INTRODUCTION

Time and digital mediations of learning

Every day it becomes increasingly obvious that research cannot continue to treat e-learning as a monolithic phenomenon. From the very beginning, learning processes have been mediated by digital media in very diverse ways - so diverse that the nature of such mediations could even be considered as different phenomena for research. While this has been always true ever since the first proliferation of digital media, it is now truer than ever with the rapidly increasing ubiquity of the new digital media, introducing digital mediation into even the smallest spaces in all our activities, including learning. In my view, this should compel e-learning scholarship not to consider e-learning as one single phenomenon for research, but rather as a group of very different phenomena which therefore deserve different conceptualizations and different research approaches to fit different kinds of mediation by digital media. One attempt to conceptualize different kinds of digital mediation within e-learning in order to be considered differently by research and design was tried almost ten years ago by Strijbos, Martens, & Jochems, who revived a distinction made by Crook. These authors then distinguished between *interaction with computers*, *interaction at computers*, and *interaction through computers*. Now, considering the current ubiquity of digital media, we might remove the word "computers" and instead say simply "digital media". The idea of *interacting with digital media* refers to e-learning settings in which, rather than interacting with another human, the learner interacts directly with algorithms, which automatically interact with the learner by means of some kind of interface. The idea of *interacting at digital media* refers to e-learning settings in which the learner interacts with other human beings *around* a digital artifact; in this case, the human interaction can be face-to-face or online. The idea of *interacting through digital media* refers to e-learning settings in which the learner interacts with other human beings *by means* of digital media; so the digital mediation makes the human interaction possible. Note that all three kinds of digital mediation could occur in one and the same learning situation: for example, when a learner is playing an educational game (interacting with digital media) and is commenting with her classmates on how to get the next level in the game (interacting at digital media) by means of a chat (interacting through digital media). In my view, in this situation, all three kinds of mediation should be conceptualized and researched separately (although the relationships between them could be also researched) in order to gain a full understanding of this e-learning situation.

The introduction of any of these three kinds of digital mediation into learning processes transforms the temporal dimension of these processes in some way; indeed, each of these kinds of digital mediation transforms time in a different way. The transformation of the temporal dimension of learning deeply transforms the learning process itself, as temporality is a crucial aspect of learning phenomena. However, research has not focused very much on the temporal dimension of e-learning, on how different kinds of digital mediation transform learning time, and how these time transformations influence the learning process. In this respect, the eLearn Center has been conducting a large research program aimed at achieving a better understanding of the

time dimensions in differently digitally mediated learning processes. In the present volume of the eLearn Center Research Paper Series, which is the second volume of the journal exclusively devoted to PhD students' research, we present four studies which focus on this issue by paying special attention to the role of time in different kinds of digital mediation of learning.

The first two papers focus on the study of perhaps the main political effort being made in Europe and worldwide to foster *interaction with and at digital media* in schools: the one-to-one project, in which governments all over the world have given one laptop to each child in schools and have encouraged the teaching materials industry to develop educational software. The paper by Guitert and Vázquez studies the perceptions of teachers participating in the implementation of the one-to-one project in Catalonia (Spain) (called Escuela 2.0). The authors particularly focus on time issues; for example, they identify some time requirements (or tensions) which the project introduces in the teachers' work and in classroom life in general, and they also explore the times in the classroom devoted to what we have called *interaction with digital media* and *interaction at digital media* by pupils. Meanwhile, the paper by Da Silva and Ornellas studies the implementation of the one-to-one project in Uruguay (called Plan Ceibal). These authors focus more on the potential of the Plan Ceibal project for transforming social and cultural communities and on the project's current failure to do so. In this paper, Da Silva and Ornellas propose a set of improvements to the Plan Ceibal project based on the experiences begun almost 20 years ago in marginal communities in San Diego (USA) by Cole and his team; experiences which have been spread out over the world and are known as "The fifth dimension". In the proposal by Da Silva and Ornellas, special attention is given to the time factor in the process of implementing a fifth dimension experience to improve the Plan Ceibal.

The other two papers in this issue focus on the third kind of digital mediation mentioned earlier: interacting through computers. The paper by Medina addresses one important problem with this kind of digital mediation which makes it very difficult to learn some competences online: the online student's difficulty in gaining access to and handling the specialized and expensive equipment necessary for some kinds of learning. In face-to-face settings, institutions acquire this equipment and make it available to students in a specific location. For online students, however, it is necessary to be able to use the equipment at a distance. One response to this problem has been the technical development of what has been called a Virtual Laboratory, which allows the remote use of specialized equipment. Medina's paper focuses on some pedagogical issues concerning the design and use of these Virtual Laboratories and offers some proposals for improving self-regulation, with special consideration given to time regulation, in learning processes in Virtual Laboratories. The self-regulation of time in *interacting through digital media* settings is precisely the main focus of the paper by Cortés and Barberà, which will close this issue of the eLearn Center Research Paper Series. Cortés and Barberà study how students' use of time on the Internet in online courses is related to their learning outcomes (knowledge acquisition, knowledge transfer and satisfaction).

In summary, in this issue, we present a selection of papers which externalize the on-going research effort by the eLearn Center to understand the complexity of the ways in which digital mediation of learning takes place, with a special focus on the role of time in these digital mediations.

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