

Chapter 2

Analysis of Constructivist, Network–Based Discourses: Concepts, Prospects, and Illustrations

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ABSTRACT

The authors propose a new approach to discourse analysis which is based on meta data from social networking behavior of learners who are submerged in a socially constructivist e-learning environment. It is shown that traditional data modeling techniques can be combined with social network analysis – an approach that promises to yield new insights into the largely uncharted domain of network-based discourse analysis.

The chapter is treated as a non-technical introduction and is illustrated with real examples, visual representations, and empirical findings. Within the setting of a constructivist statistics course, the chapter provides an illustration of what network-based discourse analysis is about (mainly from a methodological point of view), how it is implemented in practice, and why it is relevant for researchers and educators.

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INTRODUCTION

Discourse Analysis (DA) is often considered to be situated within a socially constructivist setting, drawing loosely on Vygotsky's theoretical framework which interprets human inquiry within culturally mediated social interactions and the larger set of practices of learner communities (Imm & Stylianou, 2012). In this respect, it is interesting to note that, according to Scardamalia and Bereiter (2003), constructivism "is a term whose vagueness beclouds important distinctions" between shallow and deep forms of constructivism. They argue that "the shallowest forms engage students in tasks and activities in which ideas have no overt presence but are entirely implicit. Students describe the activities they are engaged in (e.g., planting seeds, measuring shadows) and show little awareness of the underlying principles that these tasks are to convey. In the deepest forms of constructivism, people are advancing the frontiers of knowledge in their community" (Scardamalia & Bereiter, 2003, pp. 1370-1373).

In particular, discourse analysis of mathematics discussions has shown that mathematical knowledge creation (i.e. "deep constructivism") can be facilitated by encouraging learners to "justify their ideas, evaluate one another's ideas carefully, and ask questions" (Chen, Chiu, & Wang, 2012, p. 868). This finding is consistent with our previous empirical research which was based on peer reviewing-based learning, facilitated by e-learning technology, such as the Compendium Platform (Poelmans, Wessa, Milis, & van Stee, 2009), that we developed over the last few years to organize statistical courses (Wessa, De Rycker, & Holliday, 2011).

Notwithstanding the widespread adoption of computer-assisted learning approaches, there seem to be only few studies in which computer mediated communication is actually studied in terms of structure, content, and quality of learner messages (Lu, Chiu, & Law, 2011). The chapter attempts to fill some of the gaps in the literature and discusses

three important aspects of DA based on social learning networks in statistics education: (a) the provisioning of innovative e-learning technology encompassing reproducible statistical computations, collaborative writing, and peer reviewing; (b) the capturing and use of objectively measured meta information about student discourses and associated social interaction networks using the e-learning technology; (c) several methodological concepts that allow researchers and educators to better understand the discourses and underlying social dynamics in collaborative, constructivist learning.

BACKGROUND

Towards a New Methodological Approach

According to Matsuzawa, Oshima, Oshima, Niihara, and Saki (2011, p. 199) there are traditional methodological approaches in educational DA: "Thus far, researchers have applied three methodological approaches to capture the nature of knowledge building. The first approach establishes the rubrics of content knowledge that researchers expect the learners to acquire following their learning. ... The second approach involves researchers in analyzing the process of learning by breaking it into small units to categorize into different cognitive actions. ... The third approach is fine-grained discourse analysis performed as a case study, which helps researchers describe what is happening in students' collaborative learning."

However, the authors continue to argue that:

Although the three approaches are appropriate to discuss well-structured collaborative learning, none of them are sufficient to capture collective knowledge advancement. Regarding the content of knowledge, we are not only concerned with deep comprehension of domain-specific knowledge but also epistemic operation by learners to advance

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