Assessing Teaching Presence in

Instructional Computer Conferences

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Abstract

This research first reviewed theoretical models, criteria as well as methodologies for measuring teaching presence in text-based instructional computer-mediated conference (CMC). Then, used the tool originally developed by Anderson, Rourke, Garrison, and Archer to conduct a discourse analysis. Subject of the research were 273 instructors' messages (out of 1735 posts) in fifteen sessions of five online courses from one Midwestern and one eastern university.

The research revealed that 1) patterns of teaching presence clearly existed in practices of online instruction; 2) preferred types of teaching presences appeared to be different in initial, mediated, and completing phases of online instruction; 3) serious student-student discussion was rarely occurred thus some types of teaching presence were often missing. The study also suggested modifications being made on three indicators to the original coding scheme.

Keywords

teaching, discourse analysis, formal education, online learning

Introduction

According to the report from National Center for Education Statistics, during the 2002–03 an estimated 8,200 public schools, had students in the district enrolled in distance education courses. In addition, college-level, credit-granting distance education courses were offered by 55 percent of all 2-year and 4-year institutions. Moreover, during the 2004-05, over thirty-five percent of 35-54 years old adults have taken distance education courses. With the

growing number of courses offered online and degrees offered through the Internet, quality of online instruction requires more concerns. How will learning outcomes be ensured and improved? How will effective communication be established through online discussion? How new knowledge and understandings construct through instructional scaffolding?

The advancement of online technologies now makes it possible for instructors to plan, implement, and support non-linear, interactive, learner-centered online courses. Electronic discussion board provides a nature framework for augment critical thinking in computer-mediated teaching. It provides a number of ways that teacher can use to develop cognitive and social skills, if teachers know how to present themselves effectively in online discussion. The question is how well have online teachers ready for that? Previous studies (Conrad, 2004) showed that online instructors have very little awareness of collaborative learning and often do not recognize the role of instructor in online learning environments.

Two reasons the researcher began a research on teaching presence in virtual environment in higher education. Firstly, the researcher intended to examine the categories and indicators of teaching presence concluded by previous researches. Have the measurement tools covered necessary criteria for assessing teaching presence? Secondly, the researcher intended to find the pattern existed, or not existed, in current practice in terms of the types of teaching presence demonstrated. Have online instructors emphasized on particular types of teaching presence in difference phases of a course?

Literature Review

In Moore's transactional distance theory (1980), transactional distance is defined by the relationship between the instructor and the learner. Two key variables affecting perceptions of distance are dialog and structure. Moore's study implied that a balance of these

two variables would enhance transactional presence, reduce teacher-learner distance and improve the quality of learning.

What was the exact meaning of balance between structure and dialogue? How could the weight of structure and dialogue be measured? For online learning, the key factor was how instructors control the discourses in terms of instructional design and organization, discourse facilitation, and direct instruction (Anderson, Rourke, Garrison, and Archer, 2001).

Teaching Presence

To examine learning and teaching in computer conferences, Garrison, Anderson, and Archer (2000) developed a "community of Inquiry" model that contained three overlapping elements, cognitive presence, social presence, and teaching presence. They argued that these three elements were indispensable for supporting the creation of deep and meaningful learning results. Among the three, teaching presence was the one that assessed the role, behaviors and the primary responsibility of online teachers. Teaching presence is the most essential elements among the three because "Appropriate cognitive and social presence, and ultimately, the establishment of a critical community of inquiry, is dependent upon the presence of a teacher" (Garrison et al., 2000).

According to Garrison et al. (2000), "Teaching presence is defined as the design, facilitation, and direction of cognitive and social processes for the purpose of realizing personally meaningful and educational worthwhile learning outcomes." Learning and teaching in an online environment are like teaching and learning in other formal educational context. Learner needs are analyzed; framework and strategies are prescribed; content is designed and developed; learning activities are implemented; and learning outcomes are assessed. The difference was that online learning environment was supported by unique computer technologies. The most compelling feature of this context is the capability for supporting

synchronous and asynchronous educational interactions and the ability to deliver content in various formats such as text, video, audio, and multimedia. Both teachers and students could create content that are accessible in every home and workplace. Today, many educators would agree that technology is ready for supporting effective distance teaching and learning; however, what kind of teaching presence tends to spur the most debate, discussion, critical thinking, and knowledge construction? What have senior online instructors done?

Effective teaching presence demand explicit and detailed discussion of the criteria on which student learning will be assessed. A teacher who cultivates a presence of flexibility, concern, and empathy will reflect these characteristics in the style and format of assessment (Anderson, 2004).

Could teaching presence sustain upon interposing of communication technologies? Garrison's research (2000) suggested, "Teaching presence can be created and sustained in computer-conferencing environment, despite the absence of non-verbal and paralinguistic cues."

Content Analysis

Theoretical Framework

The functions of a teacher were more observable in the physical classroom than in the virtual conference where teachers and students do not meet each other face-to-face. In text-based discussion, the situation is even more critical. All emotional, social, and instructional interactions have to be communicated via text. To understand the effect of teacher behaviors in computer conferencing environment, researchers have to analyze the discourse recorded by computer.

Models for discourse analysis have evolved along the years, including Henri's five dimensions model (1992), Gunwardena, Lowe and Anderson's five-phase interaction analysis

model (1998), the Biggs' SOLO taxonomy (1999), and Garrison, Anderson, and Archer 's critical thinking and practical inquiry model (2000). Sometimes, Flanders interaction analysis model (1967) for classroom observation was referred by some researches, too.

Henri developed a model of qualitative criteria for content analysis on online discussion in 1992. The model examined five dimensions of discourses occurring in computer-mediated communication: (1) student participation; (2) electronic interaction; (3) social cues; (4) cognitive skills and depth of processing; and (5) metacognitive skills and knowledge (Henri, 1992 as cited in Hara et al., 1998). The last two dimensions of Henri's model were often used as a separate framework to highlight individuals' internal cognition (Hara et al., 1998; Rourke et al., 2001; Anderson et al., 2001; Garrison et al., 2000; Newman et al., n.d.; Hara, 2000; Gunawardena et al., 1998; McLoughlin et al., 2002; Dieter, 2007). The five levels of cognitive skills suggested by Henri's cognitive dimension are considered similar to Benjamin Bloom's (1956) Taxonomy of Educational Objectives for the cognitive domain (Hara, Bonk, & Angeli, 1998) or more Piagetian sense (McLoughlin & Panko, 2002).

Gunwardena, Lowe and Anderson model aimed at "examining the negotiation of meaning and co-construction of knowledge in collaborative learning environments". (Gunawardena, 1998) Gunawardena suggested following five-phase interaction analysis model:

Phase I: Sharing/comparing of information

Phase II: The discovery and exploration of dissonance of inconsistency among ideas, concepts or statements.

Phase III: Negotiation of meaning/co-construction of knowledge

Phase IV: Testing and modification of proposed synthesis or co-construction

Phase V: Agreement statement(s) / applications of newly-constructed meaning

(Gunawardena, 1998)

Biggs' SOLO (Structure of the Observed Learning Outcomes) taxonomy (1982) classified student responses according to the level of inherent complexity: pre-structural, uni-structural, multi-structural, relational, and extended abstract (Biggs & Collis, 1982, as cited in McLoughlin, 2002). The model is primarily designed for the print-based word in order to examine the complexity of students' responses. Researchers used SOLO to assess students' surface and deep learning approaches (McLoughlin, 2002; Holmes, 2004) or to distinguish higher order thinking (HOT) within transcripts of dialogue. (Hatzipanagos, 2006) Other researches used the SOLO taxonomy to analyze and delineating conceptual process (Hatzipanagos, 2006).

Anderson, and Archer 's critical thinking and practical inquiry model (2000) suggested three core elements for online learning interaction: cognitive presence, social presence, and teaching presence (Garrison et al., 2000). The researchers developed a measuring tool with categories, indicators and sample sentences corresponding to each element for analyzing and coding transcripts from CMC. Shea, Pickett, & Pelz (2003) who used the Garrison and et al's model in their researches, reported that the framework and categories were comprehensive for examining online discussion.

Amidon & Flanders's interaction analysis system was developed in 1967. The model was primarily developed for analyzing interaction occur in the classroom has been used for over three decades in many studies (Freiberg, 1981 as cited in Saba, 2007). Flanders divided the system into three major categories and ten sub-categories. Among them, seven sub-categories described teacher behaviors; and two sub-categories described learner behaviors in discussion. Later researches made modification on Flanders model to create instruments that

suited for current electronic learning environment. For example, in the research of Saba &
Shearer (1994), researchers modified Flanders model by adding additional categories, such as
communication maintenance, and advanced organizers, which were particular to
communication via electronic means and instructional design requirements (Saba, 2007).

Indicators

A set of precise criteria for content analysis are prerequisite for a reliable conclusion.
Different supportive theories deduce different indicators. Many evaluations of computer
conferencing transcripts were quantitative analysis (Hatzipanagos, 2006; Newman et al., n. d.)
that examined overt attributes of messages. Indicators for quantitative methodology were often
obvious such as number and time of logons, the message senders and receivers, number of
replies, number and length of student messages, etc. These indicators were easy to recognize.
Focus of this section is on the indicators for measuring both overt content and covert content
of the transcripts. In addition, since this research meant to study presence of teachers, the
discussion of indicators here will skip those indicators developed for assessing student oral
behaviors.

Flanders categories for interaction analysis might be the most time-honored and
widely adopted instrument for analyzing teacher-learner conversation. The tool identified two
major categories and seven sub-categories. In the study conducted by Saba and Shearer (1994),
the researchers made adjustment and added additional subcategories to Flanders categories
considering the characteristics of electronic media and the requirements of instructional design.
The revised tool contains ten categories and twenty subcategories as shown on Table 1.

Major Categories	Categories	Sub-Categories
Direct	Guidance	• Advance Organizer • Communication Maintenance

	Direction	
	Request	
	Information	• Declaration • Concept • Example • Procedure • Principle • Elaboration • Clarification
	Questions	• Inquisitive • Claritive • Directive
	Response	• Supportive • Directive • Corrective
	Pace Pause	
Indirect	Guidance	
	Questions	• Inquisitive • Claritive • Elaborative
	Response	• Inquisitive • Supportive

Table 1 Categories for instructor discourse analysis (Saba & Shearer, 1994)

Anderson, Rourke, Garrison, & Archer (2001) build a comparatively complete set of indicators for cognitive presence, social presence, and teaching presence through ground theory analysis of transcripts. Among them, the particular tool for assessing teaching presence contained three categories and eighteen indicators as shown on Appendix. Each indicator accompanied with a sample sentence that showed certain key words or phrases (Anderson et al., 2001). Table 2 is one of the coding schemes for the category of direct instruction.

Indicators	Examples
Present content / questions	"Bates says. . . what do you think"
Focus the discussion on specific issues	"I think that's a dead end. I would ask you to consider…"

Summarize the discussion	"The original question was . . . Joe said . . . Mary said . . . we concluded that . . . We still haven't addressed . . ."
Confirm understanding through assessment and explanatory feedback	"You're close, but you didn't account for . . . this is important because . . ."
Diagnose misconceptions	"Remember, Bates is speaking from an administrative perspective, so be careful when you say . . ."
Inject knowledge from diverse sources, e.g., textbook, articles, internet, personal experiences (Includes pointers to resources)	"I was at a conference with Bates once, and he said . . . You can find the proceedings from the conference at http://www..."
Responding to technical concerns	"If you want to include a hyperlink in your message, you have to . . ."

Table 2. Coding scheme for Direct Instruction, by Anderson, et al (2001).

The indicators for analyzing transcripts of computer conferences have transformed from broad and ambiguous to specific and precise. However, researchers still found that content analysis relied on adequate amounts of training from raters to avoid interpretive bias (Rourke et al., 2001). Even providing with example sentences, "interrater reliability for individual indicators was varied according to the manifest versus latent nature of the indicator." (Rourke et al., 2001 b)

Unit of Analysis

One of the essential steps for content analysis is to identify the units of text that would be recorded, classified and considered. The goals have been to select a unit that multiple coders can objectively identify and a one that exhaustively and exclusively encompasses the sought-after construct (Rourke, Anderson, Garrison, Archer, 2001 a).

Rourke et al. identified five types units that have been used in computer-mediated conferencing researches including sentence units, proposition units, paragraph units, thematic units; and message units. In their research, they reported that message unit was the most reliable and practical units to use because message unit combined the flexibility of the

thematic unit with the reliable identification attributes of a syntactical unit (Rourke, Anderson, Garrison, Archer, 2001 b).

Methodology

This research used the recorded transcripts from five fully online teacher development courses at two leading graduate schools of education in the United States. These collaborative courses were delivered between Fall of 2005 and Spring of 2007 by three senior online instructors. Four of the courses were six-week in duration while one was a four-week online course. Student numbers for each course were 30, 22, 24, 13, and 22. The courses were chosen because it took advantage of asynchronous learning management software systems, e.g. Desire2Learn. The learning management system automatically recorded all discourses posted by instructors and students. The students had background of teaching in k-12 or higher education. Each week or session (bi-week) corresponded to a distinct topic such as Applying ISD to the Design of Instruction. Study materials, assignment activities, and threaded questions were announced on course websites before the class began. Student contributed to the weekly discussion at least once a week as the basic requirement of the courses.

Data and Instruments

The result of literature review described in the previous section provided the rationale for selecting the criteria developed by Anderson and et al. as a starting assessment instrument of this research. Content analysis was utilized as the research technique. The set of procedure included collecting sample transcripts; pilot testing the original coding scheme; adding more example sentences to each indicators; discussing problematic coding concerns between raters; data coding and stored the results in spreadsheet software for analyzing.

Other than qualitative data, following quantitative data were also collected:

- Total number of messages posted per week/session

- Number of messages posted by instructor per week/session

- Number of messages posted by instructor per indicators

Unit of Analysis

In this study, message was taken as the smallest unit of meaning. Although messages were often continue for several paragraphs in the courses analyzed, they tended to respond one inquiry such as "Share your experience from the process of renovating your instructional objectives". To divide one message into subdivision would not provide more insight for discourse analysis. Moreover, taking message as unit of analysis saved a large amount of time which was extremely limited to this research. However, when one message showed multiple ideas, the message was allowed to be assigned to more than one indicator.

Analysis and Findings

Since one of the instructors barely had participated in discussion, data gathered from the two courses, Course Code 121 and 122, facilitated by that instructor were counted out when calculating frequencies.

Course Code	Institution Code	Instructor Code	Session No.	Number of Messages by Instructor	Total Message Post
111	1	11	1	32	116
111	1	11	3	22	230
111	1	11	6	20	62
211	2	21	1	23	73
211	2	21	3	18	66
211	2	21	6	3	14
221	2	22	1	41	142
221	2	22	3	54	121
221	2	22	6	45	98
121	1	12	1	1	87

121	1	12	3	1	306
121	1	12	4	1	144
122	1	12	1	8	87
122	1	12	3	1	17
122	1	12	6	3	172
Total				273	1735

Table 3. Basic information of subject coded.

The Criteria for Assessing Teaching Presence

According to the literature review, the tool developed by Anderson et al. appeared to have considered at most characteristics of current computer-mediated instruction. After coding 273 instructor posts (1735 posts in total) at fifteen sessions from five online courses, the research suggested the following modification be made to the Anderson tool.

No.	Indicators	Suggestions	Reasons for suggestions
1.5	Establishing netiquette	Expand the scope to include all managerial tasks	Managerial area is one of the major responsibilities of online instructors (Berge, 1995). Instructors need to respond to organizational, procedural, and administrative concerns from students. Example posts like, "No great problem, but keep it. . ."
2.5	Drawing in participants, prompting discussion	Expand the scope. Not only invite comments on particular questions but also include "asking relevant questions" for promoting discussion	Ways for drawing in participants are vary. Urging students to think wilder, e.g., "Your observation is right on target. Are there different. . .? Or are there various dimensions. . .?" "I was wondering what you thought of. . ." "if you could give us one or two particular examples. . ." was a technique commonly used by online instructors,
3.6	Inject knowledge from diverse sources, e.g., textbook, articles, internet, personal experiences (includes pointers to resources)	Add sub-indicators of "Identifying relevant elements" and " Identifying relevant elements reformulating the problem". (Hara, Bonk & Angeli, 1998)	Including pointers to diverse resources is only one of the techniques for injecting knowledge. Instructors could also provide relevant element to the target topics or even reformulate the problem to address related issues that students might have ignored. Example posts like, "I'm game to put. . ." ". It could be. . . if you're not. . . And it could be. . ."

Table 4. Modifications to the Anderson tool

Patterns of Teaching Presence

In the initial session, 35% online instructor effort was devoted to encourage, acknowledge, or reinforce student contributions. 22% of instructor effort was used to create an open, warm, and trust climate for learning.

During the intermediate phase of a course, online instructors used 20% of their time to clarify and diagnose students' misconceptions. 16% of their effort was focused on traditional role of teachers by presenting content and questions to direct attention to particular concepts or information for framing knowledge. Upon receiving responses from students, 9% of online instructors' posts were used to express their appreciation and understanding while providing assessment and explanatory feedback to promote deeper thinking. In the meanwhile, online instructors did not forget to maintain active engagement by encouraging or acknowledging students' contribution (8%), drawing in participants, and prompting discussion (8%). Establishing netiquette, dealing with organizational, procedural, and administrative matters also occupied 8% of instructor effort during intermediate phase of an online course.

Session No	Establish Netiquette	Encourage Contributions	Set Climate	Draw in Participants	Present Content	Confirm Understanding	Diagnose Misconceptions	Inject Knowledge
1		34%	22%	7%				
3	8%	8%		8%	16%	9%	20%	
6		32%				24%	9%	15%

Table 5. Frequencies of key indicators in different phases of online courses.

Before completion of a course, over 70% effort of online instructor were invested in acknowledging students contribution (32%), assessment and explanatory feedback (24%), and inject knowledge from diverse sources (10%) during the final session. Online instructors also wanted to make sure that students won't walk away with misconceptions (9%). An interesting phenomenon is, only 3% instructor effort was used to summarize newly learned knowledge in

final session of a course; however, reflective essay writing was included in all five online courses.

Several indicators were rarely used, less than 0.5%, by online instructors in this study, including "Seeking to reach consensus or understanding"; "Identifying areas of agreement or disagreement"; and "Assess the efficacy of the process". Moreover, most of the discourses were instructor-student conversation and instructors contributed 28% of the total posts. This might imply that, except in mandated activities, there were no real discussion between students occurred, even in courses that were instructed by experienced online instructors from leading graduate schools.

To tell by category, online instructors spent 45% of their effort in direct instruction, 42% in facilitating discourse, and 13% in instructional design and organization.

Limitation

The major limitation of this research was the small scale of data collection. Every online discussion has its own unique context; the researchers often had to assess a wider range of subjects to infer meanings that presented the actual status.

Conclusion

This study reviewed tools for assessing teaching presence, and examined a selected tool using data sets collected from real instructional discourses in CMC. The results showed that the role of teacher has changed in online learning. The instructors do not dominate learning like they used to. Role of online instructor has been transforming from instructor to facilitator in a observable speed during the past decade. Learning control has been passing on to students as constructivism suggested. The question is, has students ready to take the

responsibility of learning? Quality and quantity of student-student discussion did not provide optimal answer to that question.

What combination of teaching presence tends to spur larger amount of higher level thinking from student in online learning? How to inspire student-student discussion within a given timeframe? How could the instructor be aware of the process of critical thinking within a group dynamic? How to assess student cognitive skill level in order to measure learning results of a particular set of teaching presence and ultimately help online instructors working in today's emerging technologies? These are good questions left for future studies.

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Appendix

Coding scheme for instructional design and Organization

No.	Indicators	Examples
1.1	Setting curriculum	"This week we will be discussing. . ." "Our focus won't be on. . ."
1.2	Designing methods	"I am going to divide you into groups, and you will debate . . ." "I'll add another forum and let's get chatting about. . ."
1.3	Establishing time parameters	"Please post a message by Friday . . ." ". Time to do a quick trip to. . ."
1.4	Utilizing medium effectively	"Try to address issues that others have raised when you post."
1.5	Establishing netiquette	"Keep your message short."
	-- Managerial matters (organizational, procedural, administrative)	"Just a quick note. . . No great problem but keep it. . ." ""

Design based on coding scheme from Anderson & et al. (2001)

Coding scheme for Facilitating Discourse

No.	Indicators	Examples
2.1	Identifying areas of agreement/disagreement	"Joe, Mary has provided a compelling counter-example to your hypothesis. Would you care to respond?"
2.2	Seeking to reach consensus/understanding	"I think Joe and Mary are saying essentially the same thing."
2.3	Encouraging, acknowledging, or reinforcing student contributions	"Thank you for your insightful comments." "Your observation is correct generally" "It will be fun to have your perspective!"
2.4	Setting climate for learning	"Don't feel self-conscious about 'thinking out load' on the forum'. This is a place to try out ideas after all." "I have been on countless campus. . . (sharing experiences)"
2.5	Drawing in participants, prompting discussion	"Any thoughts on this issue?" "Anyone care to comment?" "It's a good question for us all to consider" "I was wondering what you thought of. . ." "if you could give us one or two particular examples. . ."
	-- Asking a relevant question	
2.6	Assess the efficacy of the process	"I think we're getting a little off track here." "I just want you to play with. . . so if the objectives are complex and numerous. . . trying to make sure you don't 'kill' yourself with work."

Design based on coding scheme from Anderson & et al. (2001)

Coding scheme for Direct Instruction

No.	Indicators	Examples
3.1	Present content/questions	"Bates says. . . What do you think?" "What do you see as the challenges to. . ." "How would you deal with small group members who fail to. . . "
3.2	Focus the discussion on specific issues	"I think that's a dead end. I would ask you to consider. . ." "No need to. . . This is one of those issues the group will need to talk about. . ."
3.3	Summarize the discussion	"The original question was. . . Joe said. . . Mary said. . .we concluded that. . . We still haven't addressed. . ." "Let's get those practice issues out on the table for a critical look!"
3.4	Confirm understanding through assessment and explanatory feedback.	"You're close, but you didn't account for. . . this is important because. . ." "I agree if. . ." "I agree but. . ."
3.5	Diagnose misconceptions	"Remember, Bates is speaking from an administrative perspective, so be careful when you say. . ."
3.6	Inject knowledge from diverse sources, e.g., textbook, articles, internet, personal experiences (includes pointers to resources)	"I was at a conference with Bates once, and he said. . . You can find the proceedings from the conference at http://www. . ."
	-- Identifying relevant elements	"I'm game to put. . ." "By starting with. . . and you are helping. . ."
	-- Identifying relevant elements reformulating the problem	". It could be. . . if you're not. . . And it could be. . ."
3.7	Responding to technical concerns	"If you want to include a hyperlink in your message, you have to. . ."

Design based on coding scheme from Anderson & et al. (2001)