

RESEARCH ON TECHNOLOGY-SUPPORTED LEARNING *

1. SCOPE

Technology-Supported Learning (TSL) is a broad expression that may include, in a strict sense, all processes of learning that are supported on the intensive use of computers and electronic communications. In this precise sense, TSL covers the same ground as the one occupied by a number of different types of systems and operators using designations like: *Internet-Based Learning, E-Learning, Virtual Universities and Campuses; On-Line Learning Programmes, Networked Learning* and so on.

From a broader perspective, the same expression may be considered to embrace the general field of *Open and Distance Learning*, of which the initials ODL are currently accepted, even if almost equivalent expressions like *Resource-Based Learning, Flexible Learning, Distance Education* are frequently used. Nevertheless, and within the umbrella of this general expression, computers and Net communications may be just a part of a whole paraphernalia of different technologies that may be used in the process of learning at a distance, meaning audio and video broadcast and recordings, video and audio-conferencing, fax and telephone, etc.

We are inclined towards this more open concept, for technologies should not be thought as the essential core of the learning process: they are just tools, as a support for concrete learning strategies, programme objectives, curricula and course contents; as well as facilitating all kinds of communications, including those used in student support and tutoring, administrative tasks, information and social contacts. From another perspective, new technologies tend to be added to (and not to substitute) the more conventional ones; so that an undue emphasis on a given technological innovation risks to make us underestimate the joint potential of all its ancestors.

This being said we shall deal, for the purpose of this paper, with all technologies involved in teaching or training systems wherein self-learning plays a significant role in

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human resources development, either in a pure distance teaching, single-mode regime or in dual- or mixed-mode ones (Trindade, 1996).

2. RESEARCH IN OPEN AND DISTANCE LEARNING

Since the explosive development of Open and Distance Learning after the successful creation of the British Open University in 1969, followed by the foundation of hundreds of ODL systems in the 70's and the 80's and literally thousands up to now, in all regions of the world, research on the corresponding issues was not given the amount of attention it deserves. The majority of the vast number of papers produced, along the years, dealt more with describing the successful ways of operation used by so many different systems than with results of fundamental research aimed at understanding the deeper aspects of the learning process itself in the different distance teaching modes.

There are many books published in the last thirty years about distance education, a good number of which have become classical references in this field (see Bibliography), dealing with the theory, concepts, typology, organization and other characteristics of distance learning systems - but not much on hard, fundamental research about *how do students learn* and how can this learning process can be improved and facilitated.

We could hope, obviously, to find more about these issues on articles in specialized reviews and periodicals rather than on books. Nevertheless, a search in a large number of both scientific journals and proceedings of international conferences dedicated to distance education questions do not yield the abundant harvest that might be expected.

Perhaps this is due to the fact that the intensive use of new technologies in distance education contexts is a quite recent phenomenon, so that operators are keener on experimenting new solutions rather than on evaluating their quality through a consistent and systematic research effort. A partial confirmation of this hypothesis is the fact that just some very significant initiatives in this field are scarcely one year old:

- The *First EDEN Workshop on Research in Open and Distance Learning* (Prague, Mars 2000);
- The launching of the electronic journal *International Review of Research on Open and Distance Learning* (University of Athabasca, Canada, June 2000);

- The invited review paper by Erwin Wagner "Research into Open and Distance Learning", in *New Learning* (A. R. Trindade, Editor, Lisbon, Universidade Aberta, December 2000, 426 p.);
- The Leonardo research project developed by Tornstein Rekkedal *et al.* under the auspices of the EU Commission, named CISAER (2001);
- Last but not the least, the present EU Commission initiative *Research on Technology-Based Learning*, announced on June 2001, under which pretext the present paper is produced.

3. CONTEXT AND BACKGROUND FOR A SUSTAINED RESEARCH EFFORT

There are many reasons for choosing the present opportunity for launching a major research initiative into ODL issues, namely on the uses of new technologies in this field.

The first one is the observed interest shown about ODL operation and supporting technologies by a large number of newcomer institutions and organizations in this field, all over the world, translated into their actually beginning operating (even if in a limited, experimental scale).

The second reason relates to many ODL well-established systems like Open Universities having added these new technologies to their current modes of operation, besides the more conventional media, either to facilitate students' access to scientific and pedagogic documents or for improving student-system and student-student interaction.

The third one concerns many conventional, face-to-face higher education institutions that, having recognized the potential of self-learning processes, are willing to adopt distance learning methodologies and technologies, in order either to become dual-mode ODL operators (and so becoming able to reach a large number of off-campus students) or to adopt a mixed-mode strategy, delivering both presential classes and distance learning materials for their on-campus students.

Besides formal education, ODL methodologies are nowadays recognized as a major asset for continuing education at all levels of qualification, as well as for many different contexts of vocational training. Being suitable to deal with large numbers of geographically-scattered users, seeking new, updated or upgraded qualifications, these methods will contribute decisively to solving the general problem of human resources development in the technological and knowledge-based societies of today.

In this context, why should we put a clear emphasis on the need for fundamental and applied research in this field? The main reason for that is, on the one hand, the fact that many new operators in Technology-Based Learning lack both the basic concepts and the actual experience in the ODL field - and so they could benefit from the results of this research, without being involved in re-inventing the wheel. On the other hand, even the more experienced, decades-old distance teaching dedicated systems have not had the time for evaluating the outcome of new solutions they have been experimenting with, in order to assess their quality, suitability to improve learning, efficiency and costs. And, finally, because we believe that a thorough investigation on the process of learning itself, either by conventional means or otherwise, will yield a number of really innovative strategies for improving learning.

4. CURRENT CRITICAL RESEARCH ISSUES

Without any hierarchical or precedence order, here are some issues that we feel deserve special attention in a future set of research programmes related to Technology-Based Learning:

- What is the added value (and possible disadvantages) of substituting textbooks and any other long documents by computer screen pages?
- Apart from the fact that good hypertexts may be more appealing to students than sequentially-written printed documents, do they actually improve the process of learning or reduce the time required for their study?
- Is a closed-structure learning document, including therein all the information required to acquire knowledge, more suitable for learning than an "open" one, that leaves the field open for students' creativity and initiative in searching for alternative sources of information? In other words: does a rigid predetermined discourse and argument structure help or create difficulties in the learning process?
- Should ODL pedagogical conceptions and scientific authors give more attention to differences in students' meta-cognitive profiles?
- Is a human tutor more adequate to facilitate learning than an automatic ("intelligent" database) one?

- What if a tutoring mechanism based on computer communications becomes so heavy in terms of manpower-intensive requirements that economies of scale in the corresponding ODL system are no longer viable? Are pure electronic-learning systems suitable for large-scale operation, in terms of competitive cost and sustainability? (Taylor, 2001)
- Are there reliable evaluations on the efficiency of learning in pure electronic-learning systems? What about students' satisfaction?
- Have we exhausted all possible solutions in designing learning strategies?

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