5.3 **ONLINE DIALOG: WHAT IF YOU BUILD IT AND THEY *DON'T* COME?**

E. S. Takle[1], E. K. Sorensen[2], and D. Herzmann[1]

[1]Iowa State University, Ames, Iowa USA
[2]Aalborg University, Aalborg Denmark

1. INTRODUCTION

In 1995 we built an online dialog capability to supplement student class-time discussion of course topics in a senior undergraduate-graduate course in Global Change. We naively thought this would promote deeper learning. The resulting discussion could most accurately be described as superficial remarks spiced with personal agendas, religious fervor, cutesy comments, and an occasional spark of academic interest. We quickly realized we needed a different means of explicitly emphasizing use of critical thinking skills and social interaction to enhance learning. We provide herein a chronology of our experiences toward achieving what we believe to be an improved, although certainly not perfect, method for engaging students in substantive online dialog on global change issues.

Global Change is a 1-semester, 3 credit course offered over 15 weeks as a regular on-campus course or (starting Spring 2003) as a distance education course. The 15-week semester is divided into 3 equal length "blocks" with approximately 15 learning units (e.g., lectures under the former system) in each block. Instructor evaluation and student self assessment is done at the end of each block. Typically there are students from about 20 different disciplines in each class, which provides a rich mixture of perspectives on global change issues. The course went online in 1995 with both content and student discussion. Course content for the present implementation is freely available on the internet at http://www.meteor.iastate.edu/gccourse but the dialog is managed from within student online portfolios that are password protected. The growing course content and annual addition of archived student dialog allows for a rapidly expanding database of learning materials for global change issues.

We first reported on initiation of this online course at this conference in 1996 (Takle and Taber, 1996) and have described attributes of the course in various conferences and papers (e.g., Takle et al, 1998, 2000, 2002; Sorensen and Takle, 2001a, b, 2002).

2. THEORETICAL BACKGROUND

We began by naively thinking that simply creating an online mechanism for dialog would promote high-quality interaction and demonstrate critical thinking skills. Failure from the onset sent us to the literature on use of dialog in learning and how this might be deployed in virtual environments. Wenger (1998) explores the nature of collaborative learning and asserts that true collaborative learning occurs through "negotiation of meaning". Sorensen and Takle (2002) cite other authors who expand on this to suggest that collaborative learning implies

- mutual exploration of issues
- mutual examination of arguments, agreements, and disagreements
- mutual questioning of positions
- dynamic interaction
- weaving of ideas
- convergence of perspectives

Genuine collaboration" (Salomon, 1995) is a condition of "genuine interdependence" between individuals that calls for

- sharing knowledge/information
- adopting complementary roles
- a "pooling together of minds"

However, methods of establishing true collaborative dialog in face-to-face environments may not be fully applicable in online environments. Instructional design that stimulates and supports collaborative dialogue on the Web requires that we start from scratch and create a design that emerges ontologically from a true integration of technology and pedagogy. Design and assessment of learning processes in such an approach should recognize the differences between face-to-face and online interactions and should, were possible, exploit advantages of the virtual environment (Sorensen 1999). Evolution of the structure and technology underlying Global Change has been guided by pedagogical principles by which we have attempted to achieve true collaborative learning. Student online portfolios provide students with a "digital home" from which he/she interacts with the course.

3. A CHRONOLOGY OF IMPLEMENTATION STRATEGIES

3.1 *Participation*

The first element of learning in true collaborative dialog is participation. While we recognize there is some learning value in passive observation of dialog carried on by others, we hold to the assertion that learning is a social phenomenon and that active

Corresponding Author: Eugene S, Takle, 3010 Agronomy Hall, Iowa State University, Ames, IA Email: gstakle@iastate.edu

participation is essential. In 1995, despite the fact that the internet was new (and very slow) and few students even had e-mail accounts, we thought that the novelty of online dialog would attract student interest and create a stimulating learning environment. With little requirement (5% of the grade in 1995, 15% in 1996) on use of online dialog, participation was low. In 1997 we forced participation by requiring all students to post a minimum number of online entries, and we allocated 30% of the grade to participation in online dialog. Table 1 reveals the impact of requiring a minimum of 5 postings per block (6 in 2002). Students obviously responded by posting more than the minimum.

Table 1. A = # students, B = # comments per student per learning unit, C = #comments per student per block.

Year	A	B	C
1995	32	0.069	1.0
1996	31	0.106	1.6
1997	32	0.350	5.3
1998	33	0.390	5.9
1999	26	0.320	4.8
2000	45	0.480	7.2
2001	44	0.382	5.7
2002	46	0.528	7.6

Having achieved some acceptable measure of student participation we noted a distinct shallowness in the comments being posted, so our next goal was to find a means of enhancing the quality of individual comments.

3.2 *Quality*

We define quality in dialog as having employed some clearly defined (and communicated to the student) critical thinking skills (CTSs). Mere participation in dialog does not ensure quality of writing. We followed the example provided by Stahl (1999) who defined a collaborative knowledge-building environment as one that employed a set of CTSs. In 2000 we required that the 5 mandatory postings per block must demonstrate one or more of the defined CTSs: analysis, synthesis, organization, articulation, brainstorming, generalization, reaction. Students declare, in advance of the posting, the type of CTS they will be using. In the follow-up self assessments submitted at five-week intervals they defend their choices of CTS categories.

In a subjective measure of quality of posting (0-10) we found that the quality went from 4.4 (1995) to 3.2 (1997) to 5.3 (2000). We speculate that the drop in quality from 1995 to 1997 reflects the obligation to post without internal motivation and the rise in quality in 2000 to the use of CTSs.

Close inspection of the characteristics of individual dialog threads revealed that the CTS requirement had created a collection of monologs that lacked the linkages required by our definition of collaborative learning. The next task, therefore, was to design a system for encouraging some element of action and reaction in connection with the substantive postings students were creating.

3.3 *Action-reaction*

We implemented various incentives for students to react to one another in online dialog. First we required students to *respond to 3 other students* per block and to *elicit comments from 3 other students* per block. This generated actions and reactions but fell short of generating the kind of substantive interchange indicative of true collaborative learning. In the weakest case a respondent acknowledges a previous perspective without addressing any substantive elements of the previous post (in some cases, the respondent may not have understood, or even read, the previous perspective). In the strongest case the respondent engages in the negotiation of meaning and achieves what we believe to be true collaborative learning.

As a second step toward improving the collaboration in dialog we introduced in 2002 a mechanism for encouraging social interaction in online dialog. We raised the number of required posts from 15 to 18 (from 5 to 6 per block) and required that three comments (one per block) be social comments. Data in Table 2 allow us to compare 2002 with 2001 to assess the impact of this new requirement:

Table 2. Comparison of comment characteristics when requirements for social comments were added.

	2001	**2002**	**Chg(%)**
Number of students	44	46	+4.5
Required # of posts/st.	15	18	+20
Total number of posts	760	1,045	+38
Actual # posts/student	17.3	22.7	+31
% actual to required	115	126	+10
Length of post (charact)	140	1,55	+11

Despite the requirement for increased number of comments, students posted 26% more than the required number in 2002 as compared to 15% more than the required number in 2001. Social comments tend to be shorter by a factor of 2, but even with these brief posts, the mean comment length increased when social comments were required. We caution that there may be factors (e.g., differences in class dynamics) other than requirement for social comments that contributed to the increases in Table 2.

The online dialog we have designed is threaded so we were able to diagnose the characteristics of threads in 2001 and 2002 (Table 3). A first comment is assigned level 1, a response to this as level 2, and so on. The tendency for the discussion to end at level 2 dropped significantly when we implemented the requirement for social comments.

Table 3. Percentage of total number of comments that occurred at each level.

Level	2001	2002
1	41	35
2	45	42
3	10	16
4	3	5
5	0.7	1.7

Despite these apparent improvements, it became evident that participation, quality of posts, and some degree of action and reaction can be present without ensuring that true collaborative learning has taken place. Introducing some social comments into the dialog helps but does not go far enough. We now are exploring a procedure for diagnosing whole threads instead of individual comments to evaluate evidence of substantive interaction.

3.4 *Collaborative learning through substantive interaction*

Diagnosing substantive interaction is a challenging task. Having students state their intent of a comment before it is posted gives us at least a preliminary view of how comments in a thread are related. Length of comment also is an objective attribute that can be analyzed and may indicate a student's level of engagement in the topic. We have examined the length of comments for various sequences to observed how comment length changes with comment type. For this analysis we only used cases with 10 or more occurrences and we eliminated the default "other" category. In 2001 comments increased in size when:

- Articulating followed articulating
- Articulating followed brainstorming
- Articulating followed reacting
- Brainstorming followed brainstorming
- Reacting followed brainstorming
- Reacting followed reacting
- Analysis followed brainstorming

and decreased in size when:

- Reacting followed articulating
- Reacting followed generalization
- Brainstorming followed reacting

In 2002 comments **i**ncreased in size when:

- Articulating followed reacting
- Reacting followed social

and decreased in size when

- Reacting followed analysis
- Reacting followed articulating
- Reacting followed brainstorming
- Reacting followed generalization
- Reacting followed reacting
- Analysis followed brainstorming
- Articulating followed brainstorming
- Brainstorming followed brainstorming
- Social followed brainstorming
- Social followed articulating
- Social followed generalization
- Social followed organization
- Social followed reacting
- Social followed social

We also found that:

- Length of post decrease with depth for all categories (both years)
- Reacting has the least decrease in length with depth
- Social comments tend to be the shortest by factor of 2
- Use of brainstorming went down significantly in 2002 compared to 2001, possibly due to more harsh grading of brainstorming in 2002
- Length of comments increased in all categories except generalization from 2001 to 2002.

In the latest implementation, initial comments tend to be articulating, brainstorming, or analysis and thread terminating comments tend to be reacting and social comments.

Substantial differences emerged in the dialog in 2002 when the major change was introduction of a requirement for posting social comments. Whether these are a direct result of the social comment requirement or other factors cannot be confirmed from the available data.

4. CONCLUSIONS

Many of the incentives we have implemented (e.g., required number of posts, required number of responses to other students, relationship to other posts) can be evaluated automatically within the computing platform by counting numbers of posts or diagnosing the topology of the threaded discussion. Assessment of other incentives (e.g., use of critical thinking skills) cannot be automated, except in a superficial way. Assessing whether collaborative learning has taken place is even more difficult than determining whether critical thinking skills have been used because diagnosis of the entire thread (not a single comment within a thread) is necessary to reveal the presence of substantive interaction.

The incentives we previously implemented promoted, but did not fully achieve true collaborative learning. Introducing a requirement for social comments moved us one step closer to that goal. Our data suggest that a requirement on use of social comments:

1) increased the number of comments per student
2) increased the length per comment for all comments
3) increased the depth of the discussion thread

Future offerings of Global Change will allow us to assess the persistence of the changes that emerged in 2002. We also will be performing a more systematic analysis of dialog threads using an alternative theoretical diagnostic perspective known as the theory of language games (Wittgenstein, 1974) in hopes that this will offer additional insight into the process of true collaborative learning.

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