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Multiple-documents literacy: Strategic processing, source awareness, and argumentation when reading multiple conflicting documents

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ABSTRACT

This study used think-aloud methodology to explore the strategic processing of 51 Norwegian undergraduates reading about an unfamiliar scientific issue in multiple conflicting documents presented in a Google-like environment. After reading, participants rated the trustworthiness of the sources and wrote essays on the issue. Findings indicated that students displayed reading behaviors falling in the main categories of identifying and learning important information, monitoring, and evaluating, with behaviors in all three categories involving the linking of information across different documents. Moreover, students' strategic processing while reading the documents was related to their evaluation of the trustworthiness of the sources and their inclusion of source citations in their essays. Specifically, more use of evaluation strategies was associated with less trust in biased and more trust in unbiased sources, and more use of evaluation strategies as well as cross-document linking strategies was associated with more explicit source citations and connections between sources and contents in the essays. Finally, students' strategic processing during reading was related to their written argumentation, with evaluating, monitoring, and cross-document linking positively related to argumentative reasoning about the scientific issue. We discuss how the findings may contribute to current theory on multiple-documents literacy and provide directions for further research in the area.

1. Introduction

Multiple-documents literacy concerns the ability to locate, evaluate, and use diverse sources of information for the purpose of constructing and communicating an integrated, meaningful representation of a particular issue, subject, or situation (Bråten & Strømsø, 2010). Long required in the document-rich professions of jurists, theologians, and historians, such literacy is currently required of all academics who want to keep abreast of and contribute to their fields of expertise. Moreover, with the information revolution of the last decades, students at different educational levels and laypersons out of school are increasingly required to handle and interpret multiple documents to learn about particular topics and take informed decisions in matters of personal and societal importance. Consider, for example, the layperson who enters cyberspace to find out whether her frequent headaches may be caused by her cell phone use. Although no time-consuming library visits and searches are needed, the layperson trying to clarify this issue may have a hard time sitting in front of her computer. Not only will she have to locate information sources that are useful and relevant for her purpose, she will also have to evaluate the trustworthiness of each source based on information about the source itself (e.g., the author or document type) and make sense of information sources that present conflicting views on the issue. Rather than insight, this situation may result in confusion or resignation; yet, the information richness provides unrivaled opportunities to construct a broad understanding and take a well-grounded decision. In many instances, however, such opportunities are lost because novices and laypersons lack the strategic competence needed to bridge conflicting perspectives and critically evaluate their own understanding as well as the sources they encounter (e.g., Brem, Russell, & Weems, 2001; Britt & Aglinskas, 2002; Maggioni & Fox, 2009; Stahl, Hynd, Britton, McNish, & Bosquet, 1996; Wineburg, 1991).

In the following, we discuss the documents model (Britt, Perfetti, Sandak, & Rouet, 1999; Perfetti, Rouet, & Britt, 1999), which describes the mental representations that may result when readers work with multiple documents on a particular issue. Then, we review prior research on strategic processes that may help readers construct those representations, also highlighting observed differences between more and less competent strategy users. Because our knowledge of students' strategic processing of multiple documents is still very limited, one purpose of this study was to further explore students' strategy use when reading about an unfamiliar scientific issue in multiple conflicting documents. Moreover, we wanted to explore to what extent strategic processing during reading may be related to essential components of the documents model, especially to individuals' awareness of information about the sources and their integrated representation of multiple perspectives on the issue. By doing this, we hoped to provide new knowledge about the types of processing that may contribute to the creation of the

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representational structures highlighted by the documents model and, thus, explain individual differences in essential 21st century literacy competence. Thus, our work extends prior research on individual differences in basic reading skills (Hulme & Snowling, 2009) as well as in reading comprehension (Cain & Oakhill, 2007).

1.1. The documents model

The documents model was originally proposed by Britt and colleagues (Britt et al., 1999; Perfetti et al., 1999) to describe the mental representations that likely result when good learners deal with challenging literacy tasks such as the one illustrated in the opening paragraph. The model extends Kintsch's (1988) theory of single-text comprehension, which assumes that meaning is mentally represented by a *textbase* and a *situation model*. While the textbase represents the text-internal meaning of the text, the situation model goes deeper and represents an interpretation of the situation described in the text, based on an integration of the text-internal meaning and relevant prior knowledge. The documents model assumes that two additional representations are required to describe the comprehension of multiple documents—the *intertext model* and the *mental model* (Britt & Rouet, 2012). These two models can be regarded as subcomponents of the documents model.

Essentially, the intertext model represents information about the sources themselves, including a "node" for each source that contains information about its author (e.g., motives, qualifications), form (e.g., type, date), setting (e.g., place, culture), and rhetorical goals (e.g., intent, audience). In the intertext model, source nodes are connected to document content, indicating, for example, that the reader remembers that a particular claim (content) was set forth by a particular author (source). In addition, source nodes are connected to each other through predicates such as "agrees with", "supports", or "opposes" (Britt et al., 1999; Perfetti et al., 1999). Presumably, these two types of intertext links (i.e., source–content and source–source links, respectively) make it possible to maintain a global, coherent understanding of an issue when conflicting claims or perspectives are presented in different documents. In such instances, knowing that opposing perspectives are according to authors with different motives (e.g., education vs. marketing) and different forms of sources (e.g., textbook vs. advertisement) enables the reader to accommodate the perspectives in his or her global understanding of the issue (Bråten, Strømsø, & Britt, 2009).

Given its relationship with Kintsch's (1988) theory, as well as its focus on reconciling different accounts of historical events or situations, the mental model was originally termed the situations model (Perfetti et al., 1999). By extending the documents model to the comprehension of multiple conflicting documents in other domains, including natural science, the general term "mental model" seems more appropriate, however (Britt & Rouet, 2012). The mental model refers to an internal representation that integrates semantic content across documents, for example, a coherent interpretation of a historical event described from different perspectives or a global, overarching understanding of a controversial scientific issue based on the reading of conflicting documents. Of note is that an adaptation of the documents model to other domains also involves that the mental model is typically organized around an argument schema rather than a narrative schema, which may be more suitable for event-based, historical content (Bråten, Britt, Strømsø & Rouet, 2011).

An argument consists of a main claim that takes a stance on a controversial issue, for example, whether cell phone radiation increases the risk of brain cancer, and supports this claim with at least one reason or piece of evidence (Toulmin, 1958). The statement, "use of cell phones can cause tumors in the brain (claim) because such tumors often occur in people who use their cell phones frequently (reason)", may illustrate a minimum argument. In an argument schema, the claim is pivotal and all other information is organized as support (reasons), opposition (counters), or limitation (qualifiers and rebuttals) for the main claim (Britt & Larson, 2003). Good arguments are expected to avoid one-sidedness and take into account competing or conflicting perspectives (i.e., counter arguments) and the evidence that support them (Britt & Rouet, 2012; Reznitskaya, Kuo, Glina, & Anderson, 2009; Wolfe, Britt, & Butler, 2009). Basing the mental model on an argument schema may be challenging for many readers, however (Kuhn, 2009; Larson, Britt, & Kurby, 2009; Wolfe et al., 2009), at least without some type of scaffolding support (Larson et al., 2009; Reznitskaya, Anderson, & Kuo, 2007; Wolfe et al., 2009). Please note that the documents model implies that interconnection between the intertext model and the mental model (i.e., source–content) links is a prerequisite for a full documents model (Rouet, 2006).

Of note is also that the original document model mainly concerned how multiple documents are mentally represented without paying much attention to the forms of strategic processing required to construct such representations. In the next section, however, we turn to work addressing strategic processes in multiple-documents comprehension.

1.2. Multiple-documents comprehension strategies

Text comprehension strategies may be defined as intentional attempts to control and modify meaning construction during text reading (cf., Afflerbach, Pearson, & Paris, 2008). Presumably, such strategies are particularly needed when individuals read multiple challenging, conflicting documents on a complex issue. In such a reading-task situation, readers themselves are the authors of the integrated documents model (Bråten, Britt, et al., 2011; Britt & Rouet, 2012). When there is a high amount of semantic overlap between documents, automatic, bottom-up resonance processes may drive integration (Myers & O'Brien, 1998; O'Brien & Myers, 1999); otherwise, top-down, strategic activity seems required to integrate information from multiple sources (Kurby, Britt, & Magliano, 2005). Also, an authentic, conflicting document set rarely includes explicit intertextual citations that tell individuals how to connect the documents. Multiple-documents comprehension, therefore, generally seems to require deliberate, goal-directed attentional, transformative, and integrative processing.

Prior research indicates that such processing may be challenging for many students. For example, Wineburg (1991), in a think-aloud study, observed that historians relied on "corroboration" to compare content across documents and examine potential discrepancies among them, "contextualization" to situate document content in a broad spatial–temporal context, and "sourcing" to note and use information about the author, document type, and place and date of document creation. Whereas historians used these strategies to piece together a coherent interpretation of an event described in multiple documents, also paying close attention to the different sources on which their interpretation was based, high-school students reading the same documents typically ignored source information and regarded the textbook as more trustworthy than all other sources. Moreover, students had difficulty resolving and even noticing discrepancies among sources.

Likewise, Stahl et al. (1996), who analyzed notes, and Maggioni and Fox (2009), who analyzed think-aloud protocols, observed that high-school students reading multiple history documents seldom used corroboration, contextualization, or sourcing. Maggioni and Fox found that students often treated the different documents as if they were paragraphs of a single document and extracted pieces of information from each document. Moreover, students did not check the sources of the documents and essentially treated them as authorless. In general, students did also not evaluate the trustworthiness of the sources or the contents of the documents in light of their sources. In fact, more than half of the students explicitly stated that using source information for interpretative or evaluative purposes was not helpful.

On a more optimistic note, Strømsø and colleagues (Bråten & Strømsø, 2003; Strømsø, Bråten, & Samuelstuen, 2003), using think-alouds, observed that some undergraduates used elaboration and monitoring strategies to construct an integrated representation during multiple-documents reading, and Wolfe and Goldman (2005), using