Fostering secondary-school students' intertext model formation when reading a set of websites: The effectiveness of source prompts

Yvonne Kammerer [a, *], Nina Meier [a, b], Elmar Stahl [b]

[a] Leibniz-Institut für Wissensmedien, Schleichstr. 6, 72076, Tübingen, Germany
[b] University of Education Freiburg, Kunzenweg 21, 79117, Freiburg, Germany

ARTICLE INFO

ABSTRACT

The present study examined whether a paper-based worksheet that provided source prompts fostered secondary-school students' intertext model formation, that is, their mental representations of sources and source-to-content links, in an Internet-reading context. In a classroom setting, $N = 45$ ninth-graders were tasked to read nine websites that differed in the type of source, in order to complete a worksheet with information from each site concerning an unsettled scientific issue. In addition to content information from the websites that should be filled into the worksheet, the worksheet provided source prompts to fill in website names and to classify the websites according to given source categories. To test the effectiveness of these source prompts, half of the students received a worksheet without such prompts. The study results indicate that students who had been working with the worksheet providing source prompts outperformed controls in their memory for sources, their discrimination between credible and less credible sources, and their mental representations of source-to-content links. To conclude, source prompts seem to be an effective way in supporting secondary-school students in the formation of an intertext model when reading a set of websites.

© 2016 Elsevier Ltd. All rights reserved.

1. Introduction

Offering a wealth of information on scientific topics, the Internet is increasingly being used by students to complete school assignments (cf. Julien & Barker, 2009; Kingsley & Tancock, 2014; Mason, Junyent, & Tornatora, 2014; Van Strien, Brand-Gruwel, & Boshuizen, 2014; Walraven, Brand-Gruwel, & Boshuizen, 2009). Information sources on the Internet, however, can vary widely in terms of their reliability and validity, as not only official institutions or scholars but also laypersons, journalists, or commercial information providers can publish information online. Hence, in order to avoid the formation of misconceptions based on inaccurate information, students need to consider information about the sources, e.g., about who provided the information and for what reason, and to integrate this source information into their mental representation of the Internet documents (Britt & Rouet, 2012). The purpose of the present study was to investigate the effectiveness of a paper-based worksheet intervention in supporting ninth-graders' reflection about and representation of sources in an Internet

---

* Corresponding author.
  E-mail address: y.kammerer@iwm-tuebingen.de (Y. Kammerer).

reading task. The worksheet that was implemented within a classroom context included written prompts to attend to and evaluate source information and to tag content for its source. Prompts in general are an instructional approach of providing scaffolds to execute certain strategies that learners already possess, but that they do not execute spontaneously (cf. Bannert, 2009; Glogger, Holzäpfel, Schwonke, Nückles, & Renkl, 2009).

1.1. The documents model framework

A theoretical framework that addresses the evaluation and representation of source information when reading a set of printed or digital documents is the documents model framework by Britt and colleagues (Britt & Rouet, 2012; Britt, Perfetti, Sandak, & Rouet, 1999; Perfetti, Rouet, & Britt, 1999; Rouet, 2006; Rouet & Britt, 2014). The documents model framework is an extension of the construction-integration model by Kintsch (1998) that describes how a reader constructs a mental representation of a single document. Britt and colleagues suggest that an adequate mental representation of multiple documents — in addition to the representation of the content of each single document − must include an additional layer, the *intertext model*. The intertext model contains document nodes and source-to-content links. Document nodes are a reader's mental representations of the documents' sources (i.e., source representations) and can include both objective information (e.g., the author's or the website's name) and evaluative information (e.g., suspected commercial interests) (Britt & Rouet, 2012). Source-to-content links are a reader's mental representations of which source says what. That is, through the construction of source-to-content links document nodes are connected to content, which allows qualifying content by its source (Britt & Rouet, 2012). In order to construct document nodes and source-to-content links (i.e., to form an intertext model) the reader needs to apply sourcing strategies. These include attending to and evaluating source information prior to or during reading of a document, interpreting contents based on source information, and tagging content for its source (e.g., Rouet & Britt, 2014; Strømsø, Bråten, Britt, & Ferguson, 2013; Wineburg, 1991).

1.2. Students' spontaneous reflection and evaluation of sources when reading multiple documents

Britt and colleagues (Britt & Rouet, 2012; Britt et al., 1999), however, do not expect every reader in every situation to form an intertext model. Instead they expect "students learning in school settings where they often see their task as one of learning about the topic" (Britt et al., 1999, p. 219) to rather generate a so-called *mush model* − especially if no prompts are provided to attend to sources. In such a mush model no source information but solely content information is mentally represented.

In line with this theoretical assumption, several empirical studies indicate that secondary- or high-school students and even university students only rarely attend to and represent source information spontaneously when reading multiple documents about historical or scientific issues (Britt & Aglinskas, 2002; Gerjets, Kammerer, & Werner, 2011; Kiili, Laurinen, & Marttunen, 2008; Maggioni & Fox, 2009; Metzger, Flanagin, & Zwarun, 2003; Nokes, Dole, & Hacker, 2007; Walraven et al., 2009; Wiley et al., 2009; Wineburg, 1991). In a thinking-aloud study, Maggioni and Fox (2009) found that high-school students working with multiple history texts mostly treated the presented documents as authorless and did not evaluate the documents' credibility, that is, the perceived ability (expertise) and intentions (trustworthiness) of the sources to provide accurate information (e.g., Danielson, 2006; Hovland, Janis, & Kelley, 1953). Further thinking-aloud studies by Kiili et al. (2008) with upper secondary-school students and by Walraven et al. (2009) with ninth-graders revealed similar results. The students mainly evaluated the online documents by content relevance, that is, whether or not the websites addressed the topic of their inquiry task. Results by Britt and Aglinskas (2002) also indicated a very low consideration of source information in high-school students when reading a set of history documents. Most students only rarely referred to the documents' sources in their notes taken during reading or in their post-reading essays and remembered only few sources correctly in a source-knowledge test taken after reading.

In contrast to students' detrimental spontaneous sourcing activities, Stadtler, Babiel, Rouet, and Bromme (2014) found that ninth-graders were well able to perform explicit sourcing tasks that required to identify sources in short news texts or to judge the sources' expertise. Furthermore, Keck, Kammerer, and Starauschek (2015) showed that secondary-school students expected information authored by an expert and presented on a university website as being of significantly higher quality than information authored by a high-school student and presented on a forum website. Similarly, Kammerer and Gerjets (2012a, 2014) showed in two studies that when high-school students were asked explicitly to judge the trustworthiness of different types of websites about a health-related topic, they were able to differentiate between a credible institutional website and less credible commercial websites. Still, they differentiated less between these websites in their credibility evaluations than university students (Kammerer & Gerjets, 2014).

In summary, although school students in principle might be able to identify and evaluate source information, without being prompted to do so, they seem to form only detrimental source representations and source-to-content links when reading multiple websites about historical or scientific issues. Thus, instructional approaches that prompt students to attend to and evaluate source information and to tag content for its source might be an effective way to promote the construction of an intertext model.