Asynchronous Online Discussion:
Empirical Evidence on Quantity and Quality

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Abstract: This paper investigates the usefulness of asynchronous online discussion. Eight forums from websites developed by the e3Learning Project were examined. The e3Learning Project supports the eLearning development and evaluation needs of teachers at three universities in Hong Kong. Analyses of the quantity and quality of the postings by students were carried out. Results show that students participated quite actively in the forums and contributed substantive ideas. Furthermore, these positive learning outcomes do not seem to correlate with the course level, course subject area, class size, forum nature, and degree of teachers' participation in the forum, suggesting that asynchronous online discussion is a useful tool for various teaching and learning styles and for various course designs.

Background

The statistics generated by most universities, including our own, show a marked increase in the use of online discussions for teaching and learning in recent years. Students and teachers carry out online discussions either through a Learning Management System (LMS), such as the WebCT or Blackboard, or through other online discussion platforms such as newsgroups and chatrooms. Online discussions are classified into two main forms: synchronous (online 'chat') and asynchronous ('threaded' online discussion) (Davidson-Shivers, Muilenberg & Tanner, 2001). This paper will focus on asynchronous online discussions.

Asynchronous interactions in online discussion forums take a form which is different from face-to-face communication. Apart from the apparent text-based characteristic of online forums, Hammond (2000) also pointed four more attributes of online forums, including 'messages are permanent', 'messages are public', 'communication is asynchronous', and 'messages can be edited before sending'.

Online forums can be a virtual platform in which students and instructors interact. Intuitively, it is thought that this mode of communication helps to create a sense of community within the course. It is also a supplementary source of course-related information that students can visit. Kirk and Orr (2003) summarized that "discussion forums are the enabling tools for those teaching in the e-learning area to build greater student learning outcomes by engaging students in productive discourse" (p. 2).

The usefulness of asynchronous online discussion for teaching and learning is an issue that is far from clear. On the one hand, some studies show that online discussions are useful; and that online discussions and face-to-face discussion serve different purposes in different circumstances. For example, Scifres, Gundersen and Behara (1998) found that, although students were more satisfied with in-class discussions than online discussions, the online-discussion teams reported higher levels of overall learning. Davidson-Shivers et al. (2001) also concluded that "both types of discussion were found to be viable and provided students with opportunities for actions and interactions that allowed them to be successful in such a learning community" (p. 364) and "the use of both synchronous and asynchronous discussions in on-line learning has merit" (p. 365). Other researchers have even advocated the advantages of asynchronous methods over real-time online or even face-to-face discussions and suggested that threaded online discussion should be the preferred mode of discussion. For instance, Driscoll (1998)

stated that asynchronous discussions provided more time for students to make reflections. Piburn and Middleton (1998) compared student-instructor interactions on a listserv (a server for online discussion) and that in class. They found that students preferred discussions on listserv and students could initiate conversations rather than the teachers; that is, a role reversal could happen in online discussions.

On the other hand, however, there are studies that report the insufficiency of online discussions. Thomas's (2002) study reported that "the virtual learning space of an online form did not promote the coherent and interactive dialogue necessary for conversational modes of learning" (p. 361), despite the promotion of high levels of cognitive engagement and creative thinking. He also found that online forums could be ill-structured and some students' ideas and expressions did not receive any response, posing the question of whether real 'interaction' existed in online forums. Furthermore, there are studies comparing the asynchronous and synchronous discussions, which suggest that synchronous interactions have an edge over asynchronous ones. For example, Davidson-Shivers et al. (2001) found that participants in a particular chat responded more frequently and provided more substantive statements than when participating in the corresponding threaded discussion.

The present paper examines this controversial issue about the usefulness of online discussion by looking at some empirical data about how forums are actually used. The data come from a relatively large sample size (asynchronous discussions on eight courses). The results support views from both sides of this issue: it is indeed observed that there are higher and lower levels of online forum use – with a great difference in discussion quantity and quality. However, the evidence in the present paper favours the more positive view that online discussions are on the whole useful. The data discussed below shows that asynchronous online discussions are able to generate communications of considerable quantity and quality, and are able to encourage student-student communications which are so much needed, but not achieved, in a traditional classroom, especially in a Chinese context.

Data and Methodology

The study looked at the websites developed and evaluated with the support of the e3Learning Project. The e3Learning (enrich, extend, evaluate learning; e3L) project is designed to assist teachers to better exploit the possibilities of web-assisted teaching. Full details of the design of this project are in James et al. (2003) and the project website http://e3learning.edc.polyu.edu.hk/main.htm. The e3L project operates across three universities, the Hong Kong Polytechnic University, the City University of Hong Kong and The Chinese University of Hong Kong.

The study looked at eight websites which were built and actively used to conduct online discussions for courses taught in the academic year of 2003 – 2004. The forums were studied for their quality and quantity. The quantity dimension includes the total number of messages sent to a forum, the average number of postings per students, the number of postings contributed by the instructors, and the thread length. All the postings in the eight forums (10,166 postings) are included in this part of the study.

Then, content analyses were carried out to reveal the quality by investigating a randomly selected sample of the forum postings. Random sampling was done by selecting one per every three to six threads (depending on the size of the forum) so that the number of postings selected at the end accumulated to a number close to 100.

A three-tier classification was used in this analysis and is related to the Structural Observation of Learning Outcomes (SOLO) classification (Biggs, 1999). This describes a student's understanding of a subject in five levels of increasing complexity: from the *pre-structural* level when students acquire bits of unconnected information to the *extended abstract* level when students are able to making connections with, generalise and transfer principles and ideas. The postings were classified as non-substantive (usually social; though we do recognise the value of social interaction in community-building online, in these cases another public forum was the social arena), substantive (related to the topic) and elaborated substantive (postings that explain well and in a structured manner). The present classification is related to the SOLO taxonomy in the manner shown in Table 1.

The actual process of classifying the postings was done in a collaborative and iterative fashion. Once the postings in any forum had been classified by a research team member, a sample would be checked by another researcher. We use a process whereby the first researcher has to 'defend' her/his judgments. In a collaborative team environment this works well. Further, earlier classifications were revisited once the data sets from all eight course websites had

been classified. This is a form of the constant comparative method (Glaser & Strauss, 1967). A number of iterations resulted in the data displayed below.

SOLO Taxonomy (Biggs, 1999) categories	Explanation of SOLO categories	Postings classification categories	Type of posting
Prestructural	Misses the point	Non-substantive	• Social
Unistructural	Single point	Substantive	• Adding new points • Enhancement and clarification of points
Multistructural	Multiple unrelated points		
Relational	Logically related answer	Elaborated substantive	• Making clear contrary statements • Developing complex arguments • Referring to material with a new perspective • Using fresh and different reference material
Extended abstract	Unanticipated extension		

Table 1: Forum postings classification categories related to the SOLO Taxonomy (Biggs, 1999)

All the eight cases were from the same university, the Hong Kong Polytechnic University. Among the eight sites under observation, seven were sites of undergraduate courses and one was a postgraduate course. Four of the cases were course websites in the School of Nursing, two were in the Department of English, and the remaining two in the Institute of Textile and Clothing. In all the eight courses, student participation was motivated in two ways: a) extrinsically by allocating some course credit to online participation, and b) intrinsically by informing the students that they would learn by participating in discussion. It is important to note that there is some degree of mandatory contribution required in all of these courses.

The study has identified the following main purposes for holding the online discussions. Some forums were set up for students to collaborate with each other on certain assignments required in the courses; here groups of students discussed in the forums, thrashed their ideas out there, and had a round-up of ideas before assignments were submitted (Collab). Some forums were set up for students to challenge each other; students formed into groups, uploaded the required materials onto the forums, and then students in other groups were responsible for giving comments or criticisms to the work (PeerChal). Some other forums were blog-like, where ideas and thoughts were posted from time to time as reflections of what is learnt or experienced; peers could pick up on what they were interested in and could reply to the points as they wished (Blog). For the eight forums under investigation, most of them serve more than one of the above functions. The nature of the eight sites is summarized in Table 2.

Nature of discussion	Shorthand	Number of forums
Collaboration	Collab	7
Challenge and critique	PeerChal	5
Blog/ journal	Blog	2

Table 2: Forums and their nature of discussion

Findings

Findings of the analyses of website quantity and quality are summarized in Table 3 and Table 4, respectively. For the quantity of postings, it can be seen that students overall participated actively in the forums. An average of 12.6 postings per student is recorded after averaging the total number of student-posted postings on all sites with the total

number of students enrolled. The figure suggests a fairly active participation in the online forums: each student on average posted one message to the forum per week. Forum 1 recorded the least discussion activities with only 0.45 posting per student; and forum 8 is the most active forum with an average of 34.3 postings per student.

Forum	Course level	Subject area	Project period	Number of students	Forum nature
1	Undergrad	Nursing	0304 Sem1	229	Collab + Blog
2	Undergrad	English	0304 Sem1	84	Collab + Blog
3	Postgrad	Nursing	0304 Sem1	26	PeerChal
4	Undergrad	Textile	0304 Sem2	41	Collab + PeerChal
5	Undergrad	Textile	0304 Sem2	36	Collab + PeerChal
6	Undergrad	Nursing	0304 Sem2	89	Collab + PeerChal
7	Undergrad	Nursing	0304 Sem2	82	PeerChal
8	Undergrad	English	0304 Sem2	100	Collab
Total				687	

Forum	Total number of postings on the site	Number of postings by teachers	Number of postings by students	Postings per students
1	167	63	104	0.45
2	1,862	0	1,862	22.2
3	91	7	84	3.2
4	782	8	774	18.9
5	236	20	216	7.0
6	449	79	370	4.2
7	1,127	63	1,064	13.0
8	3,443	12	3,431	34.3
Total	10,166	252	7,905	11.5

Tables 3a & b: Findings on quantity

It can also be seen that the degree of participation of the instructors (reflected by the number of postings by instructors) does not seem to have significant correlation with student participation, as is visualized in the following scatter plot (Figure 1).
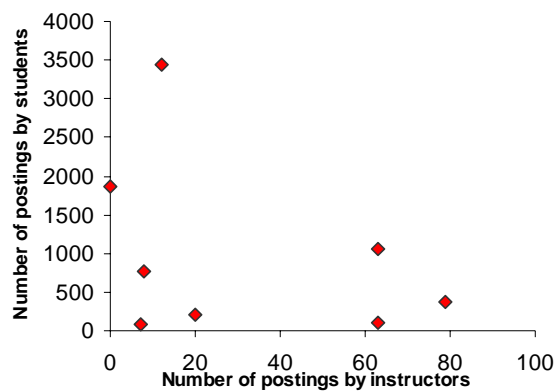

Figure 1: A scatter plot comparing teacher and student forum participation

Furthermore, there appears to be no significant relation between the quantity of students' postings and the nature of discussion that went on in the forum, and so no statistical analysis is thought to be needed.

The results of quality analyses are summarized on Table 4. Generally speaking, 75.5% (56.2% + 19.4%) of the postings are of the substantive type, while those postings that are elaborated substantive (compatible to the relational and extended abstract categories in the SOLO taxonomy) amount to nearly 20% of the postings. This shows that the postings by students were considered to be of good quality. A big range of performance is observed among the eight sites. Forum 6 seems to have out-performed the others in terms of the percentages of simple substantive and elaborated substantive postings. Forums 1, 2, 3, and 8 have a relatively low percentage of elaborated substantive messages.

Forum code	Forum nature	Number of postings by students	Number of postings by teachers	Number of postings analysed (percentage in brackets)	Percentage of postings (%)		
					Non-substantive	Substantive	
						Simple	Elaborated
1	Collab + Blog	104	63	104 (100%)	46.2	52.9	1.0
2	Collab + Blog	1,862	0	180 (9.7%)	45.0	51.7	3.3
3	PeerChal	84	7	84 (100%)	0	95.2	4.8
4	Collab + PeerChal	774	8	147 (19.0%)	66.0	19.7	14.3
5	Collab + PeerChal	216	20	83 (38.4%)	6.0	54.2	39.8
6	Collab + PeerChal	370	79	102 (22.9%)	8.8	30.4	60.8
7	PeerChal	1,064	63	157 (14.8%)	19.1	53.5	27.4
8	Collab	3,431	12	147 (4.3%)	4.8	91.8	3.4
Total		**7,905**	**252**	**1,004 (9.9%)**	**24.5**	**56.2**	**19.4**

Table 4: Content analysis of forum postings

Once again, the percentages of substantive and non-substantive postings do not have overt relationship with the participations of the teachers and the nature of discussion. Figure 2 is a scatter plot comparing the participation of the teacher with the percentage of substantive postings.
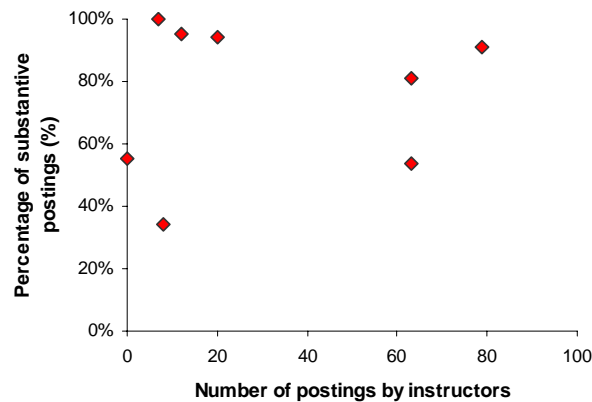

Figure 2: A scatter plot comparing teacher participation and percentage of substantive postings

Discussion

This data lead to a number of observations. The first is the growing importance and acceptance of using online discussion to supplement traditional classroom teaching. The eight cases reported in this paper have been real attempts by teachers to enrich their students' learning environment by a more student-centred approach through giving them a chance to express their views and concerns online.

Secondly, the study seems to show that online discussion can work across a variety of subject areas and in a variety of ways. The eight forums under investigation were of different levels, provided by different academic departments, with different forum natures, with different class sizes, and have received differing degrees of teacher participation.

The study also shows a promising picture that forums can lead to discussions of considerable quality and quantity, in the sense that students participated quite actively and contributed substantive ideas in the forums. With the correct facilitating factors and motivation, students are willing to use the forum to post their ideas (add to the quantity of the number of postings), such as in forums 2 and 8 in which each student has posted over 20 messages on average; and are able to feed in good comments that are related to the topics and explain well (add to the quality of the postings), such as in forums 3, 5, 6, 7, and 9 where the percentages of substantive messages are high.

The possibility of employing students in online conversation with their peers is of high value to education. It may be particularly so in the Hong Kong Chinese context where the normal classroom practice in the Chinese culture is teacher talk domineering most of the class time. Also, the style of teacher talk is didactic and does not encourage questioning (Lu, 1997). While the west views talkative students as being praiseworthy, active and talkative students in many Chinese classrooms are deemed to be showing off (Schoenhals, 1994). The opportunity now the students have to bring up their concerns and ideas in a less 'intimidating' but more student-centred online environment could well be a very good supplement to classrooms in the Chinese context.

Lastly, the study points out the concern that some forums are not as successful as the others (in the sense of quantity and quality as described in this paper). Also, there does not seem to exist any simple correlation between the quality and quantity of postings, the nature of discussion and the extent of teacher participation. Therefore, what makes the great range between the quantity and quality between forums is still unknown. The causes of this 'mysterious' establishment of online discussion atmosphere in a course are the subject of further investigation through more in-depth examination of particular cases. This study has clearly demonstrated that the criteria for effective online communities cannot be simply established or described.

Conclusion

The present study aimed at providing empirical support to the usefulness of asynchronous online discussion by investigating eight online forums and analyzing the quantity and quality of the postings inside the eight forums. The eight courses selected were of different levels and class size, and provided by different academic departments; the forums were of different natures and levels of teacher participation. Quantity and quality analyses of the postings tend to suggest that asynchronous online discussion can promote sound educational interaction, though it is clear that there is no simple set of guidelines to ensure this. This is a topic for future research by our team.

Acknowledgements

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