

## Chapter 18

# The Problem of Analysis of the Temporal Dimension in e-Learning Research

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### ABSTRACT

*E-learning is a complex phenomenon that includes technological, pedagogical, social, and management dimensions. The importance of multiple variables and temporal dimensions for evaluating changes and development are crucial elements that are not taken into account in the methods and orientation of most studies. Most established methods of research are not able to analyse complex situations adequately. This chapter describes the problems that arise when standard methods are applied and explores the use of methods that support the analysis of multiple variables and temporal dimensions for evaluating changes and development.*

### INTRODUCTION: PROBLEMATIZING THE RESEARCH IN E-LEARNING

Information and Communication Technologies (ICT) and learning are co-evolving and it is necessary to take into account the changes occurring over time in any research about ICT and learning. To date, however, this has not been done particularly effectively. This paper provides an analysis of the main problems of e-learning research, focusing on four issues: research questions, areas of research, methodological approach, and level of analysis.

According to Andrews and Haythornthwaite (2007), most research has centred analysis on the impact of ICT in terms of short-term evaluation using control experiments, the typical question being ‘what is the effect of x on learning in this case’? X is usually some specific tool or technology. If we review studies from the 1980s, 1990s, and 2000s, the differences are in the content of x (multimedia, wiki, blog, augmented reality, etc.). The evolution of technology is what determines the research questions. Therefore, there is a constant repetition and only changed the method of learning or technology. We always face the same questions and do not go far enough in either theoretical knowledge or practice.

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E-learning is a complex phenomenon that includes technological, pedagogical, social and management dimensions. The conventional research approach used in education has to be revised because it is not fully adequate for studies of e-learning due to the interdisciplinarity of the focus and the importance of taking into account multiple variables and temporal dimensions to evaluate changes and development. Researchers in the learning sciences and education know the importance of time and process in their areas of research. However, there is a lack of evidence of transformation over time.

In terms of research questions, an important problem is that the focus and orientation of much research in this field is based on an illusory understanding of how the use of technology benefits learning. According to Hakkarainen (2010), technology only enhances learning if there is a transformation of social practices. Technology and social innovation are interdependent.

“Technology as such does not determine the nature of its implementation but co-evolves with gradually transforming institutional practices. A simple adaptation does not occur; it is a reciprocal process in which tools facilitate practices and novel practices are created in order to make better use of novel possibilities provided by technologies” (p. 214). This dialectical approach is important for understanding the necessity to problematize the field of e-learning research and to elaborate better methods and instruments for research.

A recent metadata analysis by researchers at the United States Department of Education (Means, Toyama, Murphy, Bakia, & Jones, 2009) found that many of the studies suffered from weaknesses such as a small sample size, failure to report retention rates for students in the conditions being studied, and, in many cases, potential bias from the authors of the studies due to their dual role as experimenters and instructors.

Zawacki-Richter (2009) and Zawacki-Richter, B  cker, and Vugt, (2009) conducted two interest-

ing broad studies on research in distance education literature in which the technologies constituted one of the research areas. In both studies they have established three broad areas of research: macro, meso and micro levels. In general, the macro level refers to broad conceptual frameworks of distance education theories and systems. The meso level relates to management, organization and technology at the institutional level; and the micro level is focused mainly on teaching and learning processes. Zawacki-Richter (2009) and Zawacki-Richter, B  cker, & Vugt, S. (2009) revealed in these studies that there is a strong imbalance in the representation of the three research levels. Research is mainly dominated by the micro perspective. According with these authors, over 50 percent of all examined papers dealt with the top three issues: interaction and communication in learning communities (17.6%), instructional design (17.4%), and learner characteristics (16.3%)”. Research works on issues at the meso and macro level are few and tended to be very descriptive. The micro level is dominated by studies that focus on interaction and communication, patterns in computer-mediated communication, instructional design issues, learner characteristics and educational technology (Zawacki-Richter et al., 2009). A possible interpretation of this imbalance is that the selection of research topics follows practical considerations, especially related to the availability of data. However, much work still needs to be done on the meso level, in particular on issues related to management of change, innovation, professional development and quality assurance.

In summary, the e-learning research area is very broad (Table 1) and we need to establish distinctions among areas and levels of research. A complex model is necessary to establish the relationship between the actions taken by the administration, pedagogical, technological, and social areas.

In terms of research methods, most studies in the field of ICT in the 1980s and 1990s used an

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