Chapter 13

Effects of the Drewlite CSCL Platform on Students' Learning Outcomes

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ABSTRACT

This chapter presents a case study of Computer Supported Collaborative Learning (CSCL) in the field of human nutrition and health at Wageningen University in the Netherlands. More specifically, this study investigates the effect of the type of collaboration (personal discussion in front of a shared computer vs. online discussion) in CSCL on students' learning outcomes. A pre-test, post-test design was used. Eighty-two students were asked (as an individual pre-test) to design and analyze a study which evaluates a certain dietary assessment method. Subsequently, they were asked to discuss their evaluation studies in randomized pairs. The pairs in one group discussed their task results online and the pairs in the other group discussed their results face-to-face while sharing one computer, in both cases using the CSCL platform Drewlite. As an individual post-test, students had to re-design and re-analyze the same evaluation study. Learning outcomes were measured based on the results of teachers' regular evaluation of students' achievements as well as on the quality of the students' knowledge construction. The results showed that both teachers' marks and the quality of knowledge construction of all students improved significantly from pre-test to post-test. However, the type of collaboration had no significantly different effect. Furthermore, the scores on knowledge construction were consistent with exam results as obtained by teachers' evaluations.

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INTRODUCTION

With the arrival of the knowledge-based era, the swift growth of information and communication technology, and the rapid growth and widespread accessibility of the World Wide Web, it is inevitable that professionals in all fields will be confronted with rapidly changing global problems and complex issues. These complexities call for appropriate action. In the field of education, it is believed that proper educational designs have the potential to prepare and train students to become capable and qualified professionals, who can analyze, conceptualize, synthesize, and cope with complex and authentic problems (Jacobson & Wilensky, 2006).

The use of new collaborative technologies as teaching and learning tools is now quickly increasing in education. According to many scholars in the field of learning science, collaborative online learning environments prepare learners to adjust to and cope with today's complex issues. Platforms for online learning environments have evolved to increase deep learning and student knowledge construction. They can also encourage students to discuss their ideas, concepts, and problems from different perspectives and viewpoints in order to re-construct and co-construct knowledge while solving authentic and complex problems (Noroozi, Biemans, Busstra, Mulder, & Chizari, 2011; Veldhuis-Diermanse, Biemans, Mulder, & Mahdizadeh, 2006). In collaborative online learning environments, knowledge can be constructed through structuring, elaborating, and evaluating concepts and ideas, eliciting and summarizing information, as well as connecting concepts, facts, and ideas about the topic (Veldhuis-Diermanse, et al., 2006). That is why some theoretical and empirical evidence favors more online instructional settings than traditional (face to-face) settings with respect to knowledge construction processes and outcomes (Andriessen, Baker, & Suthers, 2003; Joiner & Jones, 2003; Kanselaar, De Jong, Andriessen, & Goodyear, 2000; Kirschner, Buckingham-Shum, & Carr, 2003).

However, simply putting learners in a group to work together on an authentic and complex problem in an online learning environment is not always beneficial for learning, knowledge construction or problem solving (Kirschner, Beers, Boshuizen, & Gijselaers, 2008; Kreijns, Kirschner, & Jochems, 2003; Slof, Erkens, Kirschner, Jaspers, & Janssen, 2010). Empirical findings show that online collaborative learners generally encounter communication and coordination problems (Doerry, 1996; Janssen, Erkens, Kanselaar, & Jaspers, 2007) due to the reduced bandwidth or available modes of interaction associated with online learning, resulting in degradation of problem solving performance and knowledge construction (Baltes, Dickson, Sherman, Bauer, & LaGanke, 2002; Doerry, 1996). In response to this, a variety of instructional approaches (e.g. shared workspaces, game-based learning, awareness features, knowledge representations, scripts) has been developed to promote learning performance in online collaborative learning environments. These types of learning arrangements have collectively been named Computer Supported Collaborative Learning (CSCL), which is seen as a promising context in which to facilitate and foster student knowledge construction (Andriessen, et al., 2003; Stegmann, Weinberger & Fischer, 2007; Veerman, 2000). CSCL has recently been recognized as an important and achievable instructional strategy to support learning and thereby help learners achieve a deeper understanding. In today's information and communication era, CSCL is gradually moving into the mainstream of educational designs, as it is currently receiving enormous attention in universities and schools throughout the world (Noroozi, Mulder, Biemans, & Chizari, 2009; Weinberger, Ertl, Fischer, & Mandl, 2005; Weinberger, Stegmann, Fischer, & Mandl, 2007). When students are expected to solve authentic and complex problems and reach a deeper understanding, CSCL provides a fruitful environment in which to integrate different perspectives, theories and ideas with their own arguments, counter-arguments, clarifications, and