Undergraduate Students’ Perceptions of the Value of Online Discussions: A Comparison Between Education and Engineering Students

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Abstract: This study was designed to determine differences in how undergraduate students in an introductory educational technology course (n=309) and an introductory computer engineering course (n=152) at a large Midwestern university responded to the use of online discussions in their courses. Data were collected via online surveys. After participating in two-five online discussions, students shared their perceptions regarding the usefulness of the course discussions to their learning. Students described both benefits and limitations and provided suggestions for using discussions in more meaningful ways.

Theoretical Framework and Purpose of the Study

Both educators and corporate stakeholders are increasingly emphasizing the importance of developing group interaction and problem-solving skills among their students / future employees (Dundis & Benson, 2003). Shaping the Future (1996), a report by the National Science Foundation, stated that “America's faculty must actively engage those students preparing to become K-12 teachers, technicians, professional scientists, mathematicians, or engineers. It is important to assist them to learn … how to communicate and work in teams to solve complex problems.”

One way to achieve collaborative interaction is through discussion of course material. Unfortunately, because of time and resource constraints, students in large-lecture undergraduate courses rarely get an opportunity to discuss
To address this concern, instructors are turning to online learning environments to engage students in collaborative discourse and inquiry (Bourne, Harris, & Mavadas, 2005). However, Land and Dornisch (2001) noted that students’ online participation is often limited by low confidence, lack of prior knowledge, and/or little-to-no previous experience with discussion boards. Furthermore, depending on how students define learning, they may assign different values to these discussions. Because students in different disciplines tend to have different beliefs about what it means to learn (Strobel, Cernusca, & Jonassen, 2004), engineering and education students may be more or less “ready” to benefit from online discussions. Thus, instructors may need to employ strategies that foster students’ intellectual development so they can more readily benefit from online interactions.

This study was designed to examine the differences between education and engineering students who participated in online discussions as part of their undergraduate course activities. Specifically, we examined differences in students’ perceptions of the value of online discussions; their confidence for participating in, and learning from online discussions; and their suggestions for improving the discussions to increase learning.

**Research Design / Methods**

As part of a larger study, 309 students in an introductory educational technology course (ET) and 152 students in an introductory electrical and computer engineering course (ECE) were given opportunities to participate in online discussions (for bonus or assignment points) designed to supplement “normal” course activities. Sixty-six percent of the ET students were female; 90% of the ECE students were male. ET students were primarily freshmen (42%) and sophomores (42%), while ECE students were mostly sophomores (69%) and juniors (24%).

Students were placed into discussion groups within the BlackBoard course management system based on their assigned lab sections. There were 9 lab sections in ECE and 18 in ET; 2 teaching assistants (TAs) covered the ECE labs, while 11 TAs facilitated the ET labs. This allowed for smaller discussion groups and also ensured that students would have some familiarity with those participating in the discussions with them. In general, TAs did not participate in the discussions, allowing students to interact freely among themselves. In the ET course there were five online discussions; each discussion lasted one week and occurred approximately every other week. Discussions covered issues related to teaching millennial learners, plagiarism, copyright, security, and online learning. In the ECE course, two online discussions occurred, one during weeks 4 and 5 and the other during weeks 14 and 15. In the first discussion students discussed how they used various course resources to prepare for the first exam and the extent to which they were helpful. For the second discussion, students were instructed to “discuss topics and post questions related to the ‘simple computer,’” in preparation for the next exam.

Midway through the semester, 226 ET students (73%) completed an online survey to capture early perceptions of, and recommendations for, the previous and continued use of online discussions in their course. Because the ECE students had only participated in one discussion to that point, a similar survey was not used. At the end of the semester, 160 ET students (52%) and 86 ECE students (57%) completed a final survey about the perceived benefits
and limitations to using online discussions. Descriptive statistics were calculated for the survey measures; t- or z-tests were used to identify differences between education and engineering students’ responses (z-tests were used to compare percentage of students responding, thus accounting for different sample sizes). Additional comparisons were made between ET students’ mid-term perceptions (specifically regarding levels of comfort posting and responding to peers) recorded after three discussions, and ECE students’ final perceptions obtained at the end of the semester (after two discussions). Open-ended survey responses were analyzed using a simple pattern-seeking method to determine those aspects of the online discussions that students found most valuable and most frustrating.

Results and Discussion

Previous Experiences and Comfort Responding. On average, ECE students had taken 1.6 previous courses that used online discussions, while ET students had taken 1.1 courses (t=3.4; p=.001). Thirty-eight percent of the ET students (n=60/160), compared to 22% (n=19/86) of the ECE students, had never taken a previous course that used online discussions. Despite this difference, ET students, on average, rated themselves more comfortable posting and responding to other’s posts (after 3 discussions) than ECE students (after 2 discussions). On a five-point scale (1 = very uncomfortable and 5 = very comfortable), ET students recorded an average comfort level of 4.18 when posting responses and 4.05 when responding to other’s posts, compared to average ECE comfort ratings of 3.54 and 3.48, respectively. These differences were significant (see Table 1).

<table>
<thead>
<tr>
<th>Question</th>
<th>Course (Number Responding)</th>
<th>Mean SD</th>
<th>t statistic (equal variances not assumed)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comfort posting comments</td>
<td>ET (n=226)</td>
<td>4.18 .72</td>
<td>5.22</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>ECE (n=86)</td>
<td>3.54 1.06</td>
<td></td>
<td></td>
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<td>Comfort responding to other’s posts</td>
<td>ET (n=226)</td>
<td>4.04 .76</td>
<td>4.71</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>ECE (n=86)</td>
<td>3.48 1.01</td>
<td></td>
<td></td>
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<tr>
<td>Confident will benefit from discussions</td>
<td>ET (n=226)</td>
<td>3.79 .72</td>
<td>2.30</td>
<td>.024</td>
</tr>
<tr>
<td></td>
<td>ECE (86)</td>
<td>3.5 1.1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 1. Students’ levels of comfort participating in, and confidence they will benefit from, online discussions.

It is important to remember that students did not participate equally in the online discussions, either within or across courses. For example, among the 86 ECE students who completed the final survey, 47 (55%) indicated they participated in both discussions, 29 (34%) participated in one, and 10 (12%) didn’t participate in either discussion. Reasons for not participating related to students’ personal preferences for learning (“I prefer other study methods.” “I prefer to ask the instructor.”), the perceived relevance of the discussions to the course (“Online discussions were not useful compared to alternatives.”), or students’ concerns about the accuracy of the posts (“There was no moderating for accuracy.”). In general, ET students had higher levels of participation than ECE students. Among the 309 ET students, 3.5% (n=11) participated in only one of the five discussions, while 4% (n=12) did not participate in any. Participation rates averaged 81% across all five discussions. This difference in participation may have been due to how participation was “counted” in each course; the ECE students earned bonus points, while the ET students earned assignment points. Still, the varying degrees of participation might account for the greater levels of comfort reported by the ET students. Alternatively, ET students may have participated more because they felt more comfortable working in a collaborative environment such as the online discussions. Collaborative environments in engineering education have been known to meet resistance (Bourne et al., 2005; Guzdial et al., 2001).

Perceived Advantages. When asked to identify the biggest advantages to using online discussions within their courses, the majority of the students in both courses [58% (n=93) ET students; 67% (n=57) ECE students] selected the response, “It helped me understand the content better” while approximately a third of each group [29% (n=46) ET students; 32% (n=27) ECE students] selected, “It motivated me to study the course materials and/or other related topics/content.” As noted in Table 1, students recorded similar average ratings of confidence for benefiting from the discussions (from 1 = not confident to 5 = very confident; ET = 3.79, ECE = 3.5). This suggests that although students thought online discussions helped them understand course content better, they were not highly confident that this would translate into learning gains. Because instructors play an essential role in promoting students’ motivation in online discussions, they should consider making the link between online discussions and learning outcomes more direct (Wu & Hiltz, 2004).

Finally, students’ perceptions differed significantly (z=2.39; p=.025) in selecting the response, “Discussions helped me get better acquainted with my classmates” as an advantage to online discussions. While 32% of the ET students (n=51) indicated this was an advantage, only 18% of the ECE students agreed. Although online discussions are often heralded as a means to build a community of learners (Palloff & Pratt, 2007) and to promote the development of teamwork, the majority of students in these courses did not share this perception. Both groups of students rated the level of collaboration resulting from the online discussions at a “medium” level (5 = very high; 1=very low; ET M = 3.27; ECE M = 3.36). This perception should be examined further in future research.

Perceived Limitations. When asked to identify the biggest limitations or challenges to using online discussions, a significantly higher percentage of ET, than ECE students, chose two responses: “It took too much time” [37.5% (n=60) ET students; 24% (n=20) ECE students; z=2.11; p=.05] and “I didn’t know how to respond to others’
postings” [28% (n=45) ET students; 16% (n=13) ECE students; z= 2.16; p=.05]. One explanation for this difference may relate to the different timeframes in which students were expected to respond. ECE students had at least two weeks, while ET students had only one. In addition ET students were required to respond to each other’s postings in order to receive full credit. Additional guidance regarding how to meaningfully respond to other posts may be beneficial in addressing this perceived limitation (Funaro & Montell, 1999).

More than one-third of the ECE students (39%; n=32) indicated that the biggest limitation was “I didn’t know who was right or correct,” compared to 25% (n=40) of the ET students, a significant difference (z=2.19; p=.04). The difference in choosing this response might be explained by the varying nature of the course discussions. While the ET discussions were primarily issues-based, requiring students to post opinions, the final ECE discussion, which students had just completed, emphasized finding answers about a specific content area in order to prepare for an exam. While ECE students provided guidance and “answers” to each other’s questions, students often were unclear whether these responses were accurate. Given this, course instructors may need to reconsider the kinds of topics or questions used for online discussion (Toledo, 2006) and the extent to which they should be moderated (Ko & Rossen, 2001; Palloff & Pratt, 2007).

**Implications and Conclusions**

The use of online discussions in college courses is growing at an exponential rate (Spatariu, Quinn, & Hartley, 2007) with students participating from a wide range of disciplines including computer science (Carswell, Thomas, Petre, Price, & Richards, 2000), engineering education (Kear, 2002), and teacher education (Ebenezer, Lugo, Beirnacka, & Puvirajah; 2003). However, given differences in students’ comfort participating, as well as the perceived relevance and benefits to their learning, all may not be able to benefit equally. As noted by Richardson and Newby (2006), students in different program areas are differentially prepared to benefit from online learning experiences. When designing both discussion starters and instructional supports to engage students in content-related discussions, it is important to understand the skills and attitudes brought to the learning task in order to provide the most relevant types of guidance and support.

As noted by Muilenburg and Berge (cited in Toledo, 2006), “… when facilitating online discussion, asking the right questions is almost always more important than giving the right answers” (p. 150). Course instructors may need to consider how to moderate discussions, both allowing students to create critical dialogue on their own while other times facilitating the dialogue, without dominating it (Palloff & Pratt, 2007). These are fruitful areas for future research.

**References**


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