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Comparing the use of a social annotation tool and a threaded discussion forum to support online discussions

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ABSTRACT

This study aimed to understand how a threaded forum and asocial annotation tool, Diigo, supported online discussions. Forty-five pre-service teachers in two sections of an undergraduate course participated in two online discussion activities. A crossover study was conducted to examine student participation and interaction, and students' perceived learning experience in the two environments. In the first activity, students in Section A used Diigo for the online discussion while students in Section B used a threaded discussion forum. In the second activity, the two sections switched their online discussion environments. A participatory survey was administered at the end of the study. Postings in the two activities were analyzed and compared in terms of participation, focus, and interaction types. The results indicated that the different design of the two activities and the different functions of two environments impacted student participation, knowledge construction processes, and the foci of discussions. Social annotation tools could be used as an alternative environment to encourage certain types of interaction during online discussions.

1. Introduction

Asynchronous online discussion environments, such as threaded discussion forums, are commonly used in higher education to support various collaborative learning activities in both hybrid and online courses. They allow learners to participate in discussions without the limits of time and space (Author, 2013). In addition, because the communication is asynchronous and text-based, participants have more time to ask questions, reflect, and interact with each other, which provides potentials for higher-order thinking and in-depth discussions (Collison, Elbaum, Haavind, & Tinker, 2000; Garrison, Anderson, & Archer, 1999; Yang, Yeh, & Wong, 2010).

Despite the wide use of threaded discussion forums for online discussions, some researchers have questioned their effectiveness in supporting coherent and interactive dialogues, which are essential for collaborative knowledge construction (Thomas, 2002). Knowlton (2001), for example, pointed out digressions that occurred during online discussions in threaded forums prevented students from reaching incisive understanding of learning materials. Therefore, it is worthwhile to explore alternative online discussion environments that may address the disadvantages of threaded discussion forums. The purpose of this study is to examine a social annotation tool as an alternative environment to support online discussions and to identify the types of online discussions that may be better supported by such a tool.

1.1. Online discussions in threaded discussion forums

Online discussions play an important role in student learning in both hybrid and online courses. In a threaded forum, participants can initiate a thread of discussion as well as browse or reply to existing threads. In most forums, discussion threads are presented in a chronological order, that is, the thread that receives the latest reply automatically goes to the top of the forum.

Research has showed that online discussions in threaded discussion forums can improve students' perceived learning (Wu & Hiltz, 2004) and enhance students' academic performance (Althaus, 1997). In addition, online discussions can promote higher-order thinking and critical thinking skills when discussion activities are properly designed (Larkin-Hein, 2001; Swan et al., 2000). However, online discussions in threaded discussion forums have several disadvantages.

Author (2013) pointed out three major constraints of threaded discussion forums when used to support online discussions: (1) difficulties in keeping the discussions focused because of the chronologically organized structure (Herring, 1999; Hewitt, 2001; Lambiase, 2010); (2) inefficiency in promoting interactive dialogues because of the poorly interrelated structure of postings (Hewitt, 2001; Thomas, 2002); and (3) difficulties in synthesizing ideas because of the hierarchically structured threads (Hewitt, 2001; Rourke & Kanuka, 2009). As the argument

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goes, although threaded discussion forums support online interactions among participants, the chronological and hierarchical structure fails to show the interrelationships of postings or the importance of threads, which may prevent effective discussions from happening.

1.2. Learning with social annotation tools

Social annotation tools allow people to mark webpages or online materials and leave comments. Users can access annotations via multiple devices and share annotations with others (Glover, Xu, & Hardaker, 2007). Researchers have explored the possible educational values of social annotations in higher education, and used social annotation tools in various learning tasks such as information searching, peer critique, reading comprehension, and online collaborative learning.

A number of studies, for example, examined the use of social annotation tools for collective information searching, where learners used social annotation tools to bookmark and share webpages. Studies showed that students perceived the use of social annotation tools as enjoyable (Kawase, Herder, & Nejdl, 2009; Lin & Tsai, 2011). In addition, in their study, Kawase et al. (2009) found that the social annotation tool helped students to find the needed information in a significantly shorter time than the Internet search engine tool and the social bookmarking tool.

Some researchers have focused on the effectiveness of social annotation tools on promoting students' reading abilities. Studies showed that students' reading comprehension abilities improved significantly when students used social reading annotation systems in both first language (Chen & Chen, 2014; Yang, Yu, & Sun, 2013) and second language reading activities (Chen, Wang, & Chen, 2014). Other than reading comprehension abilities, social annotation tools also helped students improve reading strategies (Chen & Chen, 2014), annotation abilities (Chen et al., 2014), and high-level cognitive abilities (Yang et al., 2013).

Due to the interactive nature of social annotation tools, researchers have also used them for peer review and other collaborative learning activities. Mendenhall and Johnson (2010) used HyLighter, a social annotation system, to support peer critique activities among students. Participants reported that the social annotation system provided a supportive environment for the peer critique process by allowing them to easily access annotations linked to specific parts of the writing. Nokelainen, Kurhila, Miettinen, Floreen, and Tirri (2003); Nokelainen, Miettinen, Kurhila, Floréen, and Tirri (2005) found that students' self-rated level of motivation on learning was positively related to their final grades when using EDUCOSM, a social annotation tool, for collaborative learning. Researchers studied the use of another social annotation tool, Vpen, to support online material reading and the results showed that participants who used Vpen learned significantly better than those in who did not in both individual and collaborative learning scenarios (Hwang, Wang, & Sharples, 2007; Su, Yang, Hwang, & Zhang, 2010).

Research has showed that collaboration plays an essential role in improving students' learning outcomes when social annotation tools are adopted. Johnson, Archibald, and Tenenbaum (2010) found that students who worked collaboratively using HyLighter had significantly greater gains in reading comprehension and meta-cognitive skills than students who worked individually. Li, Pow, and Cheung (2015) reported that group collaboration was contributive to fostering high-level cognitive and metacognitive learning when students used a social annotation tool for a group inquiry learning project. Yang et al. (2013) found that collaborative annotation in an elementary school reading class helped students develop high-level cognitive abilities.

1.3. Possible use of social annotations as an alternative online discussion environment

In general, previous research has showed that social annotation tools have the ability to support interactions and collaborations among learners in various learning activities, and make learning processes fun and enjoyable (Hwang et al., 2007; Su et al., 2010). It is argued that social annotation tools may support quality discussions over online materials because (a) social annotation tools allow users to digitally mark online materials and make on-location notes; and (b) users are able to share notes with group members and comment on each other's notes. As a result, social annotation tools provide a good support for group interactions and dialogues. While most social annotation related research focused on its effectiveness on promoting learning achievements, limited research has explored how it supports learners' dialogues and interactions as compared to other online discussion environments.

A few studies have been done exploring the potentials of using social annotations as an alternative online discussion environment. Author (2012) found that Diigo, a social annotation environment, encouraged active participation from learners and supported collaborative knowledge construction. In a follow-up study, Author (2014) examined how students chose between a social annotation tool and a threaded discussion forum for a particular learning task. In this exploratory study, ten graduate students participated in an online discussion and had the freedom to post in either or both of the two environments. The results showed that the students believed the social annotation environment had the advantage of linking a discussion to specific contents on webpages, while the threaded discussion forum was more suitable for summarized comments.

1.4. Research questions

Although efforts have been made to understand online discussions in social annotation environments, few studies have examined if students participate in online discussions differently in threaded discussion forums and in social annotation environments. To explore the types of online discussions that may better be supported by each environment and provide insights on the design of online discussion based learning activities, it is necessary to understand the possible differences of students' participation as well as the affordances and constraints of both threaded discussion forums and social annotation tools in supporting online discussions. Thus, we attempt to address the following research questions in the present study:

1. Do students participate and interact differently when having online discussions using a threaded forum and a social annotation tool? If so, what are the differences?
2. Do students perceive their learning experience differently when having online discussions using a thread forum and a social annotation tool? If so, what are the differences?

2. Methods

2.1. Participants and settings

Participants of this study were 38 female and 7 male pre-service teachers in two sections of an undergraduate course titled Technology Integration in the Classroom in a North American university. There were 23 students in Section A and 22 in Section B. The two sections of the same class had different class meeting times, but the same instructor, syllabus, and curriculum. Students were free to choose either section based on their personal schedules. The course aimed to acquaint students with commonly used technological applications in the classroom. Students and the instructor met face-to-face twice every week.

2.2. Tools

A social annotation tool named Diigo (www.diigo.com) and the threaded discussion board in Blackboard were used as online discussion tools in the study. Diigo is a free online social annotation tool that allows users to mark online materials or webpages, leave comments, and share