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Lessons learned from the design of situated learning environments to support collaborative knowledge construction

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ABSTRACT

The main characteristics of situated learning environments (SLEs) are: to provide authentic contexts, activities, expert performances and integrated assessment; to support multiple roles and perspectives, collaborative knowledge construction, coaching and scaffolding; and to promote reflection and articulation. However, current SLEs have two limitations: (1) not all of these characteristics are included, particularly lacking collaborative knowledge construction, in most cases; and (2) most SLEs are designed to support learning activities outdoors, but not indoors. This paper presents the implementation of an SLE that overcomes these two limitations. This SLE is based on bidirectional Quick Response (QR) codes, which are enhanced QR codes that not only provide information when scanned but also collect user-generated content. This "Bidirectional SLE" is evaluated in an experiment in which it is compared with an equivalent "Traditional SLE", which is built upon traditional QR codes. The purpose of this comparison is to understand if using bidirectional QR codes as a mechanism to support collaborative knowledge construction in indoor settings has an impact on students' learning outcomes and on their impression of the learning experience. Two hundred fifty-three students participated in this experiment. Data collected from this experiment indicate that the students who worked in the Bidirectional SLE (1) received better scores, providing better and more complete answers, and (2) evaluated their learning experience better than their peers' who worked in the Traditional SLE. Finally, a cross-analysis of these results including teachers' opinions led to a set of lessons learned about the design of SLEs to support collaborative knowledge construction.

1. Introduction

Situated Learning (SL) practices have gained importance in recent years given the need to train "21st century professionals" who need to be capable of collaborating and solving problems in different contexts and situations (Gardiner, Corbitt, & Adams, 2009; Lunce, 2006; Meyers & Lester, 2013; Redecker et al., 2011). Lave and Wenger (1991) defined SL as "the product of the activity, context and culture in which learning is developed and used." SL was first introduced by Brown, Collins, and Duguid (1989) as a model for classroom instruction; since then, several researchers have contributed, expanding upon this idea, proposing different definitions, instructional design strategies and models (Clancey, 1995). In 1993, McLellan (1993) proposed a model for SL instructional design in which technology was used as a mechanism for simulating authentic "micro-worlds" (as an alternative to real-life settings). For the first time, technology was proposed as a "real world" anchor that expanded the context of practice for the learner. Later, Stein (1998) defined the four critical elements of an SL environment (SLE): (1) content, the tasks and processes that learners have to perform; (2) context, the situations and environmental cues surrounding learners, and supporting them in the meaning creation process; (3) community, the group of people with whom learners

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