

Knowledge Management as the Future of E-Learning

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PROBLEMS OF EDUCATION IN KNOWLEDGE SOCIETY

Since technological changes are touching many aspects of today's society, education cannot stay behind; in a world where information is the key to progress, the education of its citizens should not be based on expositive means alone (Adell, 1997). The inevitable increase in complexity and quantity of the information that is available and necessary has led to a need for *continuous learning*. Information handling requires a profound transformation of learning and teaching methods: from a model in which the teacher is the monopolizing agent and the authorized representative of *knowledge*, we must move towards a model that offers the student room for individual exploration and self-learning. The student needs to build relations, discover the process from within, and feel stimulated to draw his own roadmap (Piaget, 1999). This way, he will not only learn, but learn to extract the relevant information, that is to say, he will "learn to learn" in actual society.

This kind of learning can only be obtained through action strategies that are not perceived as restricting obligations, but rather as interesting learning options. Content, for instance, should be represented not as an object of study, but rather as necessary elements towards a series of objectives that will be discovered in the course of various tests.

Another characteristic of actual education is that students come from different environments and have

different ages and education backgrounds, which make it more complicated to integrate them into one single group. Real personalized attention would require many more teachers and much more time. Add to that the increasing demand for continuous education, with flexible timetables and subjects, and it becomes clear that the current programs are much too rigid.

Tele-education platforms try to meet these needs by providing individualization, physical and temporal flexibility, and a higher level of student implication. However, the contents of these platforms remain the same as those of traditional systems, even if their presentation format is adapted, and therefore they do not substantially contribute to the improvement of the learning process (Martínez, 2002).

KNOWLEDGE MANAGEMENT IN EDUCATION

The learning process consists of a modification of our conduct that, by extracting knowledge from acquired experience, enables us to tackle problems (Wiener, 1967). This definition highlights the two basic aspects of all learning processes: knowledge acquisition, and the experience that leads to it (see Table 1).

The way we can access knowledge strongly depends on how it is stored. According to this criterion, three types of knowledge can be distinguished (Wiig, 1995):

- **Tacit Knowledge:** Knowledge that is so much embedded in the individual's brain that he himself cannot explain it. Since this kind of knowledge is only accessible by observing the individual's behavior (Nonaka & Takeuchi, 1995), at present we cannot physically store it.
- **Implicit Knowledge:** Knowledge that is embedded either by the organization, which locates it in procedures, models, and techniques, or by individuals who store it in their brain. In this case, the knowledge can only be accessed, located, and communicated by means of questions and discussions.
- **Explicit Knowledge:** Knowledge that is easily accessible and documented in normal knowledge sources, frequently well organized. One can typically find this knowledge in books and in digital format, and it must be formalized in order to be significant. Actually, only formalized knowledge can be electronically stored, shared, and effectively applied.

After studying the representation, storage, and information management systems that are currently in use (including databases, data mining, knowledge-based systems, and knowledge-management systems, illustrated in Table 1), we have reached the conclusion that the best currently available approach is *knowledge management*, which issues from the business environment and has proven its success on many occasions (Tissen, Andriessen & Deprez,

2000). A knowledge management system not only stores information in the shape of news, it goes further by making the users a part of the system itself. In addition, this type of system incorporates mechanisms that allow us to share tacit knowledge: meetings, pieces of advice, examples, and so on. In this way, one can say that these mechanisms facilitate the acquisition of every kind of knowledge.

Knowledge management has obtained positive results in the business world and could very well be applied in the educational sector. Apart from being the best currently available way of handling large amounts of knowledge and knowledge interrelations, knowledge management allows the user to personalize the acquisition of knowledge, improving the current systems.

Unfortunately, the intent to include knowledge management in learning systems (Calés, 2002) has so far been limited to including only certain aspects such as lists of "Frequently Asked Questions," or mechanisms for the exchange of tacit knowledge, but without including these contents in the knowledge base or allowing the feedback of the student's experiences.

To improve the learning process, e-learning models should have the following characteristics:

1. Provide individual attention, taking into account the student's preferences about learning strategies, different kinds of materials, their previous knowledge, and so forth.

Table 1. Summary of current systems for the representation, management, and storage of information

Representation System	Stored Information	Applied Transformations	Obtained Information
<i>Knowledge Management Systems</i>	Explicit knowledge plus mechanisms to share and acquire tacit knowledge	Meetings, put in common knowledge, relations between knowledge	Explicit knowledge as object and process Possibility of acquiring tacit knowledge
<i>Data Mining</i>	News	Relations that can obtain rules or categories	Explicit knowledge as object and process
<i>Knowledge-Based Systems</i>	Data, news, and relations	Rules for making deduction Transformations of frames	Explicit knowledge as object
<i>Databases</i>	Data	Consults: filters with data	News

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