Exploring Revisiting in an Online Collaborative Learning Environment (2006 words)

Abstract (103 words)
As online course offerings rise exponentially, and new technologies offer comprehensive tracking of online activities, examination of measures like rereading or revisiting become increasingly important. This study looks at the educational value students find in revisiting other’s entries in online collaborative discussions. Data suggests that amounts of, and purposes for, revisiting vary with overall levels of reading and writing participation. We identified 3 clusters based on online activity and describe the characteristic activity patterns for each. We also found a positive relationship between revisiting and learning outcomes and describe the characteristics of highly revisited entries. Implications for instruction and for further research are discussed.

1. Objectives
In light of the increased offerings of online learning courses recent research in online learning has started to investigate more deeply the role of reading and revisiting entries in online collaborative discourse to develop a more comprehensive understanding of how online reading activities may contribute to learning (Wise, Marbouti, Speer & Hsiao, 2011; Wise, Marbouti, Hsiao & Hausknecht, 2012a; Brett & Wilton, 2013; Hewitt, Brett & Peters, 2007; Qiu, Hewitt & Brett, 2012). In this paper we build on this earlier work by looking specifically at the role of online revisiting patterns of graduate students in fully online courses. Revisiting may be a potential indicator of important elements of learning. For example, entries that are revisited a lot may signify important or useful content and rereading may be a useful indicator of where student attention is focused within the course conference. In addition, revisiting may also indicate points where students are either struggling with, or focusing on, particular ideas. Understanding rereading may therefore provide important information for instructors about levels of student understanding (Wise, Perera, Hsiao, Speer & Marbouti, 2012b).

2. Perspectives and theoretical framework
Participatory activity is viewed by sociocultural theorists, including Vygotsky (1986), Wenger (1998) and Lave & Wenger (1991), as the central mechanism for learning. Learner participation in online learning environments has long been considered an important element supporting learning in such environments (e.g. Hrastinski, 2008; Rovai, 2002; Swan, Shea, Fredericksen, Pickett, Pelz & Maher, 2000). However, participation has largely been defined in terms of written participation in discussion—sometimes in terms of quantity—such as number of messages, and in other instances looking at frequencies of units such as words and phrases or ideas (Hakkarainen & Palonen, 2003). Other studies have looked at quality of posts within classification schemes such as asking questions, providing information, etc. (e.g. Carr, Cox, Eden & Hanslo, 2004). Measures of participation such as learner perceptions, message length, or logins are also frequently used, however one of the less used measures is that of reading messages. In fact a review by Hrastinski in (2008) found only 3 studies that used reading (defined as opening posts)
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as a measure. Online reading, when it has been researched, has been conceptualized variously as an indicator of online engagement (Brett, 2004) and as an element of online listening (Wise et al., 2011; Wise et al 2012a). Online reading has been measured through metrics such as scan rate (Hewitt, Brett & Peters, 2007), or note opening, and “online listening” (which posts students attend to, when and how) (Wise et al., 2011; Wise et al.,2012a).

Literature taking a broadly social constructivist stance has long emphasized the importance of discourse and collaboration to learning (e.g. Garrison, Anderson & Archer 2000; Harasim, 2012; Swan & Shih, 2005). Generally described, learners build upon their own reflections and the opinions of others by engaging in online dialogue. This process is believed to contribute to the individual’s processing of material. Such research has influenced the design of online learning courses that typically value online discussions, particularly written postings. Often instructors provide some portion of grades based on such evidence. It seems clear that discussion-based learning in an online environment involves reading others’ postings. However, student reading and rereading of others’ responses typically appears to be assumed rather than tracked specifically and thus there has been a lack of investigation of the potential importance to learning of reading other students’ postings.

Reading may be less studied because it has been harder to accurately measure and because it is less visible to the instructor. It is harder to assign grades because it is difficult to capture clear evidence of reading compared to evaluating student postings. Many learning management systems can capture views (whether a message has been opened) but cannot account for those who may open posts without actually reading them. In research, some solutions to these problems have been found through metrics such as Scan rate (Hewitt, Brett & Peters, 2007); as well as through treating online reading more contextually, conceiving of it as being part of “listening behaviours” (Wise, Speer, Marbouti & Hsaio, 2013) defined as “taking in the externalization of others” (p. 5). Online listening while importantly different from listening in a face-to-face conversation may be valuable because it can be considered an active form of participation in online discussion (Wise Speer, Marbouti & Hsaio, 2013a).

Even less studied than online reading or listening is the notion of rereading or revisiting. Wise, Hausknecht & Zhao (2013b) did find a positive relationship between rereading other students’ posts and responsiveness and suggest that the “richer end of this spectrum tends to occur when posts are attended to multiple times” (p. 6). The authors also suggested that the “[n]umber of reviews of other students’ posts was a positive predictor …of more responsive posts” (p. 6).

The research questions guiding this paper therefore contribute to expanding this literature, and they are:

1. What seem to be the characteristics of re-reading in relation to reading and writing of entries?
2. Are there particular qualities possessed by entries that are widely re-read?
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3. Is there any relationship between particular patterns of re-reading behaviours and outcomes

3. Methods
This study uses a mixed methods design to analyze the online rereading activity of a total of 64 participants across four fully online graduate courses conducted over a 2 year period. These courses were facilitated in “Pepper,” a computer conferencing program developed at the Ontario Institute for Studies in Education at the University of Toronto. This is achieved through a variety of features such as public discussion threads and private or group messaging; the facilitation of reading functions through being able to select a split screen, or contents or titles display.

In all four courses, students were required to provide an entry in the Class Biographies Conference. A Learning Journal was a requirement in each course, worth 25% of the course grade. In two of the courses, a Theory of Learning entry, posted at the beginning of the term and reviewed at the end of the term, addressed questions intended to document any changes in understanding. These entries comprised 15% of the course grade. All assignments were posted publicly in the conference.

4. Data sources and analysis
The quantitative measures include automatically collected tracking data on all online activities and the analyses of these measures using cluster analysis and bivariate correlations. Activities related to 6026 entries in four databases were categorized and 23 relevant variables were selected for analysis. Factor analysis and one-way independent ANOVAs assisted in the interpretation of the characteristics/behaviors relationships (Field, 2005; Green & Salkind, 2011). Variables were categorized according to Temporal, Collaborative/Social, Writing Quality, Revisitation and Online Participation Characteristic dimensions. For all 64 cases, participants were clustered into 3 categories based on reading and writing patterns, with an SPSS reported good quality silhouette measure of cohesion and separation (0.6).

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Number of Notes Written</th>
<th>Percentage of Total Notes Read</th>
<th>Number of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Prolific Writing/Broad Reading (PWBR)</td>
<td>86 to 241</td>
<td>42% to 100%</td>
<td>24</td>
</tr>
<tr>
<td>2. Efficient Writing/Broad Reading (EWBR)</td>
<td>24 to 78</td>
<td>64% to 99%</td>
<td>16</td>
</tr>
<tr>
<td>3. Efficient Writing/Selective Reading (EWSR)</td>
<td>18 to 89</td>
<td>17% to 62%</td>
<td>24</td>
</tr>
</tbody>
</table>

Table 1 Cluster Descriptions

Individual notes that were highly revisited were identified and content qualities were analyzed according to an established coding scheme (Wise, Hausknecht & Zhao, 2013b). The qualitative measures include responses to a 15-question pre-tested survey collecting open-ended and Likert-scale data on rereading activity and individual case studies from groups identified through the statistical analyses.

5. Results and Discussion
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To answer the first research question: *What seem to be the characteristics of revisiting in relation to reading and writing of entries*, we analysed the levels of writing and reading across the 64 cases and found three clear clusters.

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Hours Online M (SD)</th>
<th>Student Notes M (SD)</th>
<th>Teacher Notes M (SD)</th>
<th>Rereads by Other Students M (SD)</th>
<th>Final Marks Range</th>
<th>Example of significant result*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (PWBR)</td>
<td>87.6 (32.6)</td>
<td>426 (213)</td>
<td>98 (31)</td>
<td>437 (181)</td>
<td>80-98</td>
<td>Student Notes reread r = .44, p &lt; .05</td>
</tr>
<tr>
<td>2 (EWBR)</td>
<td>61.7 (25.9)</td>
<td>342 (109)</td>
<td>78 (19)</td>
<td>193 (67)</td>
<td>84-91</td>
<td>Rereads by Other Students r = .63, p &lt; .01</td>
</tr>
<tr>
<td>3 (EWSR)</td>
<td>40.6 (19.8)</td>
<td>142 (72)</td>
<td>53 (19)</td>
<td>218 (92)</td>
<td>66-91</td>
<td>Revisiting Teachers’ Notes r = .46, p &lt; .05</td>
</tr>
</tbody>
</table>

Table 2 Reading and writing patterns in relation to revisiting characteristics

We have summarized these data by cluster rather than individually due to space restrictions and highlighted some of the significant relationships with asterisks. Responses to the survey questions revealed that all students said that revisiting entries was important or very important to their learning. Examples of responses from students to the question about why they reread are revealing:

From PWBR Cluster 1: “I would revisit or reread student-generated notes to clarify course concepts, to build on their notes (i.e. so I would refer back to their note to make sure I was interpreting them correctly), or I would refer to their notes for assignment purposes....”

From EWBR Cluster 2: “One of the other reasons I revisited a previously read entry was because as the course evolved, my knowledge evolved (and in some cases my beliefs began to change)......and when that happened, it twigged memory of a post...that had been put up earlier in the course, that I wanted to rethink and assimilate with my new understanding.

From EWSR Cluster 3: “I often revisited notes to while formulating my own responses, to check that I understood what others had communicated, to search for a recommended article. One student in particular was always in the good habit of using quotes. I often reread that student's messages to use the quotes.

The data and illustrative comments reveal the importance of rereading for a variety of learning-related reasons.

The second research question: *Are there particular qualities possessed by entries that are widely revisited? How can we characterize these qualities*, involved an analysis of the top 62 student-generated revisited notes from one course (reread at least once by more than

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1 *Note: These are examples of interesting significant differences we found between the groups. Space constraints limit our discussion of all the variables used in this analysis.
half the class), yielded 36 revisited entries in categories of biography (5), learning journal (11), external resources provided by a student (2), learning theory (3), response to a moderator question (13) or response to a post (2) within the weekly conference discussion. The top 15 reread response posts were coded for content qualities based on the speaking variables detailed by Wise, Hausknecht & Zhao (2013), of Discursiveness Content and Reflectivity. The majority of these entries contained complex argumentation, synthesized others’ notes and/or developed ideas. The rest contained simple argumentation and referred to others’ ideas or course materials. All of the notes demonstrated deep group reflection and one-third of these entries demonstrated a level of elicitation.

To answer the third research question: *Is there any relationship between particular patterns of rereading behaviors and outcomes*, we looked at final grades and amount of rereading by cluster. An analysis of all students (N=64) shows a significant correlation between Final Grades and Student Notes Reread (r = .56, p < .001), Teachers Notes Reread (r = .65, p < .001) and Rereads by Other Students (r = .49, p < .001). Further breakdown by cluster revealed specific patterns.

<table>
<thead>
<tr>
<th>Who is Revisiting?</th>
<th>Who is being revisited?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student Notes</td>
<td>Teacher Notes</td>
</tr>
<tr>
<td>Final Grade</td>
<td></td>
</tr>
<tr>
<td>Cluster 1: r = .53, p &lt; .05</td>
<td>Cluster 1: r = .55, p &lt; .05</td>
</tr>
<tr>
<td>Cluster 2: n.s</td>
<td>Cluster 2: n.s</td>
</tr>
<tr>
<td>Cluster 3: r = .66, p &lt; .001</td>
<td>Cluster 3: r = .68, p &lt; .005</td>
</tr>
</tbody>
</table>

Table 3 Relationship between Revisiting and Final Grade by Cluster.

6. Scientific or scholarly significance of the study or work

The rereading patterns of the discussion entries and responses to survey questions support the prevalence of, and importance of rereading for learning. Some interesting findings are the differential relationship of reading rates to final grades for the Efficient Writing/Selective Reading cluster which does suggest that rereading may be an important strategy for those who participate in less intensive ways. Another notable finding was the amount of rereading in areas of the course like biographies and individual learning journals that were not directly assessed for marks. Participants’ survey comments suggest they use rereading of others’ learning journals to support their own reflections, and rereading others’ biographies to find partners for collaborative assignments and to maintain social connections with their program peers.

As we continue this research we will be investigating some of the pedagogical implications of rereading, such as the potential for identifying realtime thresholds of highly read notes and giving that feedback to instructors about where students’ attention is focused. We will investigate how feedback on rereading patterns –such as those identified through our cluster analysis may also provide useful information for instructors, and possibly students.
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This micro-analytic study contrasts with the current emphasis on large-scale online learning initiatives like MOOC’s. However, as new tools make it increasingly possible to innovatively track such detailed learner activities online we will be able to understand better how particular activities contribute to how people learn. Without such information gleaned at the microlevel layer of research, we will not be able to effectively and confidently design new online learning environments that emerge so rapidly in this area.

References


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