

Chapter XVI

Open Learning Environments: Combining Web-Based Virtual and Hands-On Science Centre Learning

Hannu Salmi, Heureka, The Finnish Science Centre, Finland and
University of Dalarna, Sweden

Abstract

This chapter describes the changes in the role of informal learning education in science centres. It shows by several cases how the rapid development of modern information and communication technologies after the mid-1990s has influenced the traditional hands-on exhibitions to move towards open learning environments. The reported experiences of the different types of Web-based solutions in science canterers provide evidence and practical hints for further development of traditional exhibitions towards open learning environments. Results underscore the role of intrinsic motivation as the key element for learning. The prices and other thresholds for using existing ICT-based learning solutions have decreased considerably, and now the main consideration is whether there are enough social innovations, that is, are there meaningful content and use for the innovative technology? To create an open learning environment from the elements of the exhibition and the Internet is clearly one of the main challenges of science centres.

Introduction

Using the Internet has become a common practice in education, both formal and informal, during the past few years. According to a recent Europe-wide survey (Ilomäki et al., 2004), searching for knowledge and information as well as surfing freely are the most common activities. The use of e-mail in education has also become a more common feature according to a survey among European teachers in 2003. However, other possible advantages, such as discussions, building knowledge structures using net applications and tools, making contact with experts or using the net as a publishing forum for pupils, are very rarely used in formal education. (Ilomäki et al., 2004).

The strength of science centres' role in e-learning is the willingness of teachers to exploit opportunities to get involved easily with free-ware or moderate-price new digital learning materials which then can create new pedagogical practices. This matters also to individual learners in informal education.

New educational software can be divided into two main types (see Collins & Strijker, 2003): 1) Large, complicated systems functioning mainly as distributing databases, and 2) Small digital learning materials, which can be chosen from several sources, and which can be combined with regard to the situational needs of the learner. The most common term related to this kind of educational software is "Learning Object" (LO). It began to be used widely in Europe, especially after several projects partly funded by the EU (see www.eun.org). The definition of the term is very broad, meaning practically any material, in digital or non-digital form, to be used for learning, education, teaching, or training (Duncan 2003). Characteristic features for successful and effective LOs are: 1) easy access, 2) usability, 3) readiness for use by teachers without extra work, and 4) pedagogical flexibility (Collins & Strijker 2003).

Although ICT-based applications can provide many opportunities for science centres, these institutes have not been early adaptors of cutting-edge technologies (Severson et al., 2003). One reason is that until recently there have been problems with the usability of these technologies — they have not been user-friendly and are not particularly suited for mass use such as in exhibitions. However, there are clear signs that the blended experience of both exhibitions and ICT-based solutions can fulfil a variety of learning-style needs and would appeal to both formal and informal learning.

The combination of an exhibition and the Internet forms an excellent example of an *open learning environment*, a term that has been used in the e-Learning literature since the mid 1990s, especially in the context of life-long learning and distance education (see, for example, EURYDICE — the information network on education in Europe: www.eurydice.org). The open learning environment consists typically of a combination of real physical environments and ICT-based learning. The model by Falk and Dierking (1992) describes well the physical, social and personal context inherent in this kind of situation.

When we consider the role of the Internet in science centres, we have to first define the place of science centres in informal education. Then, we have to define the role of the Internet, both in the science centre and in the wider field of education.

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