

Discussion Processes in Online Forums

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INTRODUCTION

Using online discussions to facilitate learning is a major issue in information science and technology, especially with the increasing number of massively open, online courses (MOOCs). Online discussions involve a group of participants exchanging ideas by posting messages on an electronic medium (e.g., discussion forum, knowledge building environment). Due to its information transparency, communication flexibility and opportunities for reflection, online discussions in both independent forums and forums linked to school courses offer students additional opportunities for information processing, higher order thinking and learning (Chen, Chiu, & Wang, 2012a, 2012b; Gillani & Eynon, 2014; Qiu & McDougall, 2013).

However, an online discussion forum does not necessarily guarantee engagement, effective interactions or substantial learning (Hew & Cheung, 2014). For instance, despite the widespread use of MOOC forums, often only a small proportion of the students are active participants (Onah, Sinclair, & Boyatt, 2014).

This article discusses the advantages and disadvantages that online discussions offer compared to face-to-face discussions. Specifically, individual characteristics and message attributes can influence participants' thinking and social relationships (Chen et al., 2012a, 2012b). By understanding the discussion processes through which students create new ideas and develop social relationships in online forums, designers can improve online forum interfaces. Likewise, educators can capitalize on this information to

help students participate, cooperate and learn in online forums more effectively.

BACKGROUND

While online discussions have several advantages over face-to-face discussions, they also have some drawbacks. Online discussions' advantages include information transparency, communication flexibility and reflection opportunities. As online messages are explicit, relatively permanent and organized, they are more transparent than face-to-face talk. Online messages are written explicitly and stored, so group members and teachers/facilitators can access them later. Furthermore, authors can organize online discussion messages to highlight their relationships to other messages by responding along a specific thread or via quotes of previous messages (Chiu & Chen, 2013). The interface designs of some online discussion forums constrain each message to respond to a single previous message, which helps establish clear connections and avoid ambiguous relationships among messages. Readers who heed these explicit relationships can read the related messages in the authors' preferred sequence, which can facilitate their understanding of the messages' content.

As a result of their greater permanence, online discussions offer greater communication flexibility across time and space compared to face-to-face discussions. Face-to-face discussants must be in the same place at the same time to engage in a shared conversation. In contrast, synchronous online discussants can communicate with one an-

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other from any location. In asynchronous forums, participants can review the relevant information or post messages at any time from any location.

Moreover, the greater permanence of online discussions also allows participants to take more time to reflect before responding, in comparison to face-to-face discussions, especially during asynchronous discussions (Hew, Cheung, & Ng, 2010). During face-to-face discussions, people respond in real time to one another, so they are less likely to spend much time editing their responses. In contrast, posting asynchronous, online discussion messages on a permanent online forum provides convenient access to participants, so they can spend minutes, hours, even days gathering more information from other sources, contemplating their relationships, and evaluating competing claims and justifications before writing a suitable response.

Online discussions also have some disadvantages compared to face-to-face discussions. For example, face-to-face discussion participants can use nonverbal facial expressions and social cues to clarify and reinforce their meaning. In contrast, online discussion participants cannot use them, which can lead to misunderstandings among participants (Walther, Loh, & Granka, 2005). Also, while multi-threaded discussions allow greater time flexibility, their demands are also less immediate. As these students do not need to respond immediately, they are more likely to ignore the messages and not respond at all (Hewitt, 2005; Thomas, 2002). Instead, they may initiate off-topic discussions (Wu & Hou, 2015). As participants can respond later, the group often requires more time to make group decisions, which can reduce their efficiency (Baltes, Dickson, Sherman, Bauer, & LaGanke, 2002).

Online discussion forums can be independent or linked to school courses. An independent academic forum is a bulletin board on a specific subject (e.g., high school geometry) but not related to any class or school. In such forums, peers communicate with one another as they wish, without instructor moderation or inference (Chen, 2004;

Chen & Chiu, 2008). In a course-related forum (e.g., a MOOC) however, an instructor may structure, scaffold, or moderate the discussions (Coll, Rochera, & de Gispert, 2014; Park et al., 2015).

ONLINE DISCUSSION PROCESSES

Like face-to-face discussions, online discussions include both problem content and social relations (Chiu, 2008). This section explicates the processes by which online discussants create correct, new ideas (micro-creativity) and develop social relationships. First, a theoretical framework characterizes online discussions at the message level, including a message's content and author. Then, it shows how specific message attributes and individual characteristics influence participants' micro-creativity and use of social cues during online discussions. By understanding students' micro-creativity and uses of social cues during online discussions, educators can help students engage in beneficial discussion processes that improve cognitive outcomes and positive social relationships.

Characterizing Online Discussion Messages

An online discussion message can be characterized along four dimensions: knowledge content, social metacognition, social cues, and individual characteristics (See Table 1; Chen & Chiu, 2008; Chiu & Chen, 2013; Hara, Bonk, & Angeli, 2000; Wong, Pursel, Divinsky, & Jansen, 2015).

As acquiring useful information is often a key discussion goal, the knowledge content dimension characterizes the information displayed regarding the focal topic: new ideas, old repetitions, and null content (Chiu, 2000). The validity of an idea is clear in some contexts (e.g., arithmetic), but not others (e.g., poetry). A justification provides evidence, an explanation or citation of an authority to support the validity of an idea (e.g., Neuman, Leibowitz, & Schwarz, 2000). Online discussants

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