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Facilitating students' individual and collective knowledge construction through microblogs

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ABSTRACT

This paper reports on a microblog intervention that purports to prepare students to engage in rich, whole-class discussions. In this study, students ($n = 25$) used microblogs to summarise text information, which was then shared on tablets and a big projection screen in the classroom. We analysed individual preparations, participation in teacher-led whole-class discussion, and performance on a research-developed intervention. The context for the study was a history class exploring the topic of democratic development and the role of ideologies in Europe prior to the First World War. We employed descriptive quantitative analysis to understand students' outcomes, and contrastive case analysis to trace four representative students' trajectories of participation across classroom activities. Students' engagement varied, and the differences transcended the activities in which they took part. Even though some of the students did not use the microblogs, the technology-supported whole-class discussion encouraged learning for even reluctant bloggers. We saw these gains in reference to students' ongoing interpretations shared through microblogs during the whole-class discussion.

1. Introduction

Students encounter increasingly complex tasks, topics, and types of texts as they progress through school, and the demands on them as individual readers continually grow. Research has shown that students struggle to understand and integrate information across texts, whether these texts are on-line or off-line (Strømsø & Bråten, 2013), and that Internet access can intensify differences between individual students (Goldman, Braasch, Wiley, Graesser, & Brodowinska, 2012; Hartley & Bendixen, 2001). When students are on-line, they have access to information, news, games, and social media. While some stay focused and work effectively on their own, others struggle. Similarly, students may engage in off-task on-line activities, such as copying and plagiarism, when computers are in the classroom (Rasmussen, 2009; Blikstad-Balas, 2012). Fortunately, it is also well documented that technology may facilitate students in their learning processes (Rasmussen & Ludvigsen, 2010; Mercer & Littleton, 2007; Linn & Eylon, 2011; Mercer, Hennessey, & Warwick, 2010). Since today's powerful technologies provide both opportunities and challenges, and are in constant flux, educators must continually revise their approaches for making productive use of technology across traditional boundaries, ensuring that they support individuals who struggle to work on their own and take part in class.

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The present study draws on a tradition in intervention research that uses research findings to inform designs of new technologies that support students' learning or improve existing classroom practice (Brown, 1992). We have designed an app called *Socius*,[1] with two aims in mind. The first is to help students engage deeply with the content by providing them with opportunities to summarize or reduce text information (in microblogs). The second is to help students engage in whole-class discussion and joint knowledge construction supported by the teacher. This second goal leans heavily on the technological infrastructure of the app. The blogs written by students on tablets can also appear on a big projection screen via airplay. This sharing allows teachers to help guide their students' construction of knowledge productively (Britt & Sommer, 2004; de Jong & Jules, 2005; Mercer et al., 2010). Microblogging is increasingly popular and we believe students were familiar with the short message format and the optional use of hash-tags from services such as Twitter. The microblog format also has the potential to encourage participation, even of students who may not otherwise be active in class (Gao, Luo, & Zhang, 2012).

We conducted this study in an ordinary history class in a Norwegian senior high school (25 students; age ranges from 17 to 18 years old). The main learning activities were individual preparation and whole-class discussion. It is important to emphasize that the research and development team did not take part in organizing or delivering the instructional activities. The teacher appropriated the tool as he found best. In this way, we separate the intended design from the enacted design. This distinction is central in securing the ecological validity of design-based research.

In the current study, we examined how student participation in different types of activities contributed to their construction of knowledge. We explored the ways in which the intervention, *Socius*, prompted students to engage more deeply with the subject content in a normal classroom setting with no direct impact of the research or design team.

1.1. Reading and the construction of deep understanding

Reading comprehension is crucial in today's information-dense society, but students often struggle to integrate information – both within a single text and across texts – by determining what is important, useful and so on (Strømsø & Bråten, 2013; Steffens, Britt, Braasch, Strømsø, & Bråten, 2014). Students construct a deeper understanding when they actively engage with information in the texts and also when they bring in what they already know (Goldman et al., 2012; Hagen, Braasch, & Bråten, 2014). Learning from reading is a process of active construction rather than of passive acquisition (Bransford, Brown, & Cocking, 1999). Note-taking is also an active process and can be beneficial for learning. Researchers have identified strategies that are more and less productive in relation to individual knowledge construction from note-taking. For example, Goldman et al. (2012) found individual differences as reported in think-aloud protocols, showing that high performance learners selected trustworthy texts and summarised information within and across texts, whereas the low performing students tended to repeat or closely paraphrase the information in the texts that they read. Similarly, Brown and colleagues' classic studies describe strategies such as writing the essence of the text in one's own words or reducing text information (for example, by identifying key terms) as productive, while copying and paraphrasing are described as less productive (Brown & Day, 1983; Brown, Day, & Jones, 1983). Hagen et al. (2014) found that copying or paraphrasing was related to a poorer understanding of multiple texts, and that high quality elaborative notes were related to better understanding.

Observations of individual students' use of the Internet in school tasks confirm that copying and paraphrasing is widespread, and it is commonly argued that copying is a simpler strategy because it does not require the same effort as attempts to summarise and integrate information (Scardamalia & Bereiter, 1996; Furberg & Rasmussen, 2012; Blikstad-Balas, 2012). Deep understanding is related to elaboration of what is already written in the texts, and to active connection both between and within texts. Students who make use of these strategies seem to be aware of what they are doing and why they are doing so (Hagen, 2012). This seems to apply not only to reading but also to note-taking (e.g. Britt & Sommer, 2004; Hagen, 2012; Hagen et al., 2014; Kobayashi, 2009).

Importantly, Brown and Day (1983) argued that the ability to discriminate between mere trivia and important information is a late-developing skill. They reported that younger pupils and even novice college students often rely on the simpler strategies. Other studies have shown that expert readers in different domains (e.g. history, mathematics, and chemistry) use different strategies when they construct knowledge from texts (Shanahan, Shanahan, & Misischia, 2011). A rich tradition of cognitive research demonstrates how experts in a domain make sense of information differently from beginners (e.g. Chi, Glaser, & Farr, 1988; Ericsson & Smith, 1991). Whereas beginners often focus on facts, experts regard evidence presented in texts as more than a list of facts (Wineburg & Fournier, 1994). These findings strongly suggest that strategy use is a skill that takes time to develop and that is domain- and topic-bound.

Fig. 1 summarises how we understand the development of student strategy use: from a less productive approach (focused on fact finding) to deeper engagement related to productive elaboration and integration across multiple sources (Scardamalia & Bereiter, 1996). Several researchers agree that the character of the subject or learning domain has implications for how students should work with the content and that more research on *in situ* learning strategies in specific subject domains is needed (e.g. Galloway, Lawrence, & Moje, 2013; Pellegrino & Hilton, 2012; Schunk, 2005: 297). The present study aims to do this. We follow a sociocultural view of learning where mediational means, such as historically developed practices, languages, and technologies are seen as part of what structures the ongoing subject activities (Mercer, 2013; Säljö, 2010; Vygotsky, 1986; Wells, 1999).

[1] *Socius* is available in the App Store.