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Key Factors of Online Course Design and Instructor Facilitation That Enhance  
Collaborative Dialogue Among Learners\*

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\* **Tapping Online Dialogue for Learning: A Grounded Theory Approach to Identifying Key Heuristics that Promote Collaborative Dialogue Among Secondary Online Learners** (Haavind, in press) is the full report on this study.

## ABSTRACT

A particularly challenging aspect of online teaching is promoting collaborative dialogue among students that supports instructional goals. This study identified online instructor facilitation, course activity designs and evaluation rubrics that promoted extended, substantive dialogue in Virtual High School (VHS) classes ([www.govhs.org](http://www.govhs.org)). Collaborative dialogue was recognized in *collaborative events* that contained a minimum thread depth of four linked comments discussing course content. Archival data and discourse analysis suggested an interplay among four key elements was needed to promote collaborative dialogue: social community among participants, collaborative activity designs, explicit teaching of how to collaborate, and evaluation of collaborative participation.

## INTRODUCTION

Online collaborative dialogue is considered a potentially powerful tool for learning (Hiltz & Goldman, 2005; Roberts, 2004). However, achieving such extended learner exchanges focused on course content continues to challenge online instructors (Hmelo, Guzdial, & Turns, 1998; Oliver & Shaw, 2003; Sorensen, 2004). Learners do not spontaneously engage the unique reflective advantage of the new medium. Pioneers of online collaborative learning (A. Brown, Ellery, & Campione, 1998; Harasim, Hiltz, Teles, & Turoff, 1996; Scardamalia & Bereiter, 1994) have observed that fostering a sense of community enables learners to take greater advantage of the medium. Yet, fostering a socially motivated learning community doesn't necessarily lead to the more desirable form of intellectual community where students are learning content as a result of substantive peer dialogue (Picciano, 2002). For example, Angeli, et al. (2003) reported that many highly interactive online discussions are more social than substantive.

Strategies are needed for encouraging learners to use text-based dialogue to foster a classroom-like “community of inquiry in which students listen to one another with respect, build on one another’s ideas, challenge one another to supply reasons for otherwise unsupported opinions, assist each other in drawing inferences from what has been said and seek to identify one another’s assumptions” (Lipman, 2003).

Text-based, asynchronous online delivery requires that instructional design and teacher behavior shift to fit the new medium (Harasim, 2000). When learners can’t see one another and may never meet each other or the instructor, moving a group from social communication and direct teacher-student exchanges to a more reflective level of peer interaction, or collaborative dialogue, requires new approaches. If online learning is to serve as a major educational medium in the future, understanding the pedagogical strategies that foster content-focused dialogue online is essential. Further, robust empirical research studies are needed that demonstrate enhanced learning as a result of online learner collaboration (Graham & Misanchuk, 2004). This paper describes a study that begins to address these needs. I examined secondary courses from the Virtual High School™ (VHS) to identify key factors associated with collaborative, content-focused dialogue on the secondary level. In order to pursue Lipman’s vision (2003) of collaborative dialogue, exchanges among students need to have sufficient depth and levels of engagement that enable students to build on one another’s thinking and deepen their content learning. In this study I set a standard for collaboration as requiring a minimum thread depth and length of four postings, indicating that students were replying to one another.

### The Virtual High School

Online course offerings on the secondary level have been increasing rapidly. Distance education opportunities existed in about 36% of US public school districts during

the 2002-2003 academic year. Most of these districts (72%) reported plans to expand distance education offerings in the future (Setzer & Lewis, 2005). The Virtual High School is considered an exemplary model for pre-college online learning (Zucker & Kozma, 2003).

The VHS is a collaborative effort among public high schools in which teachers at participating schools develop and offer online courses that are open to secondary students from all participating districts. The project was first launched in 1996 with a 5-year, \$7.4 million dollar Technology Challenge Grant from the U.S. Department of Education to the Hudson (MA) Public Schools in collaboration with The Concord Consortium. The concept involved accredited high schools entering into a collaborative relationship in which teachers from those schools would lead virtual courses in exchange for seats for local students in the VHS, twenty seats for each semester class taught. Ten years later, VHS is a vibrant, independent organization. Over 6,000 students are currently enrolled in more than 200 VHS classes. The 324 member schools include schools in 27 states. Twenty-four member schools are international schools from around the world. The student body in 2005 was 57% female and 43% male. Course offerings include such titles 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.

According to the authors of *The Virtual High School: Teaching Generation V*, in the area of online courses on the secondary level, VHS leads in promoting student-to-student interaction and collaborative approaches to learning content (Zucker & Kozma, 2003). However the evaluators also stated, “Generating a high level of student participation in the CourseRoom (online discussion area) is a significant problem for VHS teachers” (p. 65). This was the case in spite of the fact that VHS teachers reported using constructivist pedagogy that would encourage such participation.

In an examination I conducted of the CourseRooms of the 112 VHS courses offered in the spring of 2003, 66 courses or 59% contained student-to-student exchanges. However, the majority of these exchanges were simply single replies responding directly to the initial comment. The initial discussant rarely responded to the replies. This reflected a low level of interactivity among peers. Students were not interacting beyond singular posts, resulting in minimal exchange rather than extended student-to-student dialogue or collaborative co-construction of understanding among learners (Benbunan-Fich, Hiltz, & Harasim, 2005; Oliver & Shaw, 2003). Only six percent, or seven courses, exhibited ten or more occasions across the fifteen-week semester of student-to-student interaction involving four or more linked postings that represented students actually discussing the content of the course with each other. That semester, the remaining 35% of VHS courses did not use the course discussion area for dialogue at all.

In their evaluation of the VHS, Zucker and his associates at SRI (2003) found that fostering content-focused dialogue was one of the most significant challenges to secondary level online instruction. Parallel challenges have been documented in higher education (Angeli et al., 2003).

#### PURPOSE OF THE STUDY

This study examined VHS courses from the Spring, 2003 semester achieving the highest levels of substantive peer dialogue to determine what the teachers and learners who engaged in the most extended dialogue did to promote such dialogue. I analyzed course design, instructor activity, and peer discourse related to the extended dialogues achieved in those courses. I also compared higher collaboration courses with more typical, lower collaboration courses to ascertain factors that were unique to the high achieving classes.

#### Research Questions

The questions for research were:

1. What design and facilitation strategies did VHS teachers who were highly successful at fostering and maintaining asynchronous online dialogue about course content use to promote collaborative dialogue focused on course learning objectives?
2. Were these strategies different in kind or degree from those used by other VHS teachers in courses that could support equivalent collaboration levels, but that had much lower levels of such dialogue?
3. In addition, in both types of courses did patterns exist in the student-to-student interactions themselves that further extended or discouraged collaborative dialogue?

In particular, I assessed the presence of content exploration evident in the collaborative exchanges in order to weigh the effectiveness of some strategies over others for promoting focused discussion on and deepened exploration of stated knowledge goals. Increased understanding from this comparative analysis is intended to support other instructors seeking to enhance the level of learner dialogue in their online courses.

## RESEARCH CONTEXT

Collaborative learning is identified by online learning scholars and researchers as the preferred pedagogical approach to learning with Internet-based educational tools (Barab, Kling, & Gray, 2004; Curtis Jay Bonk & King, 1998; Duffy & Kirkley, 2004; Garrison & Anderson, 2003; Hiltz & Goldman, 2005; Roberts, 2004). Earlier research on learning through dialogue (A. Brown et al., 1998; A. L. 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. In contrast, lack of interaction limits opportunities for students to verbalize thinking and to test their emerging understanding against alternative points of view, two strategies that are central to learning (Li & Hayes, 2003). The value of collaborative dialogue is asserted by Bruffee (1999), Brown (2000), Brown and Duguid (2002), Lamon, Laferriere and Breuleux

(in press) and others. According to Benunan-Fich, Hiltz and Harasim (2005), “conversation, argument, and multiple perspectives that arise in groups contribute to such cognitive processes as verbalization, cognitive restructuring, and conflict resolution.” (p. 28.) In a study of several hundred undergraduates taking online courses, Navarro and Shoemaker (2000) verified that student-to-student interactions had a higher correlation ( $p=.24$ ) to performance than student-to-instructor interactions ( $p = .10$ ). This finding confirms and extends the enhanced learning gains established by Johnson and Johnson that resulted from peer support rather than from instructor support in face-to-face classrooms (1999).

Learning through peer collaboration is traditionally understood to involve activities where peers work together to create a product (Bruffee, 1999; Johnson, Johnson, & Holubec, 1994; Slavin, 1986). Such group work poses particular challenges in a distributed, asynchronous environment (Dirkx & Smith, 2004; Graham & Misanchuk, 2004). A primary difficulty with conducting team work or collaborative projects online is how poorly online asynchronous courseware supports such group work (Kitchen & McDougall, 1999).

Yet, the medium can lend itself to peer collaboration through dialogue. Harasim (2002) described the emerging role for computer-mediated conversation as “the shift from seeing technology as a cognitive delivery system to using it as a means to support collaborative conversations about a topic and the ensuing construction of understanding” (p. 183). Bruffee highlights the potential of conversation for deepened thinking (1999). Aviv describes asynchronous learning networks as “cooperative learning enhanced by extended think time” (2002), since the asynchronicity provides learners the opportunity to reflect and think through a response before responding. Bender suggests, “we can think of teaching and learning as being comprised and communicated by the words that flow between teacher and student, as well as student and student.” (Bender, 2003 p.56).

Specifically, invitations to learners to post comments to discussions of class readings, science labs, or math problems, to peer-review one another's assignments (Riel, Rhodes, & Ellis, 2005), or to share questions and insights about a learning experience can prompt participants to collaborate, or "co-labor." That co-laboring online becomes *collaborative dialogue*.

The online medium for learning also poses inherent challenges to instructors seeking to foster collaborative dialogue. The social cues that support learner collaboration in a face-to-face classroom are easily taken for granted. These include the facility with which class members exchange eye contact, facial expressions, and body language. Before learners feel comfortable joining in a goal-directed dialogue, alternative methods of fostering a sense of social community and trust must be implemented in a text-based, asynchronous environment (Garrison & Anderson, 2003; Gunawardena, 1997). Thinking out loud with peers, quick exchanges, brainstorming, and the use of shared visual artifacts are automatic in a face-to-face environment. Online, these collaborative activities take place predominately with text (Lankshear, Peters, & Knobel, 2002). Therefore, new skills must be developed, taught, and learned to achieve effective collaboration in this literary context (C.J. Bonk, Wisher, & Lee, 2003; Garrison & Anderson, 2003). This study represented an important step toward identifying unique characteristics of online classes that extended learner dialogue around content.

The research design for this study was based on a grounded theory approach (Glaser & Strauss, 1967; Strauss & Corbin, 1994, 1998; Vaughan, 1992). To extrapolate an explanatory interpretative model, I examined VHS courses where the highest collaboration among learners was achieved. I validated the emergent model by comparing these high collaboration courses with equivalent, more typical, low collaboration courses to ascertain



which instructor moves or course design features were most likely to have made the difference.

## RESEARCH METHODS AND DATA ANALYSIS

To date, research on online collaborative learning is scant (C. J. Bonk & Dennen, 2003; Roberts, 2004). The challenges to researchers include difficulty with controlling variables among classes and the replication of findings. According to Roberts (2004),

Rarely is it possible to compare circumstances where variables such as class size, student background, curriculum and even the level of enthusiasm of the instructor are effectively controlled. This may be one reason why many educators remain unconvinced of the potential benefits of (online) group learning. (viii)

However, the body of literature is growing as researchers attempt to minimize these obstacles by building on and extending existing research into online educational contexts. I adapted recently developed online course dialogue frameworks (Collison, Elbaum, Haavind, & Tinker, 2000; Harasim, 2002) to approach the challenge of drawing conclusions from VHS course data.

My approach involved the following major steps: First, I selected for analysis all seven high collaboration classes and the only two comparable, lower collaboration classes. I then analyzed the discourse in collaborative events within those courses to ascertain focus on course content and learning goals. Having established the quality of collaboration, I turned to factors that may have been associated with the level of collaborative dialogue in each class. I examined instructor facilitation moves within class discussions. I examined evaluation rubrics and feedback for connections between learner collaboration and grading. I probed patterns of instructional design for factors that may have influenced collaborative dialogue. Finally, I sought patterns in the moves made by participants to test whether factors other than facilitation or instructional design may have influenced the level of collaborative

dialogue in the classes studied. I organized the findings into an interpretative model for future empirical research and testing.

Only seven of the 112 courses offered in the Spring 2003 semester met the high collaboration standard of ten occasions or collaborative events within class discussions related to course content that contained a minimum thread depth of four linked comments. Four of these courses achieved over 25 collaborative events. A summary of my findings in the VHS courses based on the number of collaborative events contained in each class is presented in Table 1 below.

<b>In a 15-week semester, of the 112 courses offered that exhibited discussion areas with:</b>	<b>Total number of courses</b>
<b>A</b> No content-related forums	31, or 28%
<b>B.</b> Content forums used only for submitting assignments	8, or 7%
<b>C.</b> Content forums with thread depths of 1 or 2	51, or 46%
<b>D.</b> A total of between 5 and 9 collaborative events with thread depths of more than 3 or some other evidence of collaboration, for example peer review of student work.	15, or 13%
<b>E.</b> A total ten or more collaborative events	7, or 6%

**Table 1: Frequency of Collaborative Dialogue in the VHS during the Spring, 2003 semester**

I performed a “purposeful sampling” (Maxwell, 1996, p. 72) of the seven high-collaboration courses (row “E” above) with the goal of conducting multi-class case comparisons (Miles & Huberman, 1994; Ragin, 1987; Vaughan, 1992) of variables that contributed to sustained student dialogue among those courses.

I also included a cross-comparison with two low-collaboration (fewer than 10 collaborative events across the same semester) classes. In that same semester, just two of the seven higher collaboration classes had second sections taught by different teachers, but exhibiting low levels of collaboration, more typical of the VHS overall. These pairs of classes

were both replicas of the same online courses, modified by the individual instructors according to their preferences.

Course 1	Course 2
Class 1Hi Collaboration <i>Teacher A</i>	Class 2Hi Collaboration <i>Teacher C</i>
Class 1 Lo Collaboration <i>Teacher B</i>	Class 2 Lo Collaboration <i>Teacher D</i>

**Table 2: Four Comparable VHS Classes**

In both cases revisions to content were limited, and an overall similarity was apparent in the nearly identical syllabi and course documents, making the two classes comparable or equivalent for my purposes, though not identical.

VHS generously provided me with copies of archives of each of the nine courses sampled for the study. The archives contained full course records, including course documents, a complete set of discussion transcripts, and individualized instructor feedback documents, as well as homework, tests and projects submitted by learners and graded by instructors, including interim and final grades. Essentially, everything that transpired between instructors and students, including private conversations stored in “private groups” for individual students and the instructor, was contained in these archives. Private email and instant messaging may have taken place, but neither of these modes of communication was condoned officially by VHS for course communication. Therefore all formal course work was highly likely to be contained in the archives I received.

I named the seven “high” collaboration courses 1 Hi through 7 Hi and the two comparable, lower collaboration courses 1 Lo and 2 Lo. Classes 1 and 2 Hi and 1 and 2 Lo were language arts classes. Two classes (5 Hi and 6 Hi) were science classes. The remaining three, 3 Hi, 4 Hi and 7 Hi, were social studies classes.

Close examination of the seven high collaboration courses initially sampled revealed that three of them, a language arts class (2 Hi), a social studies class (6 Hi) and a science class

(3 Hi) exhibited the highest levels of sustained collaboration combined with notably low levels of instructor activity in the discussions. The first row of Table 3 below shows the number of instructor postings found in content-based discussions of all seven high collaboration classes. The second row shows the number of collaborative events in these seven classes.

Classes	1-Hi (LA)	<b>2-Hi (LA)</b>	<b>3-Hi (SSt)</b>	4-Hi (SSt)	5-Hi (Sci)	<b>6-Hi (Sci)</b>	7-Hi (SSt)
# posts	24	<b>3</b>	<b>6</b>	0	4	<b>27</b>	125
# CEs	18	<b>29</b>	<b>26</b>	14	26	<b>29</b>	27

**Table 3: Number of posts entered into content-based dialogues by instructors and frequency of collaborative events (CEs) in high collaboration classes. “SSt” refers to Social Studies, “LA” refers to Language Arts and “Sci” refers to science classes.**

The instructor in 7 Hi exhibited an unusually high number of postings directly in class discussions of course content: an average of over 8 comments per week, given a fifteen-week semester. The instructor in 4 Hi inserted no interventions into content-based dialogues and the class exhibited the fewest collaborative events within the sample. Such factors made these classes less useful for answering the research questions.

The combination of less direct involvement by the instructor along with higher collaboration (Classes 1, 2, 3, 5 and 6 Hi) was of particular interest. One additional consideration was factored into the final design: Two of the high collaboration classes with low instructor involvement, Classes 1 Hi and 5 Hi, exhibited strong collaborative dialogue activity during the first half of the semester, but it was not sustained during the second half of the semester. However, in classes 2, 3 and 6 Hi, discussion was sustained throughout all weeks discussions were assigned. Therefore, the instructional design and facilitation approaches evident in those classes; classes 2 Hi, 3 Hi and 6 Hi, were most useful for answering the research questions.

I also divided my study into two major phases. For Phase One, I conducted a comparative study between the two high collaboration classes that had comparable, low-collaboration counterparts (classes 1 and 2 Hi and Lo). For Phase Two, I conducted a close analysis of the three classes that exhibited the most sustained, highest collaboration with minimal direct instructor involvement in class discussions (classes 2, 3 and 6 Hi). I compared them to all the other classes sampled to see what made the instructional design and facilitation of those classes so highly successful at fostering collaborative dialogue.

Once classes were identified and the study design was set, I conducted three passes through the discussion discourse data in order to establish the overall quality of collaborative dialogue in each class. First, I color-coded all collaborative events with thread depths of four or more according to Harasim's framework for analyzing collaborative dialogue (2002). Her categories were content-based idea generating, idea linking, and convergence. I added two additional categories, social (e.g., "Thanks!") and evaluative (e.g., "I agree!"), to better fit the VHS data. In a second pass, I assigned percentages to each portion of every posting by category in order to quantify the content. Finally, I started again to match stated learning goals with the message content of each posting, assigning each post a new set of percentages based on direct alignment of discourse with learning goals.

I trained a second individual to code a random sample of the full data set in order to ascertain inter-coder reliability using the Cohen's Kappa measurement. The rating was .8865 or a percentage agreement of 92.68%. Results greater than .70 are considered acceptable (Bakeman & Gottman, 1997) and greater than .75 are considered excellent (Fleiss, 1981).

Once I established the frequency and extent of collaborative, goal-oriented dialogue present in each course, I turned to instructor moves in the public discussions to begin identifying patterns that could be associated with learner engagement in collaborative

dialogue. I categorized instructor postings using an open coding procedure. I applied the Collison et. al. (2000) taxonomy of facilitative voices (for example, *Conceptual Facilitator* or *Reflective Guide*) and critical thinking strategies (e.g., *identifying a direction* for further exploratory dialogue or *making connections* among learners' insights) to interpret facilitative interventions into learner dialogues. Table 4 below shows examples of each of the categories identified in VHS instructor postings into content dialogues. The categories are organized by the general instructional processes identified by Garrison and Anderson (2003). Cohen's Kappa agreement was .9415 with a second rater.

General Processes	Specific Indicators	Examples of Indicators
Fostering Cognitive Presence	Voice (e.g., conceptual facilitator, reflective guide) & critical thinking strategy (Collison et al., 2000)	"Okay (Name) et al, (sic) Can you discuss why: 'it is a good example of how a short story should be written'? Go beyond saying it's creepy."
Other forms of Teaching Presence	Public Praise	"Good job on your setting sketch. I can't wait to read your story."
	Negative Evaluations	"This is supposed to be a setting sketch – time, place, mood. You've gotten into the story. Please redo."
	Constructive Criticism	"Hi (Name), This reflection on 'homeland' is so general, it could be about virtually any story. If this one didn't strike you as good, perhaps try a different one that would give you specifics to talk about."
	Direct Instruction	"We are well past animal testing for irradiated food. It is being consumed now, by people around the world, including some products in the U.S."
	Offering resources	"Another book you would probably enjoy is <i>Bird by Bird</i> by Anne Lamott. It will make you laugh out loud, and think hard about your writing, and writing habits."
	Probe	"Hey (Name), What are you saying here? Can you be more specific?"

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Collegial joining in as a participant	“Glad to hear other people love this book; I’m having fun reading it with my sophomores right now, and most are into it, but you know how some kids drag their feet...I just wish the first 100 pages weren’t so slow. (I think that qualifies as a nasty run-on sentence!) My advice to students is usually, read faster!”
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**Table 4: Indicators of Teaching Processes in content-based fora.**

I also sought out all course design features (rubrics, phrasing in discussion assignments, teamwork, etc.) from the course archives that could be related to collaborative behavior among participants.

I then checked for participant influences on collaboration. To analyze participant influences, I coded the collaborative event data once again by categories related to fostering peer engagement (asks peers a question, restates peers’ statements, etc.) and created a summary of descriptive statistics. I examined participation levels by student to ascertain if high collaboration classes simply arose by virtue of a few students, one or the other gender dominating class participation, or some other factor.

I finally weighted the overall value of different instructional strategies based on both the frequency and extent of collaborative dialogue across the semester in each course examined. Thus, I was able to answer the question: which approaches or combination of approaches were most effective at nurturing and sustaining learner dialogue centered directly on stated course learning goals?

#### Reliability and Validity

Archived online course data offered a unique opportunity for data collection since the research conducted had no impact on the classes examined. I studied them in their near totality without intruding. Numerous passes, or “check-coding” (Miles & Huberman, 1994)

were made through the same discourse data for open-coding, and re-coding to assess personal reliability and to correct errors. A second coder also coded a random 10% of the discourse data in order to assess reliability and the results were strong.

The strengths of my methodology were the completeness of my data set, that is the full archives of all seven high collaboration courses taught in a single semester of VHS, and the direct access both reader and researcher can have to the raw text-based data. There was no intervening field note stage or videotape, audiotape, or transcription to come between the research and the full research “field” or VHS course archives. I included two low collaboration class cases that did not appear to fit into the formulation, yet were as closely equivalent as possible to the cases considered in the study. Analyzing comparable “negative” cases, in which collaboration was low to determine what properties and dimensions existed in those classes as well, but with an opposite effect, supported the validity of the final interpretative model I constructed. I conducted member-checks with the instructors whose courses I analyzed to insure the accuracy of my descriptions.

Now that the study is complete, the interpretative model should be tested internally by VHS instructors. A new study with an experimental design could compare two semesters of the same class taught by the same teacher: the semester in which he or she attempts to shift practice toward the design and teaching approaches suggested by the research could be compared with a previous semester archive. Such a “pre-post” research design would test and strengthen the model constructed in this initial project.

Theoretical saturation was achieved in one sense, but not in another. By analyzing all of the high collaboration courses within the set of courses taught during one VHS semester, I captured a full picture of effective approaches to fostering high collaboration in VHS classes. However, I was limited to examining only what teachers were already doing. There



were many things these VHS teachers did not try that might further enhance collaboration in their classes. The role of this research was to highlight what has already been accomplished, in the context of all the potential barriers and challenges VHS instructors may collectively face. A grounded theory approach was useful here for providing a starting point for teachers wishing to increase collaborative dialogue among learners.

## FINDINGS

Key findings after conducting both phases of the study were:

### **Collaborative Dialogue Quality**

- In the collaborative events, learners consistently conducted discussions of content that were highly focused on explicitly stated learning goals.

### **Instructor Moves**

- Although it was anticipated that facilitation meeting the criteria for focusing interventions described in Collison et. al.'s *Facilitating Online Learning* (2000) would be evident in the highest collaboration classes, that was not the case. These interventions were infrequent. Other instructor moves stood out instead.
- Collaborative dialogue occurred when the instructor assigned a relatively high percentage (25%) of the course grade to discussion postings 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 (class 2 Hi).
- Collaborative dialogue was also associated with an instructor who assigned a relatively high percentage (40%) of the course grade to discussion postings and quantified qualities of collaborative postings using rubrics supported by highly detailed collaborative designs for discussion assignments (class 6 Hi).
- A third approach that appeared to foster collaborative dialogue combined elements of the first two approaches and heavily structured activities by giving students specific collaborative roles (class 3 Hi). In this case, a significant percentage (66%) of the course grade was based on discussion participation and a model for how to interact was presented in the first week. Students were required to acknowledge they understood and accepted the collaboration-based grading policy in an email to the instructor. Also, discussion activities were clearly structured. Students were given specific roles: ask a question, contribute information about a topic, or moderate the discussion for the group.
- Higher interactivity was associated with instructors who avoided entering public discussions primarily to praise or negatively evaluate students.

### Instructional Design

- Across all courses examined, the development of social community among learners was evident in ice breaking activities and designated discussion fora for non-academic, social exchange, laying a consistent foundation of social bonds and the potential for collaborative dialogue.
- Directing students to post responses to their peers' comments in content-related discussions did not, in itself, enhance collaborative dialogue. Instead, it promoted a consistent thread depth of one or two.
- Discussion activity designs that specifically structured collaboration worked best.

The remainder of this section further describes these findings.

### Collaborative Dialogue Quality

Table 5 below shows the percentage of substantive collaborative dialogue using Harasim's (2002) collaborative categories (representing idea generating, idea linking or idea convergence discourse) in the collaborative events in the highest collaboration courses, 6 Hi, 3 Hi and 2 Hi, along with the comparative courses, 2 Lo, 1 Hi, and 1 Lo from the comparative phase. The substance of postings within collaborative events in 2, 3 and 6 Hi proved to be highly content-focused. Therefore all three highest collaboration courses exhibited substantive dialogue in their collaborative events.

Classes	1 Hi (LA)	2 Hi (LA)	3 Hi (SSt)	6 Hi (Sci)	1 Lo (LA)	2 Lo (LA)
<b>%Collab</b>	90%	<b>95%</b>	<b>96%</b>	<b>90%</b>	85%	76%

**Table 5: Percentage of Text in Collaborative Events that was Content-Focused**

Evidence of learning goal-related dialogue within those events was then analyzed for 2 Hi, 3 Hi, and 6 Hi to assess direct support for learning course content within collaborative events. Some collaborative events took learners deeply into subject matter. Others were not central to stated knowledge goals. This reflects a difference in quality of dialogue as a tool that supports learning goals. To assess evidence of dialogue directly linked to course learning goals in the classes where collaboration was both highest and sustained, I matched

lines of text in postings to stated learning objectives for the week or for the course. I then summed the lines related and those not related to learning goals in each course and divided the number of lines related to learning goals by the total number of lines to find a percentage of extended dialogue pertaining to learning goals. The results are presented in Table 6 below.

Course	% Collaboration in CEs	% Evidence of Dialogue in Support of Stated Learning Goals
1 Hi	90%	
<b>2 Hi</b>	95%	<b>95%</b>
<b>3 Hi</b>	96%	<b>94% or 99%*</b>
<b>6 Hi</b>	90%	<b>98%</b>
1 Lo	85%	
2 Lo	76%	

**Table 6: Collaboration and Learning Scores** \*A major digression in 3 Hi during March of 2003, a course about world conflict and the United Nations, focused on the controversial start of the war in Iraq. The dialogue was not directly related to course learning objectives. If that “digression” to a related current event is considered a digression from learning goals, only 94% of lines of discussion strictly adhered to stated objectives. If the discussion is considered at least indirectly related to the goals of the course, 99% of the lines of dialogue were directly linked to course goals.

Once again, within content-related discussions, learners consistently produced comments highly focused on learning goals. Unlike the participants of online discussions examined by Angeli et. al. (2003) these VHS students rarely strayed from the subject at hand. Therefore, much could be learned from the instructor moves and course designs of all three of these courses.

### Instructor Moves

VHS instructors are not specifically trained how to intervene in course discussions to focus or deepen student dialogue. Use of the Collison et. al. (2000) taxonomy for identifying such interventions revealed that, without knowledge of such approaches for enriching dialogue, few VHS teachers have discovered the approach on their own. Instead, other factors were associated with higher collaboration in these classes. In all three cases, discussion participation counted as a significant part of the course grade. In addition, none

of these instructors inserted criticism or praise of an individuals' coursework directly into the public discussion fora.

Grading policies in the three highest collaboration classes were distinctly different from one another, though they all linked the quality of discussion postings to course evaluation. The instructor in 6 Hi offered only numerical grades for both activities and discussion postings. This quantified approach to evaluation was supported by explicit and detailed directions for posting to discussions that I describe in the next section on instructional design elements.

In contrast, the instructor in 2 Hi did not use rubrics or provide details specifically about how to collaborate in the directions given for class discussions. Instead this instructor provided detailed, individual feedback that emphasized the collaborative nature of learners' discussion postings. The feedback provided by this instructor was unique in its explicit urging of learners to discuss, not just post, to earn full credit. Here's an example from the grade book for a student who was not doing well. Dialogue is explicitly encouraged:

I see 5 posts from you in those two weeks. This does not meet the minimum number of required posts for this two-week period. If you intend to stay in the class (and I sincerely hope you do) I need to see a dramatic turn around in the amount of work you are doing. This is going to require a lot of work from you--it is possible to catch up--but you must start sooner instead of later.

I'm not seeing any of the required follow-ups from you *that we so urgently need to build momentum and depth in our discussions.*

It is important that everyone checks in at least 3 times each week. Cramming assignments in at the end of a week or not doing them on time has *detrimental effects on the quality of our discussions, and it affects your participation mark. This class is about interacting, discussing, and engaging ideas with other classmates throughout the week -- not merely turning in assignments at the end of a week.* Fair enough? So be sure to spread your participation out more so we can get your grade up. (Italics added.)

In another example, a student was doing much better, and the 2 Hi instructor emphasized what the learner was doing well, specifically pointing to the student's

contributions toward sustained dialogue. The instructor cited specific phrases from the learner's postings to demonstrate exactly the type of contributions sought.

I see 18 posts from you in two weeks. While you didn't make that minimum number, *you have posted a number of quality "builds" in our discussions. This is especially true when you wrote:*

Had Goblin Market been written in present times, women would have been portrayed much differently. In those days, the only role women had in sexuality was fulfilling the man's needs and desires. Things have changed, in a society that both sexes are out to satisfy themselves. Their roles in public are no longer being silent and beautiful but having a voice, opinions and independence are looked highly upon. Christina Rossetti's poem would have portrayed the females as a little wiser in their actions, a little less dependant on the goblin's company and their fruit and they wouldn't have allowed for the mistreatment, swiftly calling a women's abuse hotline.

*Do you see what this post has to offer to the group . . . you have taken the discussion to a new and interesting place and offered direction for others to take up in follow-up posts. This is exactly the type of post we are looking for. Hurrah!! (Italics added.)*

Specific guidance was offered to improve the collaborative quality of discourse.

The instructor in 3 Hi, similar to instructors in 2 Hi and 6 Hi and unlike the other courses examined, also emphasized the importance of dialogue for maintaining a high grade point average. In this course, 66% of the total private feedback grades focused on class discussion participation, and 33% on written assignments. Dialogue was emphasized and expected. The course overview included statements such as the following two. The first clearly describes how to interact:

Participation: For this course to be successful it is necessary for us to interact with each other. This means that you and I must interact as well as you interacting with your fellow students. . . . When discussing, simply responding "I agree" does not constitute meaningful interaction as far as I am concerned. If you are participating in a discussion and you find yourself agreeing with another student *it would be better if you stated: I agree with Fred particularly when he stated \_\_\_\_\_*. This shows me that you are indeed paying attention to the discussion not just randomly responding to discussions in order to complete the assignment. [Expectations and Quality of Work in Start Here] (Italics added.)

The second emphasizes what happened to the student’s grade if s/he did not post more than four times per week:

Important Note Regarding Discussion Grades: One area of this class that prompts the most student questions to me is that of grading discussion. Students are graded on both the quantity and quality of their participation during discussion weeks. The minimum amount of student participation during a discussion week is four comments posted on different days. Some students in the past have been unsure about what “minimum” participation means. “Minimum” means the lowest possible passing grade will be given for four comments posted on different days during discussion weeks. A minimum passing grade is 60% or “D-“ So in other words should a student post four comments on different days during a discussion week they will receive a 60% for that week. [Grading Policy: Week 2]

A comparison of the evaluation related to discussion participation in all courses examined is presented below in order of greatest to least percentage of course grade explicitly allotted to participation. Class 3 Hi weights participation most heavily, with discussion participation accounting for 66% of the final grade. In contrast, in classes 4 Hi, 5 Hi and 7 Hi, no overall percentage of the course grade for participation was given in the beginning of the course.

Course	% of Course Grade	Discussion Rubric	Min # of postings per week
3 Hi	66%	Yes: offers detail about how to collaborate	Minimum 4 for “D - for week”
6 Hi	40%	Yes: highly detailed about how to collaborate	<i>None given</i>
1 Hi	30%	“Must follow directions, respond w/detail” only	Minimum 3
2 Hi	25%	Yes: offers details about how to collaborate	Minimum 10
1 Lo	20%	<i>None given</i>	Minimum 3
2 Lo	17.5%	Yes – but does not focus on collaboration.	Minimum 8
4 Hi	<i>None given</i>	<i>None given</i>	<i>None given</i>
5 Hi	<i>None given</i>	<i>None given</i>	<i>None given</i>
7 Hi	<i>None given</i>	<i>None given</i>	<i>None given</i>

**Table 7: Evaluation of Discussion Postings and Discussion Posting Rubric Compared**

The comparison above suggests that providing a clear discussion rubric from the beginning and then substantiating the expectation by making discussion participation a significant part of the final grade may have made an important difference. The rubric in class

1 Hi was limited to the phrase, “Must follow directions, respond with detail.” The differences between the rubrics provided in class 2 Hi and in class 2 Lo help to explain the differing result. Phrases from introductory documents are compared in a side-by-side matrix in Table 8 below (*italics added*):

Phrase	Class 2 Hi	Class 2 Lo
<b>Minimum Participation</b>	10 comments and <i>responses</i> to your classmates' posts	8 solid, substantive, task-centered postings per week
<b>How to reply to others</b>	Quote or paraphrase the ideas of your classmates as you <i>build upon their ideas</i>	Not stated
<b>Keep abreast of postings (by reading everything)...</b>	...and to <i>post follow-ups</i>	Not stated
<b>Percentage of final grade</b>	25%	17.5%

**Table 8: Emphasis on collaboration compared in introductory documents of classes 2-Hi and 2-Lo.**

More emphasis on collaboration in such course documents did not alone appear to increase or enhance collaboration. However, in this case the tone was clearly set differently and contrasting outcomes resulted. Most significant, participation was weighted more heavily in the final grade for class 2 Hi, and regular, individualized feedback reinforced this initial set of expectations, which seems to have caused better outcomes.

Another form of evaluation – public feedback to individuals – was found in the lower collaboration courses, but not in the highest collaboration courses. The possibility of receiving a public evaluation, if this is not conducted sensitively, can easily discourage the kind of personal risk-taking required for speaking up and sharing ideas in a learning context. Unmitigated negative feedback, delivered publicly in front of peers, discourages free participation for obvious reasons (Bender, 2003; Rovai, 2004). Positive feedback or praise can also have detrimental effects (Rowe, 1969). The authors of *Facilitating Online Learning* (Collison et al., 2000) reported that, in their learning dialogues, praise tended to shut down further dialogue. They suggested public words of approval, directed to individuals from the instructor, may give the message the topic need not be explored further since someone has

already posted a satisfactory response. Another reason praise might discourage continued participation is that it is given to some and not others. This pattern is suggested in classes 1 Lo and 2 Lo. These instructors' public evaluations ranged within a single discussion forum from "redo" to "super job."

In a text-based environment, it is not difficult to figure out who receives what type of feedback from the instructor and how often. Across the evaluation spectrum from criticism to praise, such public comments can detract from participants' likelihood of contributing insights to a growing dialogue, especially in the context of new content knowledge where understanding is emerging. Therefore another key finding of this study was that neither public criticism nor public praise, placed directly into discussions, enhanced collaborative dialogue.

### Instructional Design

All seven of the higher-collaboration courses were designed with promoting dialogue as a goal. All of them had in place key features for establishing social presence, including social networking activities in the first two weeks and active student lounge-like social fora open throughout the semester. These were expected features in all VHS classes that research supports as critical for fostering collaborative learning online (Garrison & Anderson, 2003; Swan, 2003; Swan & Shea, 2005).

Based on the initial survey of the spring 2003 VHS CourseRooms, instructors who implemented discussion activities typically set an expectation for students to respond to a peer's initial posting as part of a given assignment. The most likely result of such a directive unaided by additional interventions was a thread depth of one or two.

Discussion prompts that engaged socially bonded communities with collaboratively structured discussion assignments appeared to make a difference, however. In the less



successful courses, less focus on collaboration was evident. One of the higher collaboration science classes where numerous discussions centered on controversial topics related to science surprisingly only achieved irregular collaborative dialogue. An example of a prompt in that course was,

Think about the following questions and make a comment to the discussion called “Environmental Problems.” What do you think is Earth’s most serious environmental problem? What caused, or causes, the problem? How do you think this problem should be dealt with?

The limitation evident in this example was that there were no instructions about how (or whether) to build on one another’s thinking. Nor was there a generic “respond to the comments of your peers” statement. Collaboration was neither emphasized nor specifically graded (and, as indicated by the wording of the question itself, may not have been the intention in this case). Both explicit teaching about how to post collaboratively and direct linkages to expectations and grading appeared essential if collaborative dialogue was a goal.

Classes 6 Hi and 2 Hi offered similarly open-ended discussion prompts with more positive results. However, closer examination indicated the questions and the related directions more explicitly promoted collaboration. For example, in class 6 Hi the Week 4 controversy of the week (COW) discussion on “Food Irradiation” prompted the most collaborative events of all the discussions assigned in the course.

The question for dialogue was, “Should the U.S. allow greater use of irradiation to decrease food contamination?” Seventeen background facts were provided in a list form, such as, “Washing food does not remove all bacteria,” “Irradiated food is given to medical patients with weakened immune systems,” and “At least 40 developed countries use food irradiation although it is not extensively used in the United States today.” The expectations for COW discussions beyond the basic discussion rubric were delineated on every COW assignment document. They included 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: How many people die each year due to food poisoning?)
- 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.)*

This discussion question did not have a right answer or just a few possible avenues of exploration; the net of possible responses was cast widely. Evaluation in the course emphasized participation in such discussions, and collaboration was explicitly valued in the individual activity directive cited above. In particular, the instructions for the “final thoughts” posting involved the expectation postings would 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-opened inquiry through the final days of dialogue, holding out the possibility that additional extended discussion could still take place.

In class 2 Hi, the structure was more open-ended; yet, as described in detail earlier, the private feedback was specific. For example, the discussion forum that prompted the most collaborative dialogue in that class was titled “Need Love and Gift Love in Anthony and Cleopatra.” It stated,

...This week, we’re trying out a different theory, courtesy of *Narnia Chronicles* author, C.S. Lewis. What did you think of his theory and description of love and its four types? What impressed you or seems worth discussing further? Are there connections to this theory in the play we’re reading right now (Shakespeare’s Anthony and Cleopatra)?

Post your initial comments to this discussion starter early in the week. *Stop back later to read others’ ideas, and post a follow-up that helps us unpack our ideas further.*

Assessment: Posting at least two well-developed, thoughtful comments that

- 1) Show your understanding of C.S. Lewis' theory in a timely manner and
- 2) *Demonstrate active listening and interaction with your classmates* will earn you credit for this required assignment. (Italics added.)

Class 2 Hi participated in a whole class discussion for this assignment.

A different version of this assignment appeared in class 2 Lo that shifted a similar activity to a structured question-and-answer format. Students were required to post initial thoughts and then respond to two peer submissions. The task stated:

**\*\*Note:** visit this thread a couple times during week six.

Early in the week, post your initial responses to the web site reading, and then later in the week, stop back to *respond to a couple of your group members' ideas*. You need to post at least three well-developed comments for your participation grade.

In your initial post, answer at least three of the questions from group A and answer the question in group B. Please cut and paste these questions in to your comment so we know what you're responding to.

A. (Choose three)

1. If there are four types of love (Affection, Friendship, Eros, and Charity), how can need and gift love be considered broad categories to sort the four types?
2. Is an understanding of God and religion necessary to understand Lewis' concepts? Why or why not?
3. What is the difference between Need-Love and Gift-Love? Is one better than the other? Is this a helpful distinction?
4. In Lewis's Affection an adequate characterization of parent-child love? Is that the only thing it is good for?
5. Is Lewis's definition of Friendship adequate? Does it describe your own?
6. How, exactly, is Eros different from sexuality?
7. Describe what it would look like for a love to be transformed by charity.

B. (This question is mandatory)

1. Choose a character from the play and explain the type(s) of love that they seem to be engaging in. Choose specific, textual examples to support your ideas. (Italics added.)

Class 2 Lo was divided into two small group discussions for this assignment, even though the class contained only seven active students.

It makes sense that the conversation might be more stilted based on the version of the assignment provided in 2 Lo. Students offered many intriguing ideas and raised a variety of topics. However, the assignment itself did not encourage conversation. In class 2 Lo, evaluation and feedback did not regularly focus on collaborative dialogue or co-construction

of understanding. Therefore, dialogue remained limited to the level of brainstorming thoughts and reactions.

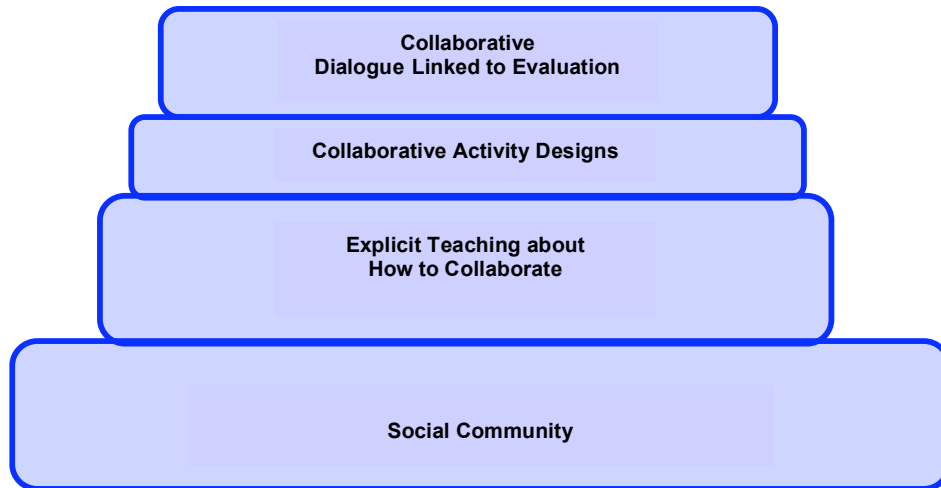
In contrast, the directions in the assignment version in class 2 Hi cast a wide net that encouraged extended dialogue by asking, “What impressed you or seems worth *discussing further?*” Additionally, the 2 Hi instructor asked students to “read others’ ideas, and post a follow-up that helps us *unpack our ideas further.*” This instructor also clearly linked assessment to collaborative dialogue when he stated, “Demonstrate active listening and *interaction with your classmates* will earn you credit for this required assignment.” (Italics added) These collaborative framings of discussion assignments, supported by detailed, individual feedback appeared to make the difference in class 2 Hi.

#### INTERPRETATIVE MODEL

I conducted this study to identify specific moves instructors made in their online courses that fostered and helped to sustain collaborative dialogue among learners. Carefully coordinated combinations of instructor moves appeared to be particularly effective. The overall course design and activity structures also appeared to make an essential difference in promoting collaborative dialogue. While some strategies were quite successful, other approaches, such as heavily intervening in course discussions, took up valuable time, but had less impact on increasing dialogue, and a few practices, namely publicly posting direct praise or evaluations of student work, may have unintentionally or unnecessarily disrupted or curtailed collaborative dialogue.

The interplay among key elements – (1) a socially-bonded community, (2) design features such as rubrics, or a collaborative frame for discussion assignments, that explicitly promoted collaborative dialogue, (3) direct linkages in feedback or evaluation to meeting these expectations, and (4) direct teaching, either in directions to students about how to

participate or individual feedback on how to collaboratively engage in dialogue around content – were essential to enhance collaborative dialogue in these online courses. Overall, online course instructors and designers who pay detailed attention to all four key elements were most likely to promote robust and sustained collaborative dialogue among learners.



**Figure 1: A balanced interplay among elements of course design, teaching practice and evaluation, all resting on a foundation of social community, was needed.**

### Significance

One of the most significant contributions made by this study is not in its findings, but in its methodology. The methodology used for this study successfully identified facilitation strategies and design choices that appeared to enhance learner interactivity. Harasim's categories of idea generating and idea linking for analyzing collaborative postings provided a useful initial framework for analyzing the contents of collaborative events. Collison et.al.'s taxonomy for interventions that focus and deepen online dialogue would have supported analysis of the public moves that promoted collaborative dialogue had instructors used them. VHS does not train its instructors in advanced facilitation skills. Elements of the taxonomy were only occasionally implemented by the instructors in this study. However advancing VHS instructors' capacity with actively focusing and deepening

dialogue may be a useful area for future development. Additional modes of analysis were developed in the course of this study that may be useful as well. For example, by examining thread depth and thread length in the context of a standard rubric that identifies collaborative events, researchers can more adequately assess the nature, extent, and effect of collaboration on student learning. Based on this work, it is clear that the research methods used in the study, as well as the emerging interpretative model, may be useful for future research on learning online

In addition, the findings suggest teachers could be taught to deepen collaborative learning in their online courses. Testing this model would be the next step. To better target sustained collaborative dialogue among learners, interested VHS instructors could make revisions in their pedagogical approaches and online classroom activities based on the interpretative model. Increases in collaborative events could be monitored. A training and support program using examples drawn from this research could be paired with an experimental research study designed to provide quantitative, comparative analysis of pre-revision discussion outcomes with post-revision discussion outcomes.

Also, experienced VHS instructors could receive a second level of online professional development. Revisions to courses would adapt the integrated approach to enrich discussion activities. Pre- and post comparisons of collaborative events and thread depth within collaborative events could be conducted to discern improvements. The present study has laid the foundation, but more needs to be done to apply and test the emergent interpretative model.

## CONCLUSION

The importance of interaction for learning is well established (A. L. Brown & Campione, 1994; Lea & Nicoll, 2002; Rogoff, 1994; Scardamalia & Bereiter, 1994). Kozma

and Zucker (2003) reviewed a variety of online secondary programs and found that even the exemplary Virtual High School lacked the level of student-to-student interaction sought by its instructors to support higher-order critical thinking in online dialogue. They indicated that research on what approaches best support extended student dialogue was needed. The systematic analysis of online learner exchanges and instructor moves conducted in this study addressed that concern and added to recent research that analyzes discourse transcripts from online classes in higher education (Garrison, Anderson, & Archer, 2001; Harasim, 2002; Meyer, 2003; Moller, 1998; Sheingold, 2005).

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 for 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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