Chapter 41

Using Multimodal Discourse Analysis to Identify Patterns of Problem Solving Processes in a Computer–Supported Collaborative Environment

Shannon Kennedy-Clark
Australian Catholic University, Australia

Kate Thompson
University of Sydney, Australia

ABSTRACT

Recently, there have been calls to undertake deeper analyses of learner interactions in collaborative computer-supported environments, analyses that move beyond code and count, in order to understand collaboration from multiple viewpoints. In this chapter, two analytical approaches are presented, analyzing and interpreting the same conversational data from learners sharing a computer to solve a virtual inquiry. It is proposed that through the combined use of group function analysis and discourse analysis perspectives, a deeper understanding of how learners interacted on both macro and micro levels can be gained. The patterns of successful and non-successful problem solving are established and, from this, factors that may contribute to goal attainment or non-attainment are outlined.

INTRODUCTION

The proliferation of technologies designed to provide learners with an immersive and enriched learning environment presents new challenges for practitioners in understanding the behavior of learners. In parallel, the ability to collect complex datasets (including audio, video and screen capture, for example) means that researchers have the information to answer these complex questions. What is needed is a process of visualizing and analyzing multiple sources of data, from complex instances of learning. Given the progress in the theories of how and what people learn, particu-

larly in fields such as the learning sciences, what is needed is to draw from traditionally opposing perspectives to establish a more systematic approach to understanding these complex learning environments. In order to appropriately answer questions at this level, complex analytical procedures, with multiple coding schemes (Evans, Feenstra, Ryon, & McNeill, 2011) and theoretical frameworks (Suthers et al., 2011) need to be applied. Knowledge of learners' behavior while using innovative tools can inform the design of the tools as well as the tasks.

In research that examines technology-mediated learning, more traditional forms of measurement, such as pre-and post-tests, surveys and interviews, have provided the base data (Barab et al., 2009; Jacobson, Lim, Lee, & Low, 2007; Ketelhut & Dede, 2006). These studies provide minimal information about the *processes* of learning, what learners are doing, saying and responding to in an immersive environment. Reporting on the processes of collaboration and the development of theory and methods of analysis has seen this area develop in the last five years. Reporting on *multiple* measures of process using group decision making and discourse analysis in computer supported collaborative learning (CSCL) is becoming more common (van Aalst, 2009; Evans et al., 2011; Weinberger & Fischer, 2006). One advantage of the use of multiple measures is the ability to report on interaction effects (Weinberger & Fischer, 2006) and relationships between data at different levels, particularly individual contributions to group processes (Ding, 2009). Discussion of how best to analyze and describe the relationship between the individual processes of learning within a collaborative process is ongoing (Friend Wise, Hsiao, Marbouti, Speer, & Perera, 2012; Clara & Mauri, 2010). However, it is generally agreed upon that there is an interaction between the individual, small group, and meso levels of collaboration (Goodyear, Jones & Thompson, forthcoming).

The use of Systemic Functional Linguistics (SFL) has been prominent in computational linguistics as a means of analyzing text-based corpora. In this area, there has been a growing interest in the role of features of language, such as modality, negation and cue words, which complement the already robust body of theoretical studies in this area (Gravano, Hirschberg, & Beňuš, 2012; Moreante & Sporleder, 2012). As Moreante and Sporleder (2012, p. 223) explain, the "emergence of this area is a natural consequence of the consolidation of areas that focus on the computational treatment of propositional aspects of meaning, like semantic role labeling, and a response to the need for processing extra-propositional aspects of meaning as a further step towards text understanding."

In this chapter, the research team's experiences capturing and analyzing patterns of student learning are described, as the data are reinterpreted through the administration of different coding systems and visual representations. The aim is to present an understanding of different levels of the conversations that acknowledges both the macro scale of group goal solving and the micro scale of word choice. By combining data about what students are doing in terms of their interaction with the tool with their discourse, this aspect of the context of their conversation is able to be taken into account. This in turn affects the way the data is visualized, how it is analyzed, and what new research questions are generated.

BACKGROUND

The term *discourse* is applied in a range of different but interrelated ways in social and linguistic research. *Discourse* can be applied to the structure of a particular text; it can be applied to different types of language used in different topic areas, such as political discourse; it can be applied to the style of the speaker, such as native

23 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: www.igi-global.com/chapter/using-multimodal-discourse-analysis-to-identify-patterns-of-problem-solving-processes-in-a-computer-supported-collaborative-environment/146425

Related Content

Soil, Soul, and Society: The Healing Power of Community Gardens in Black Neighborhoods
Kevin Richardson (2024). *Leadership Action and Intervention in Health, Business, Education, and Technology (pp. 222-234).*
www.irma-international.org/chapter/soil-soul-and-society/349504

Charismatic Leadership in Hospitality and Tourism
Gonca Ayta, Fatma Doanay Ergenand Engin Aytekin (2023). *Leadership Approaches in Global Hospitality and Tourism (pp. 91-108).*
www.irma-international.org/chapter/charismatic-leadership-in-hospitality-and-tourism/318273

Transforming Agriculture With Modern AI: Harnessing Artificial Intelligence to Revolutionize Farming
Rozy Dhantaand Marizvikuru Mwale (2024). *Leveraging AI and Emotional Intelligence in Contemporary Business Organizations (pp. 350-370).*
www.irma-international.org/chapter/transforming-agriculture-with-modern-ai/335429

Leading Through Uncertainty: Stakeholder Dynamics in PK-12 Education During the COVID-19 Pandemic
Silvana Zircherand Ryan J. Eckert (2024). *Challenges and Transitions in Education in Times of Crisis (pp. 135-155).*
www.irma-international.org/chapter/leading-through-uncertainty/352085

The Pivotal Role of Faculty in Online Student Engagement and Retention
Judi Simmons Estes (2017). *Educational Leadership and Administration: Concepts, Methodologies, Tools, and Applications (pp. 1501-1525).*
www.irma-international.org/chapter/the-pivotal-role-of-faculty-in-online-student-engagement-and-retention/169070