Chapter 1
Learn from Experience to Build Competence: A Model for Structuring Active Learning Practices in Virtual Learning Environments

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ABSTRACT

This chapter explores the research issues about effective learning environments and proposes a model for designing instructional activities for Virtual Learning Environments (VLEs), based on meaningful experience and proficient paths of reflection on experience, abstraction of principles, practice and automatization of principles application, transferring of the principle to other contexts and situations. The model is inspired from classical experiential learning cycles and propose activities with four key-moments: Challenge - Debriefing - Abstracting/Generalizing - Automatization/Transfer (CDAA). As discussed, the model can meet many instances drawn either from research on learning in cognitive science and research in the effectiveness of instructional strategies.

INTRODUCTION

In everyday life there is no gap between the world of “learning” and the world of “doing”. Every life situation can generate experience that can become a learning opportunity. In the same manner, Virtual Learning Environments (VLEs) can provide opportunities for good learning experience, but how is it possible to design good learning experiences to be implemented in VLEs?

The practice of professional educators is often driven by pervasive rhetoric that essentially describes the technology as something that promotes learning regardless of how the technologies are applied in practice. A long tradition of empirical studies (see next paragraph) though suggests that the means by which the information is delivered is less important than the didactic strategies used and the quality of learning experiences that VLEs promote.

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In the eighties, nineties and still at the beginning of the century, the novelty effect that had accompanied the diffusion of technology in school and in vocational training often gave the impression that the use of technology had a significant effect on learning. Constructivist framework (Jonassen 1999; Chau & Wong 2013) based on social interactions and low instructional guidance has supported the development of VLEs from the nineties until today.

Now these technologies are no longer novel and low instructional guidance paradigm seems to be in crisis (Kirschner et al. 2006), so it is now time to seriously consider the strategies and principles that make effective use of digital technologies in learning. This requires experimental analysis rooted in cognitive psychology and pedagogical technique. In this chapter we will outline some strategies and principles for effective teaching in Virtual Learning Environment and we will describe a model for design collaborative activities.

**Background**

Important instances in didactic effectiveness are derived from research in cognitive psychology (see Anderson 2009) and from the implementation of these instances in learning environment (see Clark et al. 2006, Clark 2010). Other instances (discussed below) derive from meta-analysis of general factors that promote learning (see Hattie 2009, Marzano et al. 2001) and the effectiveness of digital technologies for learning (see also Ginn 2005, 2006; Mayer 2009; Schmid et al. 2009; Li & Ma 2010; Tamim et al. 2011; and Cheung and Slavin 2012). These meta-analyses have also quantified the Effect Size (ES) of the factor considered to affect learning outcomes. Several issues emerge from these studies (for confidence intervals of the Effect Sizes presented see works cited):

1. It is not the use of digital technology that enhances learning but the training strategy used. Tamim and others (2011) highlight how the in-presence use of technology in the school has only a moderate positive effect on learning (ES = 0.35). The effect is greater for learners of the first cycle (learners “K-12”, ES = 0.40) than those of later or more experienced learners (ES = 0.29, Tamim et al. 2011; ES = 0.28, Schmid et al. 2009). The teaching model used plays an important role. In the meta-analysis on technologies to support the teaching of mathematics conducted by Rosen and Salomon (2007), the use of technologies has an average ES of 0.46, rising to 0.60 in presence of constructivist approaches, and increase of learning outcomes concerns more the creativity and the ability of collaboration than the speed of calculation. These results are confirmed by the meta-analysis about reading skills (average ES of 0.16, Cheung, Slavin 2012, rising to 0.38 if the technology is not used as an accessory but is integrated in traditional education activities), writing activities (ES = 0.54 on the amount of writing, ES = 0.40 on quality, with an increase also in the ability to collaborate with others, Goldberg, and Russell Cook 2003) and second language learning (ES = 1.12, Zhao 2003). The “how to use” technology is more important than “if you use ” (Mayer 2013) technology.

2. The effectiveness of the technology stands in supporting the didactic interaction in classroom and in promoting the cognitive processing of the learner. Tamim and others (2011) highlight the role of the technology in class: it is more effective if it supports education (ES = 0.42), than if it is used to distribute educational materials (ES = 0.31) and is most effective when used as a support to cognitive processing (ES = 0.41, Schmid et al. 2009) rather than as a support for the presentation of the information (ES = 0.10). The technology seems to have positive effects if support the didactic