Pedagogical principles in web-based learning

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Abstract

Web-based technologies and powerful Internet connections provide various new possibilities for the development of educational technology. However, this vast array of new possibilities does not necessarily guarantee the quality of the learning process. A coherent framework based on pedagogical principles seems to be necessary for the development of effective learning experiences. A pedagogical model, based on a constructivist approach and combining socio-cultural theories and critical pedagogy with a ‘reflective-practice’ based methodology is proposed as a basis for such framework. This paper discusses the development of the pedagogical model, together with its application within a larger conceptual framework, which also considers organisational and technical issues.

Index Terms

Pedagogical principles, Pedagogical model, Educational theories, Web-based learning, On-line learning, Constructivism; Socio-cultural theories, Reflective-practice, Collaborative learning, Critical pedagogy, Participative design.

INTRODUCTION

Technology is continuously evolving in a tremendous pace. The Internet connections become faster, new portable and wearable technologies are generated, and new possibilities of interaction and simulation environments are generated. Consequently, a vast array of new possibilities is open for the development of educational technology. However, this does not seem to guarantee neither the effective application of these technologies into education nor the quality of the learning processes they aim to facilitate.

This work looks at the development of educational theories to find answers for these issues and proposes a pedagogical model for the application of educational technology. A conceptual framework within which this model could be applied is also presented, and experiences learned with its use are mentioned.

While it mainly focuses on the context of Higher Education (HE), its ideas could be applicable to other educational instances, as long as the specific conditions of those learning contexts are taken into consideration.
CONTEXT

**Educational Theories**

When investigating educational research, one can observe that there is a paradigm shift taking place. Rethinking education from the learner’s perspective has brought a new dimension into education, causing a deep reflection on the whole process of learning and teaching. Within a move from a behaviourist to a constructivist paradigm, educational research changes from a transmission-model that emphasises teaching methods to one that is learner-oriented. Emphasis is now put on more active and exploratory learning.

Considering that the knower actively constructs knowledge, the main concern now is how to best facilitate this learning process. Within these new approaches, different theories contribute with new dimensions to the learning process:

- **Reflective Practice**: helps learners to develop metacognitive strategies which facilitate the understanding of the learning process and the development of responsible lifelong learners. According to Schön, it involves ‘reflection-in-action’ and ‘reflection-on-action’. It also emphasises the importance of dialogue, generating collaborative and critical reflection, where both learners and teachers are reflective practitioners, seeing the learning institution as an environment for reflective practice (see Schön, 1983 & 1987; Pereira, 1999).

- **Socio-Cultural Theories**: sharing the constructivist commitment towards active learning, they stress the importance of social interaction in supporting cognitive change. Inspired by the Soviet socio-historical movement of the 1930s and enriched by other lines of theory such as cognitive science and anthropology, these theories provide the basis for the work on collaborative learning, emphasising the importance of motivation, social cognition, situated learning, and the appropriation of mediational means (see Vygotsky, 1962; Crook, 1996).

- **Critical Pedagogy**: mainly based on the work of Paulo Freire, it also draws upon the work of others such as Gramsci, Foucault, and Merleau-Ponty. It sees education as a process of development and empowerment, involving stages of awareness and transformation. It combines the assets of reflective practice with those of socio-cultural theories and goes further, highlighting the importance of situating the learning within the context of the learner and of the agents and institutions of learning, constantly reflecting on them (Freire, 1979&1985; Freire & Macedo, 1987).

**Higher Education**

Having to respond to rapid changes in society, a large number of students, and economic problems, Higher Education (HE) in a considerable part of the world is going through difficulties to adapt itself. Lecturers struggle with ever-larger classes, and teaching and research quality assessments, which sometimes seem to be incompatible. As a result, they find themselves with little time to invest in the assimilation and introduction of new learning technologies. Staff development is also a major concern. (See Anstey, 2000; Olmesdahl, 1999; Dearing, 1997; Nicol, 1997).

An important study of Higher Education in Britain was presented by the Dearing report (1997) and emphasises these problems. Its findings, analysis and proposals are compatible with the situation in many other countries. Together with other sources, the
Dearing report suggests that the solution for the HE problems is to invest in an education that prepares individuals for lifelong learning, emphasising the teaching of transferable skills. It is also said that Communication and information technologies (C&IT) have an enormous potential to be considered in the process of restructuring education. However, how is that to be made possible in a way that guarantees the quality of learning and within a framework that considers all the cited problems?

Educational technology and the need for a Pedagogical Model

The design of educational technology depends very much on the assumption of knowledge we carry with us. As Brent Wilson (1995) suggests, if you think about knowledge as “a quantity or a packet of content waiting to be transmitted”, then you will think of instruction as a “product to be delivered by a vehicle”; while if you think of knowledge as “a person’s meanings constructed by interaction with one’s environment”, then you will tend to think of instruction as “a learner drawing on tools and resources within a rich environment”. These two different views of knowledge could generate quite different educational technologies.

The individual’s view of technology and how it affects our lives is also related to the view of knowledge and will favour different learning applications. If we see C&IT resources as ‘mediational means’, allowing us to interact with the world and the others, but also closely affecting the quality of this relationship and our perceptions of the world, we will look at them with different eyes (see Crook, 1996; Vavik, 1998; Wilson, 1995). Understanding this, it is easy to see that, if we opt for a constructivist approach, where interactive and situational learning should take place via collaboration and critical reflection, then a flexible and easily accessible educational environment would be the ideal. This environment should allow different learning experiences to take place, favouring the exploration of web technologies such as ‘virtual learning environments’ where different tools and forms of communication are available to users.

Therefore, it is important to define a pedagogical model which reflects not just the developments in educational research, but also our own views, and a conceptual framework for the application of this model, as it is discussed in the next sections.

A CRITICAL SOCIO-CONSTRUCTIVIST PEDAGOGICAL MODEL

The best basis to deal with the present complexity and to promote deep and meaningful learning seems to be offered by those educational theories that work within the new constructivist paradigm. While working on the same constructivist premise that knowledge is actively constructed by the knower, critical pedagogy, the socio-cultural theories, and reflective practice incorporate new dimensions to the educational process: emphasising the importance of metacognition (reflective practice), the social character of learning (socio-cultural theories), and a critical approach (critical pedagogy).

Moreover, the combination of these principles allows the development of Higher Education towards the achievement of their main present goals, forming reflective practitioners, and therefore, lifelong learners.

The proposed pedagogical approach, therefore, is situated within a constructivist framework and based on the principles of the socio-cultural theories and critical
pedagogy, and adopts reflective practice as a methodology. Summarising, the pedagogical model (shown in Figure 1), which we named “Critical Socio-Constructivist”, is basically composed by:
- a learner-oriented approach;
- the development of individual cognition, with emphasis on active and independent learning (via exploratory and highly interactive activities) – metacognition – reflective practice;
- the development of systems of cognitive activity: social interaction and collaborative learning
- critical & collaborative reflection;
- the construction of flexibly structured learning environments, which allow different learning experiences – within learning organisations;
- the development of learning as situated in real context, not just in terms of associating learning with real-world contexts, but also developing in the learners and other agents involved in the learning process, the consciousness of the social and political context where the learning experience takes place.
(For a more detailed account of the reasoning behind the development of the pedagogical model, see Pereira, 2000a).

Figure 1: Critical Socio-Constructivist Pedagogical Model.

APPLICATION FRAMEWORK

A conceptual framework for the application of C&IT into education (Pereira, 2000a), developed from this pedagogical model was also proposed. It is mainly based on:
- a critical-reflective epistemology;
- a socially constructed view of knowledge;
- an architecturally informed methodology: considering spatial issues on the design of virtual learning environments and a participative methodology, which emphasises the importance of the users reflective collaboration on the design of learning spaces (for further discussion on the application of architectural and design approaches into C&IT, see Bridges and Charitos, 1996; Cabral-Filho, 1996; Winograd at al., 1996).

This conceptual framework was used as a basis for the design and development of a prototype of a virtual learning environment for learning and teaching technical subjects in architectural education named ArchCAL. An attempt to illustrate the ArchCAL model is shown in Figure 2. The prototype was demonstrated to and evaluated by architectural students at UK universities and IT experts on the application of educational technologies.
The evaluation of the learning environment and of the framework was very positive. Moreover, in an effective reflective process, it generated material for the refinement of the ideas and a framework for their application into learning and teaching in Higher Education in general. The findings emphasise the importance of considering pedagogical, organisational, and technical issues in a balanced way, as shown in Figure 3. This framework was also further explored on the design and implementation of a Virtual Learning Space (VLS) for C&IT staff development at three HE institutions in the Northeast of Scotland. Further discussion about the VLS design and use can be found elsewhere (see Pereira et. al, 2000b; Harris et. al, 2000).

CONCLUSIONS

The vast array of new possibilities offered to educational technology due to constant developments in C&IT does not necessarily guarantee the quality of the learning process. A coherent framework based on pedagogical principles seems to be necessary for the development of effective learning experiences.

The paper considers the paradigm change taking place in educational research, the present situation of Higher Education, and how C&IT are said to have an enormous potential to be considered in the process of restructuring education and are expected to so. Within this context, the author argues that, in order to help improve the quality of learning and teaching, information technology resources should be considered as
mediational means, within a coherent conceptual framework which reflects the developments in educational research and the contextual specificity.

A proposed conceptual model was discussed, together with its application within a larger conceptual framework. Finally, research findings from the framework application emphasise the importance of pedagogical aspects, but also highlight the need to consider organisational and technical issues in a balanced way, when implementing the use of C&IT into education.

REFERENCES


