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Computer-mediated communication (CMC) text analytics: Exploring the dynamics within digital discourse

Bio data

Ward Peeters holds a PhD in Linguistics from the University of Antwerp (Belgium). He is a research fellow in science communication at Leiden University (the Netherlands) and a visiting professor at Kanda University of International Studies (Japan). His main interests revolve around studying social network impact in language learning contexts, which have materialised in a number of research projects in Belgium, Japan, the Netherlands and South Africa as part of an extensive study on computer-supported collaborative work.

Abstract

While the scholarship on computer-mediated communication (CMC) can be described as a diverse field of study, with a variety of niche areas and transdisciplinary domains, one of the main recurring research practices within the field involves analytic examinations of digital discourse (Vásquez, 2022). These examinations generally include qualitative and quantitative measures of digital text which is produced, used and re-used in a fast-evolving communicative landscape. Because of the rapid succession of devices, programs and applications that are used for mediation, the methods for analysis sometimes lag behind (as discussed by Herring, 2019). This has raised the question among scholars on how to effectively study and visualise digital discourse, taking into account all affordances and contextual factors that digital resources provide (Car, 2020; Lin, 2015). This paper presents a number of key issues and challenges in the field, bringing together findings from Computer Assisted Language Learning and Learning Analytics studies to provide some new perspectives on CMC text analytics for education.

Conference paper

Introduction

This paper discusses some of the new scholarship on computer-mediated communication (CMC) text analytics, drawing on findings from Peeters (2022), published in *Smart CALL: Personalization, contextualization, & socialization* (Colpaert & Stockwell, 2022), a volume which brings together new theoretical perspectives on technology and language learning. In this chapter, the application of social network analysis (SNA) principles—which have proven to generate substantial insights into the dynamics of mediated digital text—has been elaborated upon. Special attention was paid to time measures in this context, showing how interaction and collaboration patterns can change over time and how relevant time frames should be determined to inform any analysis of digital discourse.

In addition to the findings of Peeters (2022), this paper briefly discusses the use of epistemic network analysis (ENA) principles to analyse digital discourse. ENA, which can be defined in brief as an approach to analyse the connections and co-occurrences of certain 'codes' in dialogue, can be used to generate dynamic network models out of

digital text (Gašević et al., 2019; Peeters et al., 2020; Shaffer, 2017). ENA has been found to provide additional insights into the dynamics of CMC, as well as into associated learning and teaching processes (Vandenberg, 2021; Vujovic et al., 2021).

In the next section, the application of SNA and ENA for digital text analytics will be briefly discussed.

Network Analyses and digital discourse

Applications of social network analysis (SNA)

The chapter by Peeters (2022) discusses how the application of SNA principles to analyse and visualise the process of socialisation and information exchange in CMC text allows us a look into the wider semiotic contexts in which the learning process is taking place. In the presented case, we are able to see how socialisation unfolds while students collaborate on a number of learning tasks through Google Classroom. SNA principles were also applied to visualise the interplay between different aspects of socialisation over time.

Peeters (2022) argues that it is both informative and educational for educators and researchers to be able to observe the shifts that can occur in such interactive spaces for learning. This way we can improve both the design of CMC spaces for education—as we can create an overview of the dynamics that are present or absent in a certain learning space— as well as the support mechanisms that educators can provide throughout the learning process of their students.

Applications of Epistemic network analysis (ENA)

As mentioned in the introduction, ENA is a quantitative ethnographic approach to analyse patterns and dynamics in coded dialogue and has been designed to compare the weighted structure of links between different coded elements in discourse (Gašević et al., 2019; Peeters et al., 2020; Shaffer, 2017). It provides researchers with methods to empirically determine the behaviour and function of different discourse elements, and to build networks in which they can examine, among others, the co-occurrence or co-existence of different topics, events, emotions or collaborative actions.

The principles of ENA, together with other process measures, have been applied to online learner data before, including individuals' use of learning strategies, community of inquiry frames and self-regulated learning techniques (e.g., Bressler et al., 2019; Saqr et al., 2021). Because the analytic technique "was originally designed to capture learning as it is expressed in conversation turns, and in collaborative scenarios" (Saint et al., 2021, p. 10), it is no surprise that it has been deemed a powerful tool to analyse collaborative digital discourse as well.

Oshima and Shaffer (2021) describe in their paper on learning analytics for a new epistemological perspective of learning that ENA enables researchers to easily create visual comparisons between selected codes and variables. Referring to an earlier publication (Shaffer & Ruis, 2017), they also explain that most network analyses and accompanying statistics tend to describe how nodes or actors are connected, but gloss over the content, or what these nodes represent.

In combination with probabilistic and temporal measurements, ENA enables researchers to look at the way codes co-exist over time, how influential they are in the network, how relationships evolve and how consequential they are in the network's evolution.

Conclusion

As detailed in Peeters (2022), the principles of SNA can be applied to generate new insights into the dynamics of mediated digital text and the structure of a discourse network. ENA principles, on the other hand, can shed more light on the contents of mediated text and how certain actions, strategies or learning paths co-occur and co-exist. By taking into account relevant time intervals, both SNA and ENA can be used to visualise how these dynamics evolve over time, providing us with the necessary methods and insights to determine when and how learners communicate and collaborate.

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