems, particularly among the poor. ICT offers real hope in all these areas, offering greater citizen input into decision making and better social services for all…."*

Alternatively, it must be noted that digital divide was recently evidenced at different extents in developed countries. Warschauer (2003), for example, stated that digital divide is a social problem marking the differences among social classes (80% of high-income families in the U.S. connect to the Internet, while only 25% of low-income families do) and ethnic groups (55% of the White population in the U.S. uses ICTs, but only 31% of the African-American population and 32% of the Hispanic population do the same). He also stated that there isn't a unique digital divide marking the difference between "people who can" and "people who cannot" access computing and ICTs. What is more, he argued that