

Chapter 4.39

Diffusion of E-Learning as an Educational Innovation

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INTRODUCTION

Most of the discussions related to education are about technological innovations. Indeed as Rogers (1995) stated, we often use the word “innovation” and “technology” as synonyms. Technology is regarded as an agent of change in educational settings, and a quick analysis of the educational projects all over the world shows us that it is not possible to define a future vision of education without technology, especially e-learning, which brings two important concepts together: technology and learning. Therefore as a form of distance learning, e-learning has become a major instructional force in the world.

Besides the technological developments, the last two decades have brought a tremendous increase in knowledge in education, particularly in learning. The emerging views of learning which should be taken into consideration for every

learning environment could be stated as follows: personalized, flexible, and coherent (learning is connected to real-life issues); not bounded by physical, geographic, or temporal space; rich in information and learning experiences for all learners; committed to increasing different intelligences and learning styles; interconnected and collaborative; fostering interorganizational linkages; engaged in dialogue with community members; accountable to the learner to provide adaptive instructional environments (Marshall, 1997).

WWW is an environment that fits the new paradigm of learning and facilitates “e-learning” which faces a challenge of diffusion. Diffusion is defined by Rogers (1995) as the process by which an innovation is communicated through certain channels over time among the members of a social system. Therefore the adoption of WWW as a learning environment is influenced by the following set of factors: 1) the individuals’ percep-

tion of the attributes of e-learning, 2) the nature of the communication channels, 3) the nature of the social system, and 4) the extent of the change agents' efforts in the e-learning. These are the variables that affect the diffusion of e-learning in the schools and countries.

E-LEARNING AND INSTRUCTIONAL DESIGN

E-learning not only opens up new ways of learning and teaching, but also leads to a new way of thinking and organizing learning content. Collaborations among different stakeholders cause new standards for design of knowledge on the Internet. In traditional computer-based instruction, content comes in units called courses. However a new paradigm for designing instruction, grounded in the object-oriented notion of computer science, is called "learning objects."

Learning object is defined by the Learning Technology Standards Committee (2002) of the Institute of Electrical and Electronics (IEEE) as any entity, digital or non-digital, that can be used, re-used, or referenced during technology-supported learning. The features of learning objects are self-contained, interactive, reusable, and tagged with metadata. By the use of learning objects, one can learn just enough, just in time, and just for them. Learning objects can be considered a movement within the field of e-learning, one aimed at the componentization of learning resources, with a view to reusability (Duchastel, 2004).

The idea of educational software as a package is becoming outdated and making way for learning objects as a new way of designing instructional materials. In designing learning objects, the studies on multiple representation of knowledge become important since people have different learning styles and strategies. The associations between these two constructs are the main focus of the new instructional design principles. Therefore,

the development of learning objects and the way of creating teaching units are well suited for what we call the Information Age.

A representation of knowledge could be decomposed into its parts, where the parts are far from arbitrary. Then they can be used and reused in a great variety of combinations, like a child's set of building blocks. Every combination is meaningful and serves as an instructional whole. Holland (1995) compares building blocks to the features of the human face. The common building blocks are: hair, forehead, eyebrows, eyes, and so on. Any combination is different and may never appear twice. This analogy could be true of e-learning platforms, where learning objects are put together to make up a meaningful whole, which we call instructional materials.

The five fundamental components of instructional design process are learners, content, objectives, methods, and assessment. Hence, for a systematic instructional design of a subject matter, the basic steps are: learner characteristic identification, task analysis, objectives, content sequencing, instructional strategies, message design, and instructional delivery and evaluation.

The awareness of learner differences with respect to entry competencies, learning styles and strategies, motivation, and interest are critical. However it is difficult to accomplish this task by using ongoing approaches. Indeed, new technologies, if used properly, enable us to make the lessons more individualized. The Learning Objects Metadata Working Group (IEEE, 2002) stated its goal as: to enable computer agents to automatically and dynamically compose personalized lessons for an individual learner. This leads a paradigm shift to approaches to instructional design. As Wiley (2001) stated, a problem arose when people began to actually consider what it meant for a computer to "automatically and dynamically compose personalized lessons." It seems that the idea of learning objects is challenging, but opens to new concepts, strategies, and research areas in the instructional design process.

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