

Assessing Teaching Presence in Computer Conferences

- A Literature Review -

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Introduction

According to the report from National Center for Education Statistics, during the 2002–03 12-month school year, about one-third of public school districts, 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 at either the undergraduate or graduate/first-professional level were offered by 55 percent of all 2-year and 4-year institutions. 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 attracts more and 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. While new media have proved their potential, the evaluation of online teaching has not been well studied.

This review seeks to examine existing reports on assessing teaching presence on text-based computer conferences, the framework they used and the indicators they developed. The ultimate goal is to learn about the weakness and strength of each framework and indicators for assessing teaching presence so that future studies could make a proper selection on research instrument.

Teaching Presence

To examine learning and teaching in computer conferences, Garrison, Anderson, and Archer (2000) developed a “community of learning” 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. However, computer-mediated platform creates a unique learning environment. The most compelling feature of this context is the capability for supporting synchronous or 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 teaching and learning; however, what kind of teaching presence tends to spur the most debate, discussion, critical thinking, and knowledge construction?

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).

Can teaching presence be established and sustained 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

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, the researchers need to conduct at least three steps before they could analyze the data. First, researchers derived behavioral indices from the categories defined by theoretical framework. Second, they collected representative text of communication. Third, they assigned numeric values to indicator texts according to measurement rules in order to describe communication or infer its meaning from the communication to its context. Some researchers called the systematic research techniques content analysis (Garrison et al., 2000; Hara, Bonk, & Angeli, 1998; McLoughlin & Panko, 2002; Newman, Webb, & Cochrane, n.d.) while others called it discourse analysis (Saba et al. 1994) or transcript analysis (Gunawardena, Lowe, & Anderson, 1998). Since content analysis, discourse analysis, and transcript analysis appeared to have referred to similar research methods in different researches on teaching presence, this literature review uses content analysis as a general terms for discussion.

The text-based nature of computer mediated instructional discussion made content analysis an effective method for assessing teaching presence because computer system recorded data faithfully. All researchers need to do is compare, contrast and categorize elements of written dialogue.

Many researches have been done. The researches have created a range of models for analyzing computer conferencing transcripts including Henri (1992), Gunwardena, Lowe and Anderson (1998), the Biggs' SOLO taxonomy (1999), and Garrison (2000). Some researches often refer to Flanders interaction analysis (1967), the system for classroom observation, too.

Theoretical framework

Teaching in online context is a complex form of education. Therefore, it is important for studies in this line of education to either keep with traditional studies in the field to avoid misunderstanding and confusion (Saba, 2007), or adopt an appropriate theoretical perspective that provide framework for particular research context (Anderson, Rourke, Garrison, & Archer, 2001).

Henri (1992) developed a model of qualitative criteria for content analysis on online discussion examining five dimensions for analyzing 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). Many researchers took the last two dimensions of Henri model as a separate framework that highlight individuals' internal cognition as they drafting theoretical framework for their content analysis (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).

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

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)

McLoughlin (2002) investigated on multiple perspectives on the evaluation of online discussion and concluded that Gunawardena model was “a more suitable tool for reflecting collaborative and social factors” than Henri model or Biggs taxonomy because “it proposed a social constructivist approach to knowledge building in an online environment.” Researches conducted by Rourke, Anderson, Garrison, & Archer (2001), McLoughlin & Panko (2002), Simonsen, L., & Banfield, J., (2006), and Zhu (2006) have all referred to Gunawardena model in their studies.

According to the web materials from Teaching and Educational Development Institute, The University of Queensland, Briggs’ SOLO (Structure of the Observed Learning Outcomes) taxonomy (1982) provided “a systematic way of describing how a learner’s performance grows in complexity when mastering many tasks”. Thus, the taxonomy classified student responses according to the level of inherent complexity: prestructural, unistructural, multistructural, 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).

Garrison’s Community of Inquiry (COI) model suggested three core elements for online learning interaction: cognitive presence, social presence, and teaching presence (Garrison et al., 2000). In addition, COI model described categories, indicators and sample sentences corresponding to each

element and constituted a template and tool for analyzing and coding transcripts from computer conferences. Shea, Pickett, & Pelz (2003) who used Garrison, Anderson, and Archer framework in their researches, reported that the COI framework proposed a comprehensive conceptual background and a developed and detailed set of categories for examining online discussion.

Amidon & Flanders (1967) constructed the interaction analysis system on which number of studies formed their basis. Flanders interaction analysis system that was primarily developed for analyzing interaction occur in the classroom has been using for over three decades in several 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), based on Flanders interaction analysis system to developed additional categories, such as communication maintenance, and advanced organizers, which were particular to communication via electronic means and instructional design requirements (Saba, 2007).

Indicators

Developing categories and indicators for content analysis is an important step before the researchers can use the method to analyze the transcripts. Although content analysis is a standard methodology for studying text, every online discussion has its own unique context, the researcher often has to design evaluation criteria for his/her specific project (Hara et al., 1998).

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 are easy to recognize. Focus of this section is on the indicators

for measuring both overt content and covert content of the transcripts. These indicators would likely be able to answer concerns of many educators about whether or not computer conferencing can facilitate higher-order learning outcomes (Rourke et al., 2001).

Flanders categories for interaction analysis might be the most time-honored and widely adopted instrument for analyzing teacher-learner conversation. Although Flanders categories were originally designed for classroom observation, many researchers referred to the categories to deduce criteria for analyzing teacher-learner behaviors in online context (Saba, 2007; Rourke et al., 2002; McLoughlin, 2000). The tool developed by Amidon & Flanders identified two major categories, direct and indirect; and seven sub-categories, accept feeling, praise or encourages, accept or use idea of students, ask question, lecture, give direction, criticize or justify authority, for analyzing instructors' verbal behaviors. 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
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Direct	Guidance	<ul style="list-style-type: none"> • Advance Organizer • Communication Maintenance
	Direction	
	Request	
	Information	<ul style="list-style-type: none"> • Declaration • Concept • Example • Procedure • Principle • Elaboration • Clarification
	Questions	<ul style="list-style-type: none"> • Inquisitive • Claritive • Directive
	Response	<ul style="list-style-type: none"> • Supportive • Directive • Corrective
	Pace Pause	
Indirect	Guidance	
	Questions	<ul style="list-style-type: none"> • Inquisitive • Claritive • Elaborative
	Response	<ul style="list-style-type: none"> • Inquisitive • Supportive

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

Henri’s five categories are often considered to be broad and could be subjective and ambiguous in practice (Hara et al., 1998). Single category might include a number of different activities. Thus, possible classification problems often occur during the process of content analysis. Later researchers had to add specific indicators to Henri’s categories. One example is from Hara, Bonk, & Angeli (1998). The researchers added several categories and examples to Henri’s framework as shown in Table 2.

Dimension	Categories	Indicators
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Cognitive Skills	Elementary clarification	<ul style="list-style-type: none"> • Identifying relevant elements • Identifying relevant elements Reformulating the problem • Asking a relevant question • Identifying previously stated hypotheses • Simply describing the subject matter
	In-depth clarification	<ul style="list-style-type: none"> • Defining the terms • Identifying assumptions • Establishing referential criteria • Seeking out specialized information • Summarizing
	Inferencing	<ul style="list-style-type: none"> • Drawing conclusions • Making generalizations • Formulating a proposition which proceeds from previous statements
	Judgment	<ul style="list-style-type: none"> • Judging the relevance of solutions • Making value judgments • Judging inferences • "I agree, disagree . . ."
	Application of strategies	<ul style="list-style-type: none"> • Making decisions, statements, appreciations, evaluations and criticisms • Sizing up
Matacognitive Skills	Evaluation	<ul style="list-style-type: none"> • Asking whether one's statement is true • Commenting on one's manner of accomplishing a task
	Planning	<ul style="list-style-type: none"> • Predicting the consequences of an action • Organizing aims by breaking them down into sub-objectives
	Regulation Self-questioning	<ul style="list-style-type: none"> • Redirecting one's efforts • Recalling one's objectives • Setting up strategies
	Self-awareness	<ul style="list-style-type: none"> • "I'm pleased to have learned so much ,,,,,," • "I'm discouraged at the difficulties involved ,,,,,,"
	Reflection	<ul style="list-style-type: none"> • Reflecting personal experiences

Table 2. Cognitive and matacognitive skills adopted and modified from Henri (1992) by Hara, Bonk, & Angeli (1998)

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 defined as having three categories – design and organization, facilitating discourse, and direct instruction.

Eighteen indicators were identified for these three categories. 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 3. Coding scheme for Direct Instruction, by Anderson, et al (2001).

Above review shows that 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. They decided that message units combine the flexibility of the thematic unit with the reliable identification attributes of a syntactical unit are the most reliable and practical units to use (Rourke, Anderson, Garrison, Archer, 2001 b).

Other reviewed researches have used paragraph unit (Hara, 2000), message unit (McLoughlin et al., 2002; Gunawardena, 1998), and meaning unit (Newman et al., n.d.) for their content analysis.

When one unit of analysis showed multiple ideas, the researchers were allowed to be assigned to more than one indicator.

System Dynamics Model

When thinking about qualitative research methodology for education, the choice would likely be case study, observation, interview, focus on particular individual, program, or event (Lee, Driscoll, & Nelson, 2007). Some scholars argued that online discussion is an ongoing matter. Any session would have lasted a period, e.g., fifty minutes, two hours, etc. Furthermore, for asynchronous online discussion, a discussion might proceed a quarter or a semester. Therefore, time is a factor that should not be neglected when examining teaching presence, a dynamic behavior, in computer conference (Saba, 2007). The weakness of the case study method prevents a reliable solution; interviews lead to a descriptive model that is too complex for the human mind to solve reliably (Forrester, 1991).

“System dynamics uses concepts drawn from the field of feedback control to organize available information into computer simulation models. . . (to have) insights into behavior of social systems.” (Forrester, 1991) As a pioneer researchers of using system dynamic as a method for researching topics in higher education, Saba and Shearer (1994) “assumed a systemic and dynamic relationship between dialogue and structure, and suggested how a learner and a teacher . . . could control the level of transactional distance in a purposeful instructional selling.” They collected data through discourse analysis then import the data in the form of number indicating the frequency of each

category to STELLA, a simulation software for system dynamics. By injecting system dynamics model into educational research, researchers could identify a pattern of teaching presence that has been a problem and increase the possibility of eliminate the problem. Using patterns of teaching presence, researches could also understand how new insights, knowledge, perspectives result from instructional scaffolding (Zhu, 2006).

Conclusion

Taking together, using content analysis to address quantitative and qualitative data recorded in computer systems is reasonable and valid. Conducting a content analysis of online instructional discussion is to support online teachers in designing and developing effective teaching techniques that can stimuli higher-level thinking from learners. Some studies, however, have taken a dynamic approach by not limiting themselves in measured data and looking at certain teaching presence that produced certain type of interaction. Although many researches have been done, there are needs for more researches that combine content analysis with systemic methodologies such as system dynamics model. New researches for assessing teaching presence should base on more than quantitative or descriptive methodologies. Future researches should consider teaching presence as systemic behavior that has various patterns and can be enhanced by finding and modifying the problem pattern of behavior.

As for the discussion of indicators, since each research has different focus and subject of study, choosing proper theoretical framework and develop a series of indicators for research assessment is the pre-requisites for persuasive results and articulate conclusions. This literature review showed that, the measurement instruments are getting more and more specific and explicit. In addition, it showed that future researchers can compare, contrast, and combine different set of indicators to develop a new measurement instruments that fit in their particular context of research.

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Appendix

Comparison Chart of Three Sets of Indicators for Teaching Presence

Flanders	Saba & Shearer	Anderson et al
Accepts feeling	Response – supportive (Direct & Indirect)	2.4 Setting climate for learning
Praises or encourages	Guidance – Community maintenance Guidance (Indirect)	2.3 Encouraging, acknowledging, or reinforcing student contributions
Accepts or uses ideas of pupils	Response - Inquisitive (Indirect) Response – Supportive (Indirect)	2.1 Identifying areas of agreement/disagreement 2.2 Seeking to reach consensus/ understanding
Ask Questions	Questions - Inquisitive (Direct & Indirect) Questions - Claritive (Direct & Indirect) Questions – Elaborative (Indirect)	2.5 Drawing in participants, prompting discussion 3.1 Present content/questions
Lecturing	Information (Direct)	3.1 Present content/questions 3.6 Inject knowledge from diverse sources, e.g., textbook, articles, Internet, personal experiences (includes pointers to resources)
Giving directions	Directions Questions - Directive Response – Directive (Direct)	3.2 Focus the discussion on specific issues 3.3 Summarize the discussion
Criticizing or justifying authority	Information (Direct) Response – Corrective (Direct)	3.5 Diagnose misconceptions
	Request (Direct)	1.2 Designing methods 1.3 Establishing time parameters 1.5 Establishing netiquette
	Guidance – Advance Organizer (Direct)	1.1 Setting curriculum 1.4 Utilizing medium effectively
		3.4 Confirm understanding

		through assessment and explanatory feedback
		3.7 Responding to technical concerns
Pupil talk – response		
Pupil talk – initiation		
Silence or confusion	Pace pause	