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WEB-BASED LEARNING COMMUNITIES

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In this article we intend to go through the main contributions given by the hypermedia educational approach to the development of a learner centred apprenticeship in the *World Wide Web* virtual communities. We have started by conceptualising what virtual learning communities are, and have then proceeded with issues concerning access to and information management in the *Web* hypermedia environments. These ones comprise individual ability to direct and organise the learning process, to develop collaborative and distributed representation models and to simulate and design real learning contexts.

1. Information technologies in education

The impact of information technologies on today's society has gone further and far beyond what was expected for personal and social development in areas like education, communication, economy, labour market as well as the new information industries.

We have chosen to draw our attention to the particular effects that the information technologies quick development has brought into education and all related communication domains.

On one hand, we will discuss matters dealing with information and telecommunication technologies infra-structures due emphasis being given to problems arising from access, use of tools and information treatment techniques, namely the ones occurring because of this domain's permanent growth. On the other hand, our attention will be focused on educating towards the Information and Knowledge Society closely following on the steps

of the cognitive and social approach, which is centred upon the people involved in this process.

The demands arising from a rapidly expanding information universe are due to a high volume of contents output that isn't matched by the consequent ability to organise coherent ways of displaying the information to the final users. These two facts have been enough convincing that new fields of knowledge should be implemented and researched so that people may use the *media* and information in a productive and creative way in regard to their personal development all along their lives.

The information technologies have been of the utmost importance for the development of digital communication and contents, especially in what concerns network communication systems, that have changed communication into a global affair where

spatial or cultural boundaries have ceased to exist. However, the globalisation of communication and contents output has introduced a multiplicity of digital narratives as well as new demands in what concerns access to and analysis of information contents particularly in regard to their relevance when used in training programmes.

Therefore, Romiszowski *et al.,* (1997) stresses the importance of training oriented to requirements of the Information and Knowledge Society, as a means to become fully integrated in the information globalisation process, though not forgetting the use of his/her critical competencies whenever being a user. As a consequence, a great emphasis has been given to the building up of personal orientation and monitoring competencies in regard to the learning processes and knowledge creation in a networked society.This autonomy, which is mainly supported by the easily using interactive technologies belonging to the Information and Knowledge Society, isn't but a theory where the learning process is learner-centred, as follows:

> "One increasingly important competence in the future will be "self-direct learning". (Romiszowski, 1997:27).

The development of the individual ability to master his/her own apprenticeship represents a high standard of self-organisation in what concerns training and education. Thanks to it, the subject can learn what is required at the right time and preferably while performing his/her present task.

The information technologies are thus highly responsible for the radical change occurring in regard to the system organisation and training methodology. They have changed concepts based on groups which were static as far as space and time were concerned, to the new distributed model, which can be used and controlled by the subject at any time and place.

Under this perspective, the interactive information technologies are more than mere devices they are the vital support for the rise and development of experience and knowledge building up virtual centres. These centres are based on the simulation of real environments, the ideal scenario for the implementation of flexible and collaborative knowledge orientated towards and by the user. This is no doubt this century's biggest advance in what regards learning processes.

The non-linear information organisation and knowledge representation of hypertext theories, as well as hypermedia and multimedia technologies are extremely important to the conceptualisation of new educational environments that regard apprenticeship as an active and collaborative process where the media besides supporting communication act as cognitive activity mediators. This approach has lead some authors like Lévy (1990, 1997) to name hypermedia technologies as intelligence technologies, since they are ways to thought spreading and collaborative knowledge building up inside the global communication systems.

2. Hypermedia environments

The design of flexible, collaborative and open learning environments directed to building up knowledge in straight relation to the subject's own pace and the user's needs has its roots in the new psychological approaches. These include constructivism and situated cognition as well as the pedagogical theories, which are supported by the hypertext and hypermedia educational approach through web-based instruction models (Spiro *et al.,* 1995; Jacobson *et al.,* 1996; Clancey, 1997; Romiszowski, 1997; Collis *et al.,* 1997; Carvalho *et al.*, 1997; Dias *et al.*, 1998). The change in the design of new environments is shown through the flexibility of the learning processes, the individual decision concerning the materials required for the job, the clarification of which goals are to be attained and last but not least, through the working out of a personal strategy for knowledge building up and experience.

This approach doesn't regard the learning process as one where knowledge is systematically acquired and retained and the competencies externally defined (Hannafin *et al.,* 1994). Furthermore, it stresses the importance of contextual building up of knowledge representations in learning, which is supported by the creation of individual links between the contents that are suggested by the hypertext. The educational hypertext is based on non-linear information organisation that allows the user to choose his own individual or collaborative paths on a network, configuring it to his learning needs, previous knowledge and training goals. The hypermedia approach was particularly innovative in terms of training since the hypertext

doesn't only *display* the information, as it makes the book but it *works out* as information too. As a dynamic representation system, highly interactive as far as the user is concerned, it enables correlation between facts that aren't set together and turns access to information easier as well as conceptualising and understanding the representations complexity.

The hypertext and flexibility representational dimension in constructing the representation network is closely related to the construction of meaning in learning. The construction of meaning as well as the hypertext representation network is a dynamic process, which is based on correlation between the information nodes set by the user. While moving in an educational hypertext environment the user is expected to create a dynamic representation network through the setting of links and, as a consequence, to focus his attention on the importance of correlating ideas instead of stand alone facts.

The *authoring* idea that goes with hypertext and hypermedia learning environments may have a greater effect in understanding and developing personal representations than experiencing knowledge paths that are others' as Borsook, (1997) referred:

> "If learning is a constructive process, then authoring one's own hypermedia project may be even more effective than simply traversing the paths laid down by someone else". (Borsook, 1997:733).

Whenever learning materials are presented without reporting to their real context we may expect that kind of knowledge won't be of much use in new contexts, namely when transferred to new case-problems. This fact strongly emphasises that the cognitive strategies and competencies built through knowledge acquisition in disregard for context are bound to failure.

To design environments and tools to understand cultural complexity and the contexts that are responsible for its production, is one of the main challenges the education and technology researchers have to face with support from hypertext and distributed representation, flexible, multidimensional hypermedia technologies as learning procedures. Distributed representation is supported by (information and communication) networks which act as facilitators in the access to knowledge complexity. Flexibility develops through reconfiguring knowledge representations into cognitive "frames" temporarily stable. Multidimensionality characterises the *media's* diversity and representation levels that enable the user to access and deeply explore the contexts to which knowledge is addressed. Multidimensionality means also the *fusion* between informational objects — text, sound, image, and motion —, by means of a network that may work out as the representation and communication context metaphor for the interactive interpersonal process in the hypermedia environments.

Under this perspective, the hypermedia technologies allow for the creation of dynamic representation experience and knowledge building up environments, favouring context learning as well as the development of metacognitive capacities to the analysis and control of the process itself.

3. Web-Based Learning communities

The learner-centred approach has encouraged the design of innovative environments and so far the World Wide Web has been at the forefront of progress in this area.

> "The World Wide Web is the latest embodiment of hypertext/hypermedia environments, allowing the practical implementation and use of hypertext to graduate from the relatively small stand-alone systems (...) to much larger and universally available systems of structured information." (Romiszowski, 1997, 28).

The Web-based learning is deeply influenced by virtual social interaction as well as technology and the learning communities' instructional practices.

The concept of virtual learning community is more adequate inside a flexible and distributed frame where hypertext and hypermedia systems work out not only as devices to represent and organise information in the World Wide Web but also as collaborative and extremely powerful ways to knowledge social building up. This way viewed the Web also allows to watch the learning process while the learners navigate, link, juxtapose and think about the new findings, (Bonk *et al.,* 1997).

The first hypertext projects, namely Ted Nelson's *Xanadu* and Douglas Engelbart's *NLS/Augment*, were responsible for setting the basis to the implementation of information and communication electronic networks that were intended for the projects own development, as Engelbart himself comments (1998):

> "...we began to develop technology required to augment the knowledge work of first individuals, then groups of collaborators, first in a single location, and then in communities distributed over wide area networks such as the ARPANET." (Engelbart, 1998: 15).

However, the concept of hypertext, which Ted Nelson had first proposed, won't be widely spread until 1985 when the *Intermedia* project (Yankêlovitch *et al.,* 1985), showed up. This one offered education a network environment since it displayed some courses, which had been designed according to the hypertext rules and link services between tutor and learners in the campus environment.

The evolution affecting the information and communication concept goes beyond the *presentation* and *representation* perspectives belonging to

the first hypertexts, what turns Internet into the ideal space for its development inside a wide community of users, whose estimated growth will be 150 million in the year 2000 (Galbreath, 1997).

As a consequence of the Internet development, Tim Berners-Lee, R. Cailliou, J. F. Groff and B. Pollemann have created the World Wide Web in CERN, in 1989. Accordingto the information organisation hypertext approach, Berners-Lee *et al.,* (1994) describe the World Wide Web as follows:

> "The World Wide Web (W3) was developed to be a pool of human knowledge, which would allow collaborators in remote sites to share their ideas and all aspects of a common project." (Berners-Lee *et al.*, 1994: 76).

Based on hypertext theory and on hypermedia technologies the W3 created an information based system that has added new dimensions like sound, video and graphic motion (Lennon, 1997) to the already familiar tools like e-mail and Internet file transference.

Kept at a good distance stays now the geographical and temporal horizon as the conveyed limit for communication interaction. On its place a fiction universe has arisen where real and virtual are fused together and the virtual learning communities now set the limits. The erosion of physical limits and of sense and identity frontiers has given rise to non-centralised and flexible computer mediated narratives that allow their authors to communicate in the cyberspace as if they were involved in some kind of social interaction.

According to Rheingold (1993; 1997) these new virtual communities are social groups emerging from the Internet whenever computer mediated interaction networks are set between subjects. They are guided by the sharing of interests and should last enough long so that links in the cyberspace may be created.

Out of the many aspects that account for the World Wide Web's great potential as far as education is concerned we must stress the overcoming of traditional hints like time, physical space or other social ones. As a consequence, the virtual transference of classroom skills through collaborative learning as well as the simulation on the network of distributed knowledge representation contexts have been made real.

According to Lave *et al.,* (1995), the development of knowledge addressed to its context production characterises on one hand the learning-based model, and offers on the other an identity to the learning community. Therefore, this model can't either be dissociated from contents management or observed in disregard for the social relationships that legitimise the partnership of its members. The community's development is supported by the social contexts that may have a motivational and cognitive impact on the subject, by means of learning intended situations.

In the World Wide Web identity emerges between the virtual learning community's members mainly as a social tie, which builds up according to the relationship the subjects have with knowledge. This fact makes for the spread of a *non-territorial civility* (Lévy, 1994: 35) that gives emphasis to educational interaction through intercultural communication.

The Web, while a virtual group's medium, favours the development and spread of local narratives and small individual stories that aren't but communication fragments of authors and readers connected without distinction by the same network. And this certainly accounts for the way collaborative knowledge has developed in a community willing to share interests, goals and experiences.

The virtual learning community is one of shared interests and practices of immersion in distributed representation environments that develops a collaborative culture of simulating knowledge production contexts. McLellan (1997) refers Schrage's collaborative model as a means to support learning in virtual communities, through the principle of *shared experience* (McLellan, 1997: 185).

While stressing the collaborative building up of knowledge, the author is also calling our attention to the importance of a dynamic process of *sharing* as far as virtual learning communities are concerned.

In other words, the use of devices and technologies for access and information management regarding activities in virtual learning communities needs to be shared by other community members, as well as supported by the cultural background that determines the activity's virtual context. The Web-based education intends to promote creative processes, critical thought and collaborative work (Bonk, 1997).

In virtual learning communities the interaction addressed to the network users, favours intra and inter-group interactions and intends to reach learning as well as cognitive and social goals. It follows a period where the development and exploitation of interaction possibilities orientated to the micro worlds displayed on computer have been carried out (Collis, 1997; Collis *et al.*, 1997).

These are some of the main guidelines of virtual learning communities:

to simulate the enormous variety of knowledge building up contexts; to compare and share multiple interpretations inside the community; to reorganise activity context based-learning and to make sure this *problem rising* activity reaches the real world's professional places for problem discussing and solving.

The Web-based learning communities will be the places for knowledge simulation. They are bound to recreate the existing social tie with knowledge

in regard to the building up of a collective intelligence that moves from the physical space into the virtual one and from the information model into the knowledge one. This will lead us into the spread of a Knowledge Society.

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