

Tapping Online Dialogue for Learning: A Grounded Theory Approach to Identifying Key Heuristics that Promote Collaborative Dialogue Among Virtual Learners

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Abstract: This study examined factors that promote content-related, collaborative dialogue in secondary-level online course discussion forums. Discourse transcripts from nine Virtual High School courses from the spring semester of 2003 were analyzed. A high collaboration course was defined as a course that included at least twenty-five linked interactions with a thread depth of at least four over fifteen weeks. These linked interactions were called *collaborative events* in which students responded to and built on one another's thinking. The findings from this study suggest that to elicit and sustain online collaborative dialogue requires a balanced interplay among elements of course design, teaching practice, and evaluation. With these elements in place, regular participation by the instructor in the content-related discussions is not essential for promoting collaborative dialogue.

The Problem In Context

Recent web-based communication technologies have drawn millions of learners and instructors to their computers to take or teach courses online. Educational quality varies widely. Yet researchers have found that online learning has considerable potential: Experiences involving asynchronous, interactive dialogue among learners, facilitated and supported by an instructor, can yield thoughtful and reflective engagement around educational content (Garrison & Anderson, 2003; Roberts, 2004). However, promoting extended, substantive learner exchanges online remains difficult for most instructors (Sorensen, 2004). Few robust empirical research studies exist that demonstrate enhanced learning as a result of online learner collaboration and develop heuristics for achieving collaborative dialogue (Graham & Misanchuk, 2004).

The evaluation of the Virtual High School (VHS), conducted by Zucker and his associates at SRI (2003), similarly found that fostering content-focused dialogue was one of the most significant challenges for the secondary-level online instructors they observed. The Virtual High School™ is a collaborative of accredited high schools in which local teachers lead virtual courses in exchange for seats for local students in the VHS: twenty-five seats for each semester class taught. Currently, 4,526 students are enrolled in 169 VHS classes taught by 176 teachers. There are 268 member schools in 29 states and over 20 countries worldwide. Course offerings include such courses as History of Pop Music, 101 Ways to Write a Short Story, Fractals, Introduction to Programming in Visual Basic, Advanced Placement Calculus, Biotechnology, the Holocaust, and the Vietnam War. It is considered an exemplary model for pre-college online learning (Zucker & Kozma, 2003).

According to the SRI evaluators, Virtual High School teachers reported using constructivist principles and pedagogy. Even so, they felt frustrated in their attempts to achieve similar levels of student-to-student interaction online as they achieved in their face-to-face classrooms. At the same time, some teachers were successfully fostering collaboration. What was different in classes where collaborative dialogue was present?

The Study

The goal of this dissertation study (Haavind, in press) was to determine what the teachers and learners who engaged in the most extended dialogue did to promote such dialogue. First I surveyed the discussion areas of all 112 courses offered in spring of 2003 to identify those with the highest incidence of sustained interactivity. I sought threads of linked postings that deepened to a thread depth of four or more. Only seven courses achieved that depth of interaction more than ten times in the course of the fifteen-week semester. Only four achieved that level of collaborative dialogue more than 25 times, an average of not quite twice a week. I then analyzed course design, instructor activity and peer discourse related to collaborative dialogue that appeared in the discussion forums of those courses. I also compared them with more typical, lower collaboration courses to ascertain factors that were unique to the higher achieving classes.

To identify key heuristics that supported content-centered collaborative dialogue, I examined overall course design features, evaluation criterion, discussion activities, instructor moves made both in private feedback and class discussions, as well as participant behavior. I analyzed nine VHS courses in all, including the full population of seven higher collaboration courses from the spring, 2003 semester. There were only two comparable, low collaboration courses where equivalent dialogue could have been supported but was not. A comparative analysis was conducted for those two cases and their higher collaboration counterparts.

Unit of Analysis

Collaborative dialogue online takes place in asynchronous, threaded discussion forums. Early research on online learning (Brown & Campione, 1994; Lea & Nicoll, 2002; Rogoff, 1994; Scardamalia & Bereiter, 1994) indicated that student-to-student content-related dialogue could significantly enhance learning, particularly in an online environment. The value of dialogue and the social nature of learning is asserted by Bruffee (1999), Brown (2000) and others. Learning via peer collaboration is traditionally understood to involve activities where peers work together to create a product (Johnson *et al.*, 1994; Slavin, 1986). Harasim (2002) points to *collaborative dialogue* as an emerging role for computer-mediated conversation. Participation in collaborative dialogue involves interactively co-constructing meaning and building understanding of new content. A *collaborative event* (CE) was the unit of analysis for this study. It is any set of substantive postings in a content-based online discussion forum that involves four or more linked postings with a thread depth of at least four. This level of thread depth, or postings linked as replies-to-replies indicates sustained dialogue. Harasim's framework of discussion-based collaborative learning (Benbunan-Fich *et al.*, 2005) was used to measure collaborative discourse within collaborative events. Content was further compared with explicit course learning goals to assess learning associated with dialogue.

The constant comparative method (Glaser, 1978; Glaser & Strauss, 1967) was then employed to analyze course design, instructor activity, and peer discourse related to all collaborative events in the nine courses. I performed an iterative progression of data analysis to identify core categories and develop an interpretive model (Bogdan & Biklen, 1982).

Findings

Table 1 below illustrates the robust nature of collaboration in the nine courses across time, Collaborative events that contained content-related dialogue related to course learning goals are mapped across the 15-week semester. The 7 courses with higher collaboration are designated, "Hi" and the two comparable courses are designated "Lo." Classes 1 Hi and 1 Lo were different sessions of a language arts course in short story writing taught by two different instructors. Classes 2 Hi and Lo were different sessions of a literature course, also taught by different instructors. Classes 3, 4 and 7 were social studies courses. Classes 5 and 6 were science courses. The number in parenthesis in the first column is the total number

Week Class	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total
1 Hi (24)		1		6		5	3	1	1		1					18
2 Hi (3)			1		1	5	4	4	1	6	3	1	1	2		29
1 Lo (32)					2		2									4
2 Lo (5)				1		1	2					1				5
3 Hi (6)				8				4	5	9						26
4 Hi (0)		2		2		1	2			2	2			2	1	14
5 Hi (4)		6			2	7	5	1			3				1	25
6 Hi (27)	2	2	3	7	2	3	3			2	1	2		2		29
7 Hi (125)		1		1	1	1		1		1	4	9	6	2		27

Table 1: Collaborative Events in each Class displayed by Semester Week

of public postings made by the instructor in content-focused discussions. These could be probes to student comments, suggestions of resources, direct teaching and public evaluations or praise of individual comments. Posts to non-content oriented forums such as answering technical questions or questions about course activities or posts in social forums (e.g., the Student Lounge) are not included in this total.

Clear and diverse patterns in collaborative events emerged from this analysis. Only three of the courses sustained collaborative dialogue over the full semester: Classes 2 Hi (language arts), 6 Hi (science) and 7 Hi (social studies). Classes 1-Hi (language arts), 4-Hi (social studies) and 5-Hi (science) either did not sustain collaboration after the first seven weeks or fewer than 20 collaborative events occurred overall, or both. Additionally, instructor involvement in content-related discussions varied widely. Of all the higher collaboration courses initially selected, six of the seven instructors intervened into content-related dialogues 27 times or fewer over 15 weeks, or less than twice per week. Four of those six intervened just six times or fewer. In contrast, the instructor in 7-Hi (social studies) inserted 125 interventions into content dialogues, representing an extreme comparative outlier. This high level of teacher talk within content-related dialogues may indicate this instructor's lack of experience with teaching online using a seminar format (Sheingold & Polin, 2002) cited in Polin (2004). High teacher involvement also defeats the purpose of creating activities intended to promote learning from student dialogue, given that research has shown that peer learning is enhanced by the peer exchange and less so by instructor intervention (Navarro & Shoemaker, 2000). From a practitioner's viewpoint, it is simply too much work, and makes teaching online more time consuming and challenging than necessary. In any case, this highly work-intensive approach in the context of other, significantly less work-intensive solutions may be effective, but has obvious drawbacks.

Taking these factors together, two classes, 2-Hi and 6-Hi showed strong and steady collaborative dialogue across the semester with a reasonable level of public teaching presence – just three interventions from the instructor in 2-Hi (language arts) and 27 interventions from the instructor in 6-Hi (science). Class 3-Hi, a course in Social Studies, achieves all 26 of its collaborative events within just four weeks during which discussions were assigned. This high concentration of collaborative events was exceptional. The extent of collaborative dialogue within each of these events was also unusually high for VHS. The average thread depth (total layers of reply-to-reply linkages) was five and the average thread length (number of postings included in a single collaborative event) was 13. Comparatively, both 2-Hi and 6-Hi's thread depth was four and their average thread lengths were only five and six respectively. All three of these courses show particularly high density of collaboration among learners; two over fifteen weeks and one over four weeks. All three suggested closer scrutiny would be especially useful for understanding what other teachers might adopt to increase collaborative dialogue in their classes.

Indications of Learning in Collaborative Dialogue

Evidence of learning was assessed using the number of lines of text in collaborative events directly linked to explicitly stated course learning goals. In Class 2-Hi, 95% of posting content in collaborative events was linked to course goals. In 6-Hi, 90% was linked and in 3-Hi, 99% of collaborative content was linked to course goals. Learners consistently produced comments highly focused on learning goals. Therefore, learners were enriched by engaging in collaborative dialogue in the sense that learning occurs when learners must respond to the multiple perspectives of their peers on new content, continuing to make sense of what they are learning as they converse (Brown & Duguid, 2002; Bruffee, 1999; Harasim, 2002).

For example, the following post meets the stated course objective, “Reflect on your life experience, applying the author’s philosophies, in writing and discussion” by 100% in 2-Hi, a literature course. The discussants were asked to compare the meaning of love romantically and realistically, in the context of an analogy made to salt crystals on a branch conceived by the French philosopher Stendahl. This learner built on a previous discussant’s comment in a posting entitled “salt branch and crushes,” stating,

This theory was really interesting to me because it sounds so familiar! It really reminds me of the part in *Gone with the Wind* (if any of you have read that) where Scarlett discusses what she felt for Ashley as being “in love with a pretty suit of clothes.”

I think we’ve all been there before. It’s so easy to fall “in like” with someone when all you know about them is what you yourself made up. It’s not so fun when the “crystals shake off” and you realized you just wasted so much time on someone who wasn’t really worth it!

In an example from 6-Hi, the topic was depleted uranium (called “DU” in the comment). The discussion explored the question, “What responsibility do we have to workers who are exposed to radiation or have been exposed to radiation in the past?” Again, the following posting was made by a discussant building on the comment of previous participants. This post, titled “Re: Depleted Uranium,” was also 100% on topic. Note the explicit linking to a previous comment in the opening:

[Name] mentioned that DU is a toxic element, which is the main reason why DU is dangerous. Think about the substances people consume everyday that are toxic...tobacco and alcohol are two prime examples of toxic substances (consumed daily by many) Can we blame the government for getting diseases from using these toxic elements? Sure, these are by choice – but DU has not shown strong evidence of illnesses directly from the substance.

Student posts into content-related discussions are predominately content focused in all the classes examined. All types of linking comments extended and expanded upon the sense-making activity of the group. The majority of comments that followed an initial student generation of ideas link to the preceding comment with an extension of the thought, a confirming example, a probing question for clarification, a suggestion or, occasionally, a statement of disagreement, correction or alternative interpretation. A small number of these postings include off-content material. For example, appearing occasionally are opening approval comments (“Great idea!” and “I agree!”), more socially-oriented additions such as “This past week has been crazy for me...” or qualifiers like, “You don’t have to follow my suggestion, it’s just my opinion.” Another common social comment is an apology, for example, “Sorry this is so long!” It is noteworthy that these tangential comments accumulated more in lower collaboration classes. Class 1-Lo’s collaborative events were 85% on-topic, Class 2-Lo’s were only 76% on-topic. All the higher collaboration courses’ collaborative events were over 90% on-topic. In the higher collaboration classes the knowledge-building occurred in an observably more focused way.

An Interpretative Model

Analysis of overall course design features, evaluation criterion, discussion activities, instructor moves made both in private feedback and class discussions, as well as participant behavior suggested that fostering and maintaining online dialogue about course content at the secondary level is difficult. To elicit and sustain online discussions requires a balanced interplay among elements of course design, teaching practice, and evaluation such as the following.

- Collaborative dialogue occurred when the instructor assigned a relatively high percentage of the course grade to discussion postings (25%) and provided frequent, private, constructive feedback that emphasized the importance of dialogue, pointing out what students were doing correctly to that end and describing what more they might do to extend peer discussions.
- Collaborative dialogue also occurred when the instructor assigned a relatively high percentage of the course grade to discussion postings (40%) and quantified qualities of collaborative postings using a detailed rubric. Expectations included asking questions of one another, responding to each other's questions, or adding details to another student's response.
- A third approach that effectively fostered collaborative dialogue combined elements of the first two approaches and heavily structured activities by giving students specific collaborative roles. In this case, 100% of the course grade was based on discussion participation and a model for how to interact is presented in the first week. Students are required to acknowledge they understand and accept the collaboration-based grading policy in an email to the instructor. Also, discussion activities are clearly structured. Students are given specific tasks to do: ask a question, contribute information about a topic, or moderate the discussion for the group.

For example, Class 6-Hi, a science course exploring nuclear physics, included regular controversy of the week (COW) discussions on such topics as food irradiation, nuclear defense, or Hiroshima. The expectations for COW discussions beyond the basic discussion rubric were delineated on every COW assignment document, including the following procedural expectations:

- Remember, to complete this assignment you
- should comment on the topic based upon what you know now.
 - may *respond to others at any time*.
 - should do some research on your own.
 - check on the "facts" (can you confirm or dispute information supplied?)
 - expand the "facts" (for example: ...)
 - add to our knowledge (did you find some relevant information that would help in our discussion?)
 - identify websites with related information.
 - should *return to this thread a couple times before weeks' end to add comments*.

Assessment: Total Points Available=40

- 10 points for posting your initial comments in the CR (by Thursday)
- 10 points for adding something to the discussion...knowledge, a website, etc. (by Friday)
- 10 points for *responding to at least two others* (by Sunday)
- 10 points for your final thoughts about the topic (Monday or Tuesday)

Before making your final comment you should read all other comments posted. Your final comments may include something you learned, something that surprised you, a summary, a shared thought, what you consider important about the topic, what you still wonder about, etc. (Italics added.)

Questions for discussion do not have a right answer or just a few possible avenues of exploration; the net of possible responses is cast widely. Evaluation in the course emphasizes participation in such discussions, and collaboration is explicitly valued in the individual activity directive cited above. In particular, the instructions for the "final thoughts" posting involve the expectation that postings will reflect that students have considered everything previously posted to the dialogue. By suggesting they highlight new learning, surprises, shared thoughts, or what remains less understood, the instructor re-opens inquiry through the final days of dialogue, holding open the potential for additional extended discussion to take place. A balanced interplay between design elements, explicit teaching about how to collaborate and clear links to evaluation and grading led to collaborative dialogue focused on learning goals.

Additional Observations

In less collaborative courses, sub-optimal elements not present in the most collaborative courses were also noted. For example, public evaluations of individual learners by instructors were substantially more evident in the lower collaboration comparative courses. This finding confirms that avoiding public praise or negative personal comments fosters a sense of open inquiry and safety for participants (Collison *et*

al., 2000; Rowe, 1969). Regular, personal public comments may reduce learners' sense of freedom to explore beyond "right" responses. Safety for taking intellectual risks in class discussions is likely reduced. It is therefore preferable to keep both positive and negative comments about individual student work largely within the domain of private feedback.

In the courses analyzed in this study, the commonly used VHS teaching strategy of building into assignments the expectation that learners must post to discussions more than once is not sufficient to promote collaborative dialogue among learners. Such directives as "respond to at least one or two comments of your peers" without the additional supportive scaffolding described above usually resulted in an initial comment followed by a list of independent responses, with few participants building on another respondent's comment. Of the 112 classes surveyed following the spring of 2003 semester, 59% were dominated by thread depths of only one or two. Participants followed directions as they were written by posting independent responses to other students' postings without engaging in dialogue.

Another finding in comparing less collaborative and more collaborative course dialogues was that regular participation by the instructor in the content-related discussions was not essential. More effective ways of being consistently supportive and available to learners included regular private feedback, timely presence in private threads that are available for students to query instructors any time, and prompt responses to questions about assignments or technical issues.

Discussion

Based on the results of this study, VHS teachers and others seeking to promote collaborative dialogue may want to consider including (or revising) discussion activities to more effectively encourage learners to engage collaboratively around content. The cases in this new study provide a variety of approaches that worked in three different disciplines, language arts, science and social studies. Adopting an approach that is most likely to enhance collaborative dialogue would require attention to discussion activity designs, development of a rubric or another form of explicit teaching approach to showing learners how to become more collaborative with their online discussion postings, and direct linkages between achieving collaborative dialogue and course evaluation or feedback.

Encouraging collaborative dialogue and monitoring individual contributions to discussions are both simpler tasks than encouraging collaboration through group projects. Facilitating collaborative dialogue does not pose the challenges commonly associated with assigning collaborative group projects. Common problems for virtual participants in collaborative group projects include coordinating a plan and coming to agreement on a topic, on scheduling and honoring internal due dates, and on fairly dividing the work. Since peers are more anonymous than they would be in a face-to-face context, these challenges are more difficult than in classroom settings.

For the instructors, encouraging collaborative dialogue and monitoring individual contributions to discussions requires discerning whether all group members contributed – this can pose challenges as well. However, by monitoring and promoting collaborative events, instructors can discern when learning is evident in the higher-order thinking that emerges, when posts to online discussions move beyond initial brainstorming, and when dialogue matures and intensified to create sustained collaborative events. All three of the most highly collaborative courses examined in this study exhibited these indicators of mature dialogue among students.

There are also limits to these findings. The most significant is that it reveals only those heuristics already utilized in existing VHS courses. For example, some approaches may be less useful in other disciplines not represented in the courses analyzed for this research, or in any course where discussion is not of clear pedagogical value (as in a self-paced, independent training module). In addition, strategies used by instructors in other virtual schools may expand the repertoire of moves instructors can use to promote collaborative dialogue. In a *Best Practices* session at this conference, "Facilitating Deepened Online Learning" I present an approach to online facilitation of dialogue that promotes and sustains collaborative dialogue for deepened learning. It is described in a book I co-authored with others at The Concord Consortium, **Facilitating Online Learning, Effective Strategies for Moderators** (Collison et al., 2000). Without the training needed to learn how to use interventions that focus or deepen dialogue, instructors are unlikely to adopt the strategy on their own.

Finally, this study is only a beginning. The model developed will be strengthened with testing. An experimental research design will reveal whether the model can be adopted and replicated in other online classroom contexts. The findings from this project begin to reveal elements that support online collaborative dialogue on the secondary level. This study takes an important step toward assessing the quality of online learning in achieving content-based collaborative dialogue. It draws insight directly from work of VHS practitioners, with the explicit intent of enhancing the credibility and usefulness of the research for online instructors seeking realistic approaches to enhancing collaborative dialogue in their online courses. The methodology and strategies that were derived in this study can set the stage for the next level of work in improving online instruction and the professional development for online instructors.

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