

# Chapter 37

## Methodological Considerations for Quantitative Content Analysis of Online Interactions

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### ABSTRACT

*This chapter focuses on quantitative content analysis of online interactions, in particular, asynchronous online discussion. It clarifies the definitions of quantitative content analysis and provides a summary of 23 existing coding schemes, broadly categorized by the theoretical constructs under investigation: (1) (Meta) cognition, (2) knowledge construction, and (3) presence. To help interested researchers harvest the rich source of data in online communities, guidelines for using quantitative content analysis of online interactions were provided. In addition, important methodological considerations and issues were discussed, including the issues of validity, reliability, choice of unit of analysis, and latent versus manifested content.*

### INTRODUCTION

Content analysis as a research method has been reported since 1950s (e.g., Berelson, 1952). Beginning with journalistic and communication studies, it has penetrated into various fields of study. With recent development in virtual communities and proliferation of tools like Computer-Supported

Collaborative Learning (CSCL) technologies, we see new applications of content analysis for virtual communities, particularly through the use of asynchronous online discussions, which can function as a collaborative learning space where collaborative meaning-making is mediated through interactional dialogues and computer supports. Content analysis methods have been used in several research settings to examine different levels and structures of participation. Such content

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analysis research has provided useful insights as to how to better design online learning environments as well as to reveal the complex nature of online interaction. Yet, despite the long history of content analysis, its application for online discussion is fraught with methodological issues like validity (Rourke & Anderson, 2004), reliability (Strijbos, Martens, Prins, & Jochems, 2006) and lack of theoretical and empirical bases (De Wever, Schellens, Valcke, & Van Keer, 2006). Specifically, Quantitative Content Analysis (QCA), a research method of quantitatively describing the content of communication in a systematic objective way, has been criticized due to its lack of situated or contextual considerations, described as an attempt “to apply overly reductionist strategies to the study of a rather complex communication channel” (Naidu & Järvelä, 2006, p.98). It is thus timely to review content analysis as a method for analyzing online interactions.

In this chapter, we focus on quantitative content analysis of interactions using text transcripts commonly found in asynchronous online forums. The rationale of analyzing these text transcripts lie in the fact that the transcripts are legitimate source of data that offer a window to the cognitive processes involved in collaborative learning and that they are obtained through unobtrusive means (Chi, 1997; Weber, 1990). To help researchers harvest this rich source of data that are readily available in many virtual communities, we will provide some guidelines when using this method and highlight some methodological considerations and issues. In addition, we review and summarize some reported analysis schemes that might be useful to the researchers.

## **BACKGROUND**

In this section, we first review content analysis literature to clarify some fundamental concepts before describing some recent applications in asynchronous online discussion.

Just like in many fields of research, the key players in content analysis have different definitions of content analysis. The main contention lies in the debate about whether it is a quantitative or a qualitative method (or both). Researchers using or advocating quantitative content analysis method described the method as “objective”, “systematic”, and “scientific” (Berelson, 1952; Neuendorf, 2002; Riffe, Lacy & Fico, 1998). Neuendorf (2002, p.10), for example, offers the following definition: “Content analysis is a summarizing, quantitative analysis of messages that relies on the scientific method (including attention to objectivity-intersubjectivity, a priori design, reliability validity, generalizability, replicability, and hypothesis testing).” To Neuendorf (2002), qualitative methods like discourse analysis or conversational analysis should not be called content analysis because “content analysis has as its goal a numerically based summary of a chosen message set. It is neither a gestalt impression nor a fully detailed description of a message or message act” (p. 14).

On the other hand, Krippendorff (2004) takes an interpretive stance and regards content not as an inherent objective property in text, but subject to researcher’s interpretation with reference to a particular context. He defines content analysis in less absolute scientific terms: “Content analysis is a research technique for making replicable and valid inferences from texts (or other meaningful matter) to the contexts of their use.” (p. 18) Note that Krippendorff did not reject the use of quantitative data arising out of the coding; in fact, he included analytic techniques like factor analysis and multivariate analysis in his book. Rather, he emphasizes the epistemological nature of text interpretation that requires meaning making by the researcher, who needs to take into account the particular context, discourse and purpose of the communication. In this chapter, we concur with Krippendorff’s (2004) view that in content analysis, researchers need to interpret the meaning of texts and draw inferences to their chosen con-

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