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The problem arena of researching computer supported collaborative learning: Introduction to the special section

Martin Valcke ^{a,*}, Rob Martens ^b

^a *Department of Education, Ghent University, H. Dunantlaan 2, 9000 Ghent, Belgium*

^b *Leiden University, The Netherlands*

Abstract

In this introduction to the special section, research in relation to asynchronous discussions in computer supported collaborative learning (CSCL) environments is analysed from a methodological perspective. The discussion centres on three quality issues that are considered as critical in recent content analysis approaches: (1) the accuracy of the research methodology applied to gather data in CSCL-settings, (2) the low reliability of the research instruments and procedures, and (3) questions about the validity of the research instruments. Finally, the four contributions in the special are positioned in relation to these three critical topics.

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1. Introduction

This special section focuses on the need for the design and development of more valid and reliable instruments and methodologies to assess the impact of learning and working in Computer Supported Collaborative Learning environments (CSCL). In this introductory article, we discuss the need for and the nature of this reorientation in CSCL-research.

* Corresponding author. Tel.: +32 9264 8675; fax: +32 9264 8688.
E-mail address: martin.valcke@ugent.be (M. Valcke).

Table 1
Reported shortcomings of CSCL research instruments and focus of the four articles in the special section

Reference	Focus on own research			Focus on CSCL research in general		
	More accurate research methods are required to obtain information about the process studied in the CSCL setting	Higher validity of research methods required	Higher reliability of research methods required	More accurate research methods are required to obtain information about the process studied in the CSCL setting	Higher validity of research methods required	Higher reliability of research methods required
Chan and van Aalst (2004)				x	x	x
Fisher et al. (2002)	x					
Gros (2001)					x	x
Kaatinen and Kumpulainen (2002)		x		x		
Kealy (2001)					x	
Kreijns et al. (2003)				x		
Kreijns et al. (2004a, 2004b)					x	
Kreijns et al. (2004a, 2004b)	x	x		x		
Lipponen et al. (2004)				x	x	x
Lipponen et al. (2003)				x		
Neuendorf (2002)						x
Rourke et al. (2001)						x
Rudestam (2004)				x		
Strijbos et al. (2004)				x		x
Strijbos, Martens, Jochems and Broers (in press)						x
Van Bruggen et al. (2002)				x		
De Wever et al. (this issue)					x	x
Strijbos et al. (this issue)	x		x	x		x
Schrire (this issue)	x	x		x	x	
Weinberger and Fisher (this issue)	x	x		x	x	

The contributions in this special section point at a list of problems, questions and issues that can be raised about CSCL-research. For instance, Strijbos, Martens, Prins, and Jochems (this issue) analyzed the proceedings of CSCL conferences and conclude that authors hardly report psychometric data or do not analyze reliability and/or validity measures in the context of their research design. This questions the credibility of the research (How solid are the results and conclusions?) and hinders replication of the research design and research findings. De Wever, Valcke, Schellens, and Van Keer (this issue) add to this that a high number of the instruments used to direct the content analysis have a weak theoretical and empirical basis and that there is a lack of replication studies to underpin the quality of the content analysis instruments.

A further analysis of articles, published recently in the field of CSCL and content analysis helps to clarify the shortcomings reported by researchers. A first finding when analyzing the literature is the small proportion of articles that discusses explicitly methodological issues about content analysis in the context of CSCL research. Secondly, when authors tackle critical issues they refer mostly to the theoretical underpinning of CSCL. This is not surprising since the psychological and educational processes underlying CSCL are very complex and the dependent variables differ widely within and between studies (e.g., Strijbos, Martens, Jochems, & Broers, 2004). Thirdly, a large number of the authors in these articles raises clear issues about the psychometric quality of the content analysis instruments used and/or procedure adopted in the research design. Table 1 structures and summarizes a list of such comments, based on a selection of recent articles that mention explicitly methodological reflections about CSCL research and content analysis. A distinction is made in the table between comments presented in relation to their own research versus reflections about CSCL research or content analysis in general.

It is striking that authors – from a quantitative perspective – especially point at shortcomings of CSCL research and content analysis research in general, but reflect to a far lesser extent on their own approaches. The summary in the table also indicates that three issues return in a consistent way:

1. More accurate research methods are required to obtain more detailed information about the processes studied in the CSCL setting.
2. Higher validity of research methods and instruments is required.
3. Higher reliability of research methods and instruments is required.

2. The contributions to the special section

A further elaboration of these issues will be found in the articles that constitute this special section. In Table 1, the four articles have been characterized as to what issues especially are being tackled. The authors of these articles are acquainted with content analysis in the context of CSCL research. They have been invited to address the issues summarized in Table 1 from the perspective of the literature and their own research. Most of them will, as a consequence, illustrate alternative approaches by discussing and dissecting their own research designs and research instruments.

In the article of De Wever et al. (this issue), the authors discuss the psychometric qualities of 15 different content analysis instruments, regularly found in the CSCL-literature. They discuss the

theoretical and empirical base of the instruments and come to critical conclusions about their validity and reliability. The analysis is further also critical when it comes to the issue of reliability. The authors put forward the need to improve the theoretical and empirical base of the existing instruments in order to promote the overall quality of CSCL-research.

Srijbos et al. (this issue) discuss methods to extract information from the CSCL-process and link this to a discussion about the reliability of the procedures in the research designs. A central concept in their discussion is the “unit of analysis”, that is used as the base for the coding process. Examples are discussed and an alternative approach to determine the unit of analysis is presented.

Schrire (this issue) mainly centers on the nature of the research method, adopted to gather high quality and rich information about the actual process in the CSCL setting. Whereas the first two articles centre on (1) the identification of units of analysis, and (2) coding approaches, this article presents an attempt to grasp the structure in CSCL discussions. The author presents a model for the analysis of collaborative knowledge building in asynchronous discussions that helps to map the structure of the interaction, the cognitive structuring and the structure in the discourse. In this way also the issue of validity is introduced in this special section.

The contribution of Weinberger and Fisher (this issue) is compatible with the article of the former author. These authors focus also on the nature of the methods adopted to extract high quality and rich information about a variety of processes in the CSCL setting. They develop a framework that is helpful to analyze different process dimensions of knowledge construction in CSCL. The multi-dimensional nature of the framework stresses the importance these authors attach to the validity of their approach when analyzing CSCL-contributions. Their approach introduces again a discussion about segmentation of the CSCL-discussions and the reliability of alternative approaches.

This special section concludes with a commentary article of Naidu and Jarvela (this issue). Their contribution builds on the different perspectives presented in the four articles, and clearly pinpoints the principal rationale of the special section. A reorientation in CSCL and content analysis research is needed. But the authors also end with a warning. They agree with the authors that combining multiple methodologies might be beneficial, but point at potential confusion due to the adoption of different epistemological positions.

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