Investigating the Effects of Messaging on Students’ Asynchronous Threads

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Abstract
While the independent contributions of synchronous and asynchronous interaction in online learning are clear, comparatively less is known about what happens when both modes are available in the same environment. In this study, we examine relationships between students’ use of asynchronous discussion forums and synchronous personal messages (PM). We find that the most active forum-posters are also the most active PMers, suggesting that PMing is not reducing their contribution to public discourse. Additionally, we find that frequent PMers are less likely to rapidly scan forum notes, and that they spend more time online than those who make less use of PM.

Objectives
Although research so far has clearly described the advantages and disadvantages of using synchronous or asynchronous tools in online learning environments, the online learning literature lacks studies investigating the pedagogical outcomes when synchronous and asynchronous technologies are converged. There are very few studies that have explored students’ behaviors when both communication tools are employed concurrently. When such studies do exist, they tend to focus on the media itself, rather than its pedagogical role (Chen, Liu, & Wong, 2007). It is not enough to assume that the combination of synchronous and asynchronous media carries the benefits of each type of media in isolation. In particular, we need to know how individuals’ synchronous communication affects their asynchronous threaded discussions if we are to identify the pedagogical benefits and pitfalls of using a synchronous tool within an asynchronous online learning environment. This study examines patterns of use of messaging within an asynchronous online environment in order to better understand this relationship.

Background and Perspectives
Our perspective is based on the social-constructivist notions that learning in online contexts is a social activity by which meanings are constructed through communication, collaborative activity, and interactions with others (Swan, 2005). Given the educational importance of these processes, whether different communication tools could support each other and foster participation in the greater course context becomes critical. The importance of student participation in educational settings is often emphasized in the literature (Hrastinski, 2006).

The dominant form of communication in online courses involves asynchronous communication through a threaded discussion board (Kuyath, 2008; Rockinson-Szapkiw, 2009). Many researchers argue that asynchronous communication affords in-depth and thoughtful discussions (e.g., Branon & Essex, 2001; Dede & Kremer, 1999; Tu & Corry, 2003). However, the literature also
reports limitations associated with asynchronous communication: lack of immediacy, the extended time necessary for discussions to be fruitful, and a sense of isolation (Branon & Essex, 2001; Romiszowski & Mason, 2004). Synchronous communication, on the other hand, has been associated with a sense of immediacy and sense of community (Hines & Pearl, 2004). Compared to asynchronous discussion, synchronous discussion involves a much faster exchange of ideas, and facilitates the transmission of short messages in addition to content-laden messages (Dudding & Drulia, 2009). However, its capacity to support learning practices has been questioned: meeting times must be pre-arranged, and students may in some cases feel inhibited from contributing to discussion (Contreras-Castillo, Favela, Perez-Fragoso, & Santamaria-del-Angel, 2004). It is evident that both communication types have different strengths and weaknesses, and that they can productively be employed for different learning practices. Indeed, this argument pervades much communication media literature. Two frequent study designs include those that compare synchronous tools with asynchronous tools (e.g., Abrams, 2003; Hines & Pearl, 2004; Hrastinski, 2006; Ligorio, 2001), and those that investigate either synchronous or asynchronous tools for online discussions separately (e.g., Burnett, 2003; Dickey, 2003; Kear, 2004; Shotsberger, 2000).

A further consideration is the fact that synchronous tools, such as IM, can be used asynchronously: we may not respond immediately to or notice a message we receive by IM. Similarly, asynchronous tools, such as a discussion board, can be used synchronously if people happen to be online at the same time. For this study, we added an instant-messaging-like tool (called private messages) to an otherwise traditional asynchronous online learning environment. The key difference between a PM and an asynchronous note is that a PM is directed to one (or more) participants, whereas an asynchronous forum note is viewable by all. Both the PM and asynchronous communication facilities are embedded within the same environment.

**Data and Methods**

We investigate whether using our PM tool affects students’ asynchronous learning behaviors. In particular, we focus on students’ writing, reading, and responding, since much literature bestows the benefits of asynchronous communication on these behaviors (e.g., Johnson & Aragon, 2003; Hiltz & Wellman, 1997; Morse, 2003). We additionally use a particular reading metric, scan rate, (Hewitt, Brett, & Peters, 2007), to help us distinguish careful reading of notes from more superficial skimming. A student is said to scan a note when they read that particular note at eight words per second or more (see Hewitt, Brett, & Peters, 2007 for more information on the metric). Looking across several reading and writing practices, we analyze the relationships between what students do using PM and what students do using asynchronous notes.

We collected data from 9 online graduate education courses that took place between September 2010 and April 2011, in a large northeastern North American research university. All courses were conducted in our in-house online learning environment. The environment contains two
communication modes. First, students may read and write public notes in a weekly conference space. Second, students may send private messages to one or more course participants. To understand the nature of the use of personal messages, we analyzed automated tracking data provided by the course environment.

**Results**

We found that 83.67% of PMs were directed to students, while only 16.33% were directed to teachers. Results further demonstrate that there is a strong correlation between average number of PMs and average number of notes (r=0.6) and average length of PMs and average length of notes (r=0.71).

To better understand whether students use PMs differently from asynchronous notes, we ran a series of two-tailed t-tests (alpha level 0.01). We compared PM messages with asynchronous notes across a number of measures including vocabulary (through the Academic Word List, which contains the most frequent words that appear in academic texts but not other texts), Grade Level, and Reading Ease. The results indicate that student’s PMs are significantly different from notes for each of these measures (AWL: t=22.73, p<0.01; GL: t=27.32, p<0.01; Ease: t=5.88, p<0.01). Table 1 provides detailed results. This suggests that the writing style and function of PM’s are different from that found within the shared discussion entries.

<table>
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<tr>
<th></th>
<th>Means</th>
<th>t value</th>
<th>p</th>
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<tbody>
<tr>
<td></td>
<td>PM</td>
<td>Notes</td>
<td></td>
</tr>
<tr>
<td>AWL (average per note)</td>
<td>18.84</td>
<td>1.23</td>
<td>22.73</td>
</tr>
<tr>
<td>GL</td>
<td>4.3</td>
<td>10.41</td>
<td>27.32</td>
</tr>
<tr>
<td>Ease</td>
<td>67.95</td>
<td>55.76</td>
<td>5.88</td>
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We also analyzed whether the use of PMs makes any difference in writing, reading, responding, and scanning behaviors in the courses generally. We selected 50 students that used PMs actively and 50 students that did not use PMs at all or used them very infrequently. The t-test (alpha level 0.05) results indicate that students using PMs have significantly different writing, reading, replying, and scanning behaviors in their asynchronous entries. We found that students write more entries (t=5.15, p<0.05), write longer entries (t=3.8, p<0.05), read more entries (t=5.69, p<0.05), send more replies to their peers (t=4.84, p<0.05), receive more replies from their peers (t=5.16, p<0.05), scan less (t=2.51, p<0.05), and spend more time online (t=5.26, p<0.05). Table 2 shows the results in detail. The higher levels across these measures found among the most active PM users suggests that these, very engaged students, use all the functionality available to them in the online context and thereby increase the overall interactivity in the course.
Table 2: Comparison of most active students with least active students

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<th>Means</th>
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<tr>
<td></td>
<td>50 Most Active</td>
<td>50 Least Active</td>
<td></td>
</tr>
<tr>
<td>Notes Written</td>
<td>80.6</td>
<td>35.3</td>
<td>5.15</td>
</tr>
<tr>
<td>Words Written</td>
<td>12383.26</td>
<td>5621.08</td>
<td>3.8</td>
</tr>
<tr>
<td>Notes Read</td>
<td>964.38</td>
<td>456.04</td>
<td>5.69</td>
</tr>
<tr>
<td>Replies Sent</td>
<td>63.96</td>
<td>25.96</td>
<td>4.84</td>
</tr>
<tr>
<td>Replies Received</td>
<td>64.5</td>
<td>24.74</td>
<td>5.16</td>
</tr>
<tr>
<td>Scan Rate</td>
<td>21.2582</td>
<td>28.7406</td>
<td>2.51</td>
</tr>
<tr>
<td>Time Online (Hours)</td>
<td>59.6</td>
<td>23.1</td>
<td>5.26</td>
</tr>
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Discussion and Conclusions

While this is a single study investigating a fairly new question in the online learning literature, the results indicate that introducing an additional personal message function into the asynchronous course environment can have positive effects.

The strong correlation between levels of personal messages written and asynchronous notes written suggest that these are very engaged students who are taking advantage of the affordances of personal messages in order to participate in new ways. This is an important finding: one could imagine a new means of communication within the course environment "distracting" students away from the public, shared space. Our results suggest that this fragmenting and privatizing does not seem to occur. A significant relationship between the number of PMs and the number of asynchronous notes might also suggest that the personal nature of messaging increases the sense of community among class participants and encourages more interactivity. The higher level of replies both sent and received by the most active personal message users are two indicators that support such a hypothesis.

The specific role played by PMs varies per course. Some instructors, for example, send introductory PMs to students to help get them started with a course. Students use the tool to coordinate group activities or privately discuss course-related material. Regardless of motive, our data suggest that personal messages are a useful addition to the asynchronous discussion context for both instructors and students. Having PMs available within the course context seems to positively change the distribution of writing, reading, and replying contributions of students. Such an interpretation would allow us to argue that the messaging interactions may support the ongoing asynchronous learning activities of the courses and appears to be a productive addition to the course
environment. Another important finding is that the average scan rate is lower for the most active PM users. Thus, even though they are spending more time online, they are reading not just more entries, but more entries more thoroughly. This finding supports the notion that the PM users are very engaged in the course process.

**Scholarly Significance**

The significant differences found in measures of the average number of academic words per message, grade level, and reading ease suggest that students use personal messages differently and perhaps more casually compared to discussion entries. However, more qualitative data is needed to clarify the precise nature of the differences. While we have not qualitatively investigated this issue to date, data gathered from informal student focus groups and online comments suggest that students feel a need for personal interaction within the online course to facilitate particular types of tasks and consolidate the sense of community within the class. Personal messages appear to offer a space for social exchanges, some personal questions, and feedback from other participants and the instructor(s).

What we do not yet know from these data is how students understand the role of personal messages and how they see those messages in relation to the asynchronous tools. Accordingly, our next iteration of this research will involve content analysis of personal messages and a series of interviews with students from courses with a range of instructors. As well, we will interview instructors to find out how they see the pedagogical role of PMs in their particular courses, and how this instructional focus may in turn impact student use and attitudes towards messaging.

**References**


