

Chapter 1

Indicators for Cooperative, Online–Based Learning and Their Role in Quality Management of Online Learning

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ABSTRACT

Learning is a constructive and social process that works best in interaction with others. From this perspective, interaction and cooperation are seen as essential for learning especially in online-based learning environments. The objective of this chapter is to propose and test indicators for cooperative online-based learning. The indicators focus on three areas: presence of participants (indicators: access index, access pattern index), participation of participants (reading index, contribution index, completion index), and interaction of participants (answer contribution index, connectivity index, reciprocity index). The indicators can be applied both to students and instructors. The indicators were applied to three online-based courses in higher

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education. Log data from the learning management system was used. Also, success rates, student evaluations, and workload analysis were conducted. Results show that the indicators can be calculated automatically and can provide meaningful information for students' and instructors' dashboards. The presented indicators are tailored to cooperative online-based learning environments, where interaction and cooperation are means of fostering higher levels of learning.

INTRODUCTION

Learning is a constructive and social process that works best in interaction with other persons (Vygotsky, 1978). Through interaction and cooperation, students gradually construct systems of shared meanings (Mercer, 1995). Interaction and cooperation are seen as essential for learning in general (John-Steiner & Mahn, 1996), but especially for successful learning in online-based learning environments (Chou, 2002; Dixson, 2010; Lenning & Ebbers, 1999; Zhao, Lei, Yan, Lai, & Tan, 2005). Online teaching should thus be built on a thoughtful instructional design to facilitate interaction and cooperation among students.

Cooperative learning is the instructional use of small groups so that students work together to maximize their own and each other's learning. Different types of cooperative learning can be distinguished, such as formal cooperative learning where students work together to jointly complete specific tasks and assignments; informal cooperative learning where students work together in ad-hoc groups; and cooperative based groups that are long-term, heterogeneous learning groups whose primary responsibilities are to provide support, encouragement, and assistance (Johnson & Johnson, 2013).

To see whether the chosen instructional design is successful in achieving interaction and cooperation, instructors in online-based environments need to carefully monitor students' interaction and cooperation. Monitoring allows them to detect situations where they must adjust their instructional strategy or where they need to support less active or struggling students. To do this, well-defined indicators allowing a quantitative monitoring of interaction and cooperation may be of help to support this task.

Learning analytics is the collection and analysis of data about learning and learning context. The objective of learning analytics is to better understand and improve learning (SoLAR, 2011). With the shift to blended and online learning, and the increasing amount of data available from learning management systems, learning analytics has found its place in education and is increasingly considered as an enabler to transform teaching and learning (Jacqueleen, 2015). In pure face-to-face settings where no learning management system is in place, learning analytics

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