DEVELOPING HIGH-LEVEL COGNITIVE SKILLS IN DISTANCE EDUCATION

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Abstract: *This research analyses how the development of high-level cognitive skills happens in higher education distance learning courses that employ e-learning. Field research was completed at the following six universities in the United Kingdom: The University of Manchester, Open University, Manchester Metropolitan University, University of Liverpool, University of London, and Cranfield University. Were investigated the determining and restrictive factors to the development of high-level cognitive skills through e-learning; identified academic activities that facilitate the development of these skills, identified procedures for assessing the development of cognitive skills and set up links that facilitate the development of high-level cognitive skills in higher education courses delivered by e-learning. This study shows that e-learning provides a number of benefits that facilitate the development of high-level cognitive skills. Specifically, the ability to develop asynchronous activities was the quality most often cited during the interviews. e-learning also displays some restrictive factors, such as difficulties that e-learning students had during autonomous studies. Some activities are given to facilitate the development of high-level cognitive skills by e-learning.*

Keywords: *cognitive skills, distance education. e-learning.*

1. INTRODUCTION

The labour market requires professionals with high-level cognitive skills, which means professionals who know how to think in analytical, critical and reflective ways, how to ask questions, make decisions, solve problems, and know how to learn independently (ZOLLER & PUSHKIN, 2007). To meet this demand, the focus of education should target the development of skills of critical thinking and of autonomous and organized study. These skills will be useful to individuals because success in university courses and in most professions require such skills (COTTRELL, 2005; GARRISON & ANDERSON, 2003). Although there is consensus on the need to develop these skills, what is not so clear is how they can be developed in students in university courses (MCLOUGHLIN & LUCA, 2003).

The advancements in communications technology and the increased use of computer networks have made distance education based on the Internet, e-learning, a widely recognized approach in the field of education. Distance education using e-learning is rapidly becoming an alternative to face-to-face teaching at universities.

Saba (2003) suggests that one of the main characteristics that differentiate distance education from other forms of education is the central focus on the student and on their independence in the learning process. Can it be deduced from this that successful distance learning helps to develop autonomous and organized study skills? Is it possible to develop other high-level cognitive skills learning at a distance by e-learning? The purpose of this research was to identify how the development of high-level cognitive skills happens in higher education distance learning courses that employ e-learning.

1.1 Research Approach

The research was a exploratory investigation that involved literature analysis and empirical observations based on interviews with staff at the following universities in the UK: University of Manchester, Open University, Manchester Metropolitan University, University of Liverpool, University of London, and Cranfield University.

The interviews covered aspects of policy, design strategies, learning objectives, learning design, teaching practice, learning outcomes and

performance. A total of 26 people from 6 universities were interviewed representing 26 courses. Research was conducted in 2007-8 and funded by CAPES. This paper provides an overview of the main outcomes of this research. A full description of the results is provided in Iriondo (2008).

2. RESULTS OF LITERATURE AND EMPIRICAL INVESTIGATIONS

Distance Education aims to reduce social inequalities, opening new opportunities and using concepts that return to students some of the control and authority that traditionally belonged to teachers (MOORE, 2003). The traditional approach adopted in higher education, which could be defined as "passive transfer of information", contrasts with the potential of constructive and interactive of e-learning, where students and teachers form part of a community that recognizes the ideas of its members and discussed them in the light of its knowledge, norms and values. The great advantage of e-learning is its ability to support asynchronous text-based interactions, which enable reflection, independent of pressure of time and the restrictions imposed by distance (GARRISON & ANDERSON, 2003).

2.1 High-level Cognitive Skills

Skills are complex capacities that require knowledge and involve performance. There are physical skills and cognitive skills. Certain skills are easily identifiable, and others are less easily and therefore should be identified, characterized and assessed by studying the behavior of individuals (HALADYNA, 1997).

Cognitive skills are capabilities that make the individual responsible, allowing interaction with the environment. These skills form the basic structure of what might be called cognitive competence of the person, allowing him to discriminate objects, events or stimuli, to identify and classify concepts, raise and build issues, rules and to solve problems.

In this work, we considered some of the high-level cognitive skills most often referenced in the literature, i.e. the skills of reflection, of critical thinking, of autonomous study and of problem solving (ZOLLER & PUSHKIN, 2007; MARZANO , 2004; COTTON, 1991; MARZANO & ARREDONDO, 1986).

2.1.1 Reflective Skill

Reflection is the process that enables connections between various elements of some experience. Learning occurs only when the individual reflects on his personal experience, as a "loop" of learning that runs back and forth between the experiences and relationships that are inferred. One of the most effective tools to facilitate lifelong learning is the ability to reflect and learn from experiences (MCLOUGHLIN & LUCA, 2003; SOCHA, RAZMOV & DAVIS, 2003; SCHÖN, 1999; KOLB, 1984).

According to Fleming and Martin (2007), strategies to facilitate the development of skills of reflection significantly improve the results obtained by students in the teaching learning process. Philip (2006) agrees that reflection is a valuable skill to develop quality learning, but comments that the concept of reflection seems difficult to understand, both for students and for some teachers.

e-learning courses provide a benefit that was mentioned by the majority of people interviewed in this study. In e-learning, students must be active in the learning process. In online courses a system of learning is imposed which rejects the passive attitude of students and demands participation and interaction with the teacher, with the materials, and with other peers. Other benefits of e-learning are the ease of record and evaluate students' contributions. This would be virtually unthinkable in face-to-face meetings, but achieving this in a online discussion forum is perfectly feasible.

But the survey showed that e-learning is often used merely as access to a repository of information or to expand the ability to provide resources, but the resources offered by e-learning are not always being used properly for the development of high-level cognitive skills.

2.1.2 Critical Thinking Skill

Critical thinking enables an individual to decide whether he/she has good reason to believe or to do what other people try to persuade him/her to do or believe (BOWELL & KEMP, 2002). The main goal of critical thinking is to determine whether the arguments used by other party are valid or not (HUGHES & LAVERY, 2004).

The formation of communities of students to investigate and discuss academic issues may be the means to develop in them critical thinking and reflective skills (GARRISON & ANDERSON, 2003). Rovai (2007) also highlights the importance of communities of students as facilitators of discussions in e-learning.

Interviewees comment that students need to be engaged in conversations, they need to be engaged in discussions, or joint analysis of questions and texts, or be induced to self-reflection. It is necessary to make students deal with elements that motivate discussion and critical thinking.

2.1.3 Problem Solving Skill

Problems are characterized when a goal cannot obviously be achieved because of lack of resources, or lack of knowledge or for any other reasons. Actions taken to achieve the objectives outlined are attempts to find solutions to problems (KAHNEY, 1997).

Many of the interviewees identified the development of the ability to solve problems as one of the objectives of the courses in e-learning mode. E-learning enables the use of authentic problems, based on scenarios, projects and games. The idea is not to teach how to solve problems as an autonomous skill, decontextualized and abstract, but as part of a real activity. This usually motivates the interest, confidence, persistence, the acquisition of knowledge and reduces the anxiety of students.

2.1.4 Autonomous Study Skill

Autonomous study is a purposeful mental process, accompanied and supported by behavioral activities involved in finding and identifying information. The student accepts the responsibility of making decisions about the goals and the effort to be done, becoming, therefore, his own change agent for learning (LONG, 1990). Autonomous study is critical, according to Fischer and Scharff (1998), when it becomes an integral part of people's lives, based on the desire and need to understand something or to perform some activity. But Long (1990) comments that it is not reasonable to expect that people who during all their years of school life have been used to receiving ready-made and formatted information, now will be instantly transformed into independent learners.

According to some interviewees, some students do not know how to manage their time and their activity and it is a mistake to assume that all of them are familiar with technology and can use them with autonomy. This assumption can leave students on the abandoned, and if they feel they are alone, teachers may lose them forever.

Several interviewees suggested that, to keep students motivated to autonomous study, it is necessary to explain all the time "what" they are learning, "why" this must be learned, "how" the subject should be studied, "when" and "where" that knowledge can be used.

Although this may seem a contradiction, the development of autonomous learning skill in e-learning is to encourage or require collaborative activities. Students are encouraged to work and learn independently and at the same time to develop activities that require the collaboration of other colleagues. Working collaboratively, students participate actively in the teaching-learning process, creating a shared identity among students and teachers. Support for colleagues with the same aim of learning produces synergy between the members of the group. This relationship, although difficult to be reached at the beginning, is very important, especially in heterogeneous courses delivered at a distance.

Apparently collaborative learning is more effective than other approaches because students themselves organize, summarize, elaborate, explain and defend the concepts and ideas discussed. Students who do intellectual work, especially the conceptual work are the students who learn more, according to interviewees.

2.2 Advantage and Restrictive Factors of e-learning for the Development of High-level Cognitive Skills

The most frequently advantages cited by interviewees were the possibility of developing asynchronous interactions, ease of tracking students performance, the possibility of designing more sophisticated study material and learning activities, the development of autonomous study skills and collaborative activities.

The most frequently cited restrictions were: technical problems, both in the Virtual Learning Environment and in students' computers; difficulty in

planning the courses and in the development and maintenance of learning material; the need of better teachers training; and the difficulty students had to studying in virtual environments for learning and in participating in collaborative activities.

When asked about e-learning academic activities that facilitate the development of high level cognitive skills, the activities that incorporate asynchronous interactions were cited most frequently by the interviewees. Activities must be motivating and interesting for students, incorporating within them some kind of self-assessment.

The development of high-level cognitive skills in e-learning can be facilitated with activities where students have to "describe", "recognize", "select among a few", and use previously acquired knowledge. Another interesting task to develop the skills of analysis and synthesis is to propose activities where students have to look in a certain critical field, and "discuss", "compare and contrast", identify which are the key points, and express their own opinions on the method used to develop the proposed activity.

There seems to be consensus among interviewees that, allowing the students to express and justify their ideas in blogs, forums, or in any other form of asynchronous communication, make that those ideas and concepts remain with them for much longer. Such activities, as well as discussions with teachers and their peers apparently give better results in the development of high-level cognitive skills.

e-learning offers the advantage of tracking all the activities of students and this is considered a particular advantage in the assessment process, but all the interviewees have the same opinion about the difficulty of assessing the development of high-level cognitive skills. The interviewees are unanimous about the need for a combination of both formative and summative assessments during the learning process to get an overview about the development of those skills. Assessments made by peers, or student-student, are also important in e-learning.

3. CONCLUSION

Based on the literature review and on the analysis of interviews with practitioners, some suggestions can be made about how to facilitate the

development of high-level cognitive skills in higher education courses delivered by e-learning.

It is strongly suggested that e-learning courses should stimulate asynchronous interactions, not only student-teacher interactions, but also student-student and student-material interactions, and encourage students to express and justify their own ideas in blogs, forums, or in any other form of asynchronous communication. These interactions propitiate the development of autonomous study skills and collaborative working skills; develop reflection and critical thinking as well.

It is suggested that e-learning courses should clearly show students the goals to be achieved, focusing the topics to be studied, explaining why topics have to be studied, how they fit within a larger scheme of topics and skills, saying when and where this knowledge can be applied, and also explaining how topics have to be studied.

Another way to encourage the development of high-level cognitive skills is to propose activities where students have to describe, recognize, select among a few, discuss, compare and contrast, identify which are the key points, and explain the method used to develop certain proposed activity.

Materials and activities should encourage students to develop, integrate and evaluate knowledge in new ways, adding value to an object, phenomenon or information, developing ideas and taking positions, and also explaining and defending their positions before others. To achieve this, it is suggested that asynchronous interactions are used and group activities are developed, in which students can work collaboratively, and in which students are stimulated to read, reflect and undertake self-evaluation.

The possibility offered by e-learning of tracking students' activities is considered a particular advantage in the assessment process, but according to interviewees, assessing the development of high-level cognitive skills in e-learning still seems to be very difficult.

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