

E-LEARNING USES OF CONCEPT MAPS

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Abstract: Concept maps can be considered as a multi-resource in e-learning environments. Concept maps present a strong power of integration, navigable and meaningful representation. Under this point of view, a student centred framework can be approached, as the European Higher Education Area (EHEA) requires. In the present work, we show five types of different significant uses of concept maps for learning purposes: a) as a guide for navigation inside the virtual environment; b) as a learning activity; c) as an expert model of knowledge representation; d) as an evaluation tool; and e) as facilitators of the construction of collaborative work.

1 Theoretical framework

Concept maps are potent tools of knowledge representation that allow to transmit complex conceptual messages in an understandable way. They facilitate both teaching and learning. Novak & Cañas (2006) define concept maps as graphical tools for organizing and representing knowledge. This representation includes concepts, usually enclosed in circles or boxes of some type, and relationships between concepts indicated by a connecting line. Words on the line referred to as linking words or linking phrases, specify the relationship between the two concepts. These authors define concept as a perceived regularity in events or objects, or records of events or objects, designated by a word. Propositions are “statements about some object or event in the universe, either naturally occurring or constructed. Propositions contain two or more concepts connected with other words to form a meaningful statement”

On the other hand, e-learning is a general term covering a wide range of approaches and it may combine a mixture of different elements such as: information and communication technology, interaction, learning resources, collaborative and individual learning, formal and informal learning and support (Clarke, 2004). On May 2000, the European Community Commission adopted the initiative “E-learning: designing tomorrow’s education”. This initiative is defined as the use of new multimedia technologies and the Internet, to improve the quality of learning and facilitate access to resources and services, such as exchanges and distance collaboration (European Community Commission, 2001).

The emergence of learning technologies is fundamentally changing the nature of how people learn. People are more and more encouraged to learn by themselves and they do it in interactive way. To be successful in e-learning is necessary to have big doses of self regulation skills (Nagy, 2004) and technology skills (Clarke, 2004). The tools of an e-learning system (computer based learning) and content’s design can help the students to manage themselves easily across the course, including a more fruitful approach to the learning activities and the online resources.

A number of studies with the broad subject of e-learning have examined the evolution of different types of systems over time. First generation e-learning systems, for example, were often seen as a substitute for classroom training, on-line courses tended to be developed as direct analogues of conventionally delivered courses (Darby, 2002). Actually, online learning must move towards a model that offers the student opportunities 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. Thus, he will not only learn, but will learn to learn (Pedreira, 2004; Novak, y Gowin, 1996). In agreement with Pedreira, this kind of learning can only be obtained through action strategies. Contents should be represented not as an objective but rather as necessary elements towards a series of objectives that will be discovered along the course.

The use of concept maps like instrument facilitators of meaningful learning (Ausubel, Novak and Hanesian, 1986; Novak and Cañas, 2006), turns them into a valuable resource in this new paradigm of learning, in conformity with the European Higher Education Area requirements (EHEA) which promotes student centred learning.

2 An integration proposal

In this poster we propose, and show, a meaningful utilization of concept maps as a potent multi-resource in e-learning environments: a) as a **virtual guide** inside a course, that is to say, as a facilitator of the relationship between the learner and the course structure and didactic contents and, at the same time, as a good organizer of

different course resources; b) as a **learning activity**, orientated to the promotion of student's meaningful, active and deep learning of the student c) as an **expert model**, due to the fact that they are powerful tools for the presentation of complex knowledge networks; d) as an **evaluation tool** that allows the exploration of the student learning process. Having used concept maps in different phases of the learning process, to develop an approximation to a knowledge extension network is possible; e) as a **tool of production** of shared knowledge, as it facilitates collaborative processes of reflection and discussion.

- The use of concept maps as a virtual guide: this use orients learners' attention and action system. For example, as a way to present a Project: this map (see illustration 1) presents -in a hyperlinked image- the steps to develop a learning activity based on maps. The main characteristic is the organization of all the resources to be used by the participants: tutors and students. A low number of visual elements and textual contents is recommended at this level.

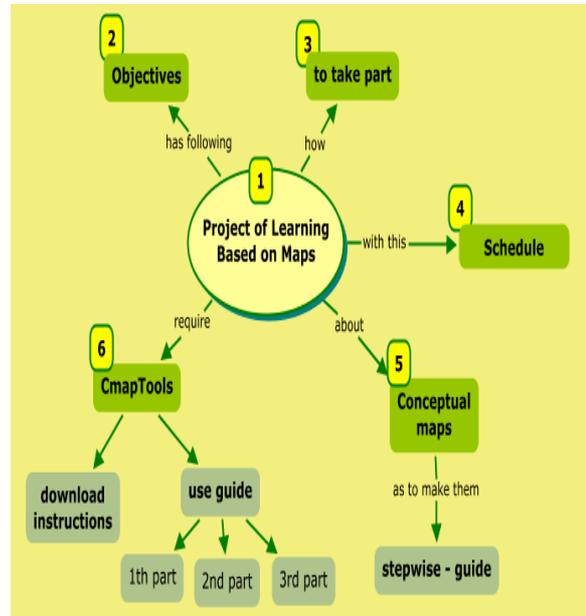


Illustration 0

- The use of concept maps as learning activities: this is the most common use of concept maps. On one hand, it is important that the student approaches the learning process of a module with previous knowledge activated. In this sense, it is necessary to determine the level of understanding that students have about the topic to be studied before the topic is introduced (Novak & Cañas, 2006). Concept maps can be used during the introduction of a learning module, as a mechanism promoter of specific cognitive activity: the recovery of information. This work can be done by the tutor, in a strong directive way, or by an individual or collaborative work of students under a low directive way. When the module has been presented to the students, the central task will be the elaboration of a concept map. During this production phase, mistakes, confusions or absences of relevant information are frequent, allowing the re-elaboration through deeper analyses. If a course provides good resources about the learning unit, the maps will be extended and refined. In this phase, the cognitive activity is centred in storage information in knowledge networks, based in multiple significant associations with old and new concepts: this is a wide assimilation process. But that is not all, this cognitive process contributes to students' ability to evaluate critically and a reasonable way about evidence more generally. This is fundamental not only to their understanding of learning contents, but also to their ability to contribute to society as a critical consumer of information (Namy, 2002).

- The use of concept maps as expert models: this utilization is focused on teacher's efforts to communicate the conceptual and theoretical aspects of the didactic unit, and its relational and significant structure. This resource is mainly oriented to direct the student attention over the structured network of knowledge (see illustration 2). These maps might allow, finally, the construction of the curriculum of a degree, a very attractive project based on concept maps!

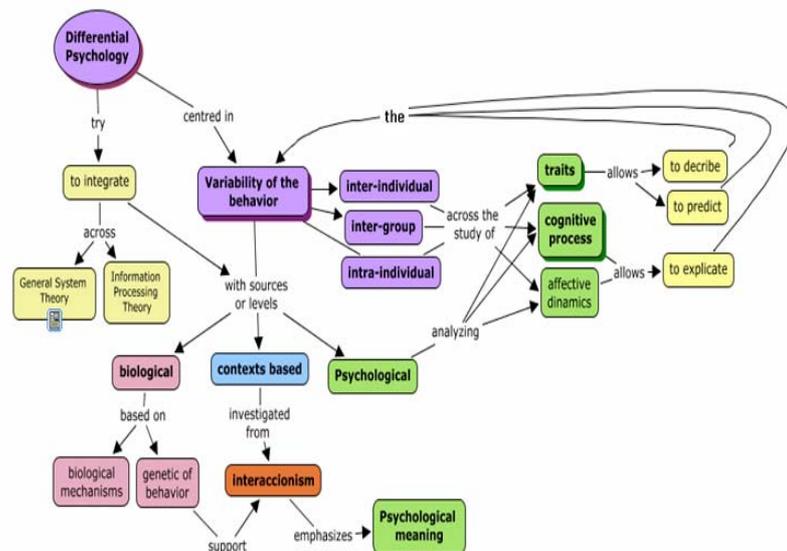
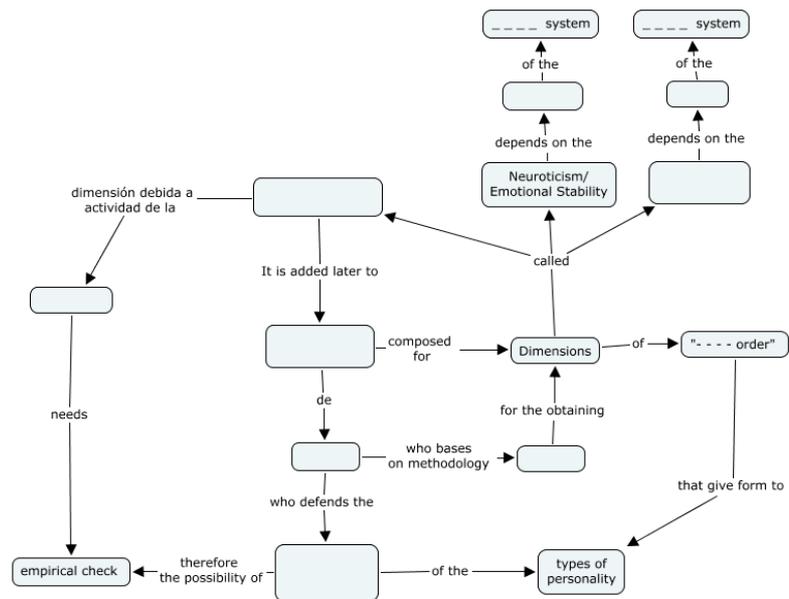


Illustration 0

- Use concept maps as

assessment tool: The process of evaluation produces effects on the process of education - learning that, according to Barberà (2003) can be described like: - of type motivational, doing that the student centres his/her attention on the evaluated, - of consolidation, from the same moment of the evaluation backing or consolidation takes place (is produced); - anticipatory, so that the evaluation shapes from the beginning of the learning process across directives, the own learning process (see illustration 3). In this respect, the elaboration of tests of selection multiple promotes the learning directed towards memorization, while the evaluation based on production and creative activities probably orientates towards the deep learning. The use of concept maps as evaluation tools facilitates a vision more nearby of the network of knowledge and of the cognitive individual process.

- The use of concept maps as facilitators of the construction of collaborative work: in the current knowledge society, new significant models of knowledge construction based upon collaborative work are a central goal of more advanced educational models, being also strongly emphasized in working environments. In this sense, the use of concept maps as a way of promoting discussion and negotiation processes through communication tools can be a powerful learning tool. Collaborative knowledge construction takes place when several participants contribute to accretion of interpretations by building, commenting on, transforming and integrating a shared information base (Suthers, 2005).



3 Summary

Concept maps represent a wide range of versatile and economic tools in e-learning environments. They show organizing capacities in two senses: knowledge and learning resources organization. Concept maps can be widely used in virtual environments, being able to be presented as learning tools in all phases of the learning process. According to this point of view, we agree with a Novak and Gowin (1996) comprehensive and original definition. They define concepts as “a perceived regularity in events or objects, or records of events or objects, designated by a label”. In this sense, we consider this definition includes also “action”, because in an e-learning context, the movement around the contents, across the resources and different sources of information can be guided in a significant way using concept maps.

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