COLLABORATIVE LEARNING IN A WEB-BASED ENVIRONMENT:
EXAMINATION OF FACTORS, INTERACTION PATTERNS, AND DISCOURSE TYPES

by

SEUNGYEON HAN

(Under the Direction of Janette R. Hill)

ABSTRACT

This study focused on developing an understanding of how students’ collaborative learning is supported and reflected in asynchronous discussion. The participants in this study consisted of the instructors, facilitators, and the students in a master’s level course at a university in the South. Various sources of evidence were used in the study (individual and focus group interviews, and discussion board transcripts), and multiple methods were used to analyze the data (inductive analysis, discourse analysis, and mapping strategy).

First, the study explored how asynchronous discussion, supported by a Web-based learning system, facilitated collaborative learning. Three main categories with multiple themes emerged from the data as important for facilitating collaboration in online environments: context (i.e., structural support, active participation), community (i.e., a formation of membership, generation of social dialogue), and cognition (i.e., a social process of learning, communal facilitation).

Second, the study examined different interaction patterns and different types of discourse generated in an asynchronous discussion board. The findings of the study reflect a fundamental change from viewing online discourse as an individual process to a social process. Three
different patterns of interaction were identified (i.e., interaction between messages, interaction amongst participants, and interaction around the messages). In addition, five different types of discourse were illustrated (i.e., description, conceptualization, connection, application, redirection).

INDEX WORDS: asynchronous discussion, collaborative learning, interaction, Web-based learning
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In memory of my dearest father,

Dr. Jong-ha Han

who dedicated his life to the field of education
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PROLOGUE

This document is a compilation of articles exploring how collaborative learning is reflected and supported in a WBLE. The organization and specific content of these papers is described in more detail in the following paragraphs.

The first paper, *Revisiting the meaning of collaboration, communication, and learning in virtual community*, presents a conceptual framework for virtual learning communities. The paper explores the theoretical foundations of virtual learning community (i.e., situated cognition perspective), based on review of current research and development of web-based learning environments. In exploring the foundations, a concept of virtual learning community as a community of (co-) inquiry is examined. The paper reappraises the meaning of collaboration, communication, and learning in a virtual community: collaboration as a social process of learning, communication as a means of generating learning, and learning as a collective intelligence. This paper is currently in press¹ and will be published in S. Dasgupta (Ed.), *Encyclopedia of Virtual Communities and Technologies*, Idea Group.

The second paper, *Web-based learning as a social process: A Critical examination of the research*, reviews research related to the social process of Web-based learning (WBL). The purpose of this article is to describe how WBL can be viewed as a social process and explore opportunities and challenges associated with research in this area. The paper examines the research, in terms of types of interaction, levels of interaction, and patterns of interaction.

¹ See APPENDIX A for Copyright permission
Implications for research are considered. The target journal for this manuscript is *Distance Education*.

The third paper, *Collaborate to learn, learn to collaborate: Examining the roles of context, community, and cognition in asynchronous discussion*, explores how asynchronous discussion supported by a Web-based learning system facilitates collaborative learning. The participants in this study consisted of the instructors and the students in a master’s level course at a university in the South. Different sources of evidence were used in the study (individual and focus group interviews, and discussion board transcripts), and various methods were used to analyze the data (inductive analysis and discourse analysis). Three main categories emerged from the data as important for facilitating collaboration in online environments: context (i.e., structural support, active participation), community (i.e., group cohesiveness, a formation of membership, and generation of social dialogue), and cognition (i.e., a social process of learning, communal facilitation). The target journal for this manuscript is *Journal of Computing in Higher Education*.

The fourth paper, *Language that is shared, situated, and distributed: Examining interaction patterns and types of discourse in asynchronous discussion*, describes a study exploring how students’ learning is reflected in asynchronous online discussion. The study examined different interaction patterns and different types of discourse generated in an asynchronous discussion board supported by a Web-based learning system. In examining online group discussions using discourse analysis, this study reflects a fundamental change from viewing online discourse as an individual process to a social process. A primary goal of the article is to illustrate how the investigation of online discourse furthers our understanding of social processes and online learning. The article also discusses the methodological issues related
to analysis of online discourse. The target journal for this manuscript is *Journal of Asynchronous Learning Networks*. 
CHAPTER 1

REVISITING THE MEANING OF COLLABORATION, COMMUNICATION, AND LEARNING IN A VIRTUAL COMMUNITY

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2 Han, S., & Hill, J. R. Accepted by Encyclopedia of Virtual Communities and Technologies, Idea Group. Copyright 2006, Idea Group Inc. Reprinted with permission, 2/28/05 (See APPENDIX A for Copyright permission)
Abstract

This chapter presents a conceptual framework for virtual learning communities. It explores the theoretical foundations of virtual learning community (i.e., situated cognition perspective), based on review of current research and development of web-based learning environments. It examines a concept of virtual learning community as a community of (co-) inquiry. It then reappraises the meaning of collaboration, communication, and learning in virtual community: collaboration as a social process of learning, communication as a means of generating learning, and learning as a collective intelligence.
Introduction

The use of the World Wide Web (Web) for teaching and learning in higher education has increased exponentially in the last five years. Traditional universities (e.g., MIT, University System of California) as well as “virtual universities” (e.g. Western Governors University, Kentucky Commonwealth Virtual University) have moved toward offering courses and degrees around the world. Web-driven communication systems have further increased the popularity of Web-based learning. Web-based course-management and communication systems (e.g., WebCT®, Ellumination®) are specifically aimed at using the Web to support students, instructors, and experts in communicating, sharing, and collaborating with each other in the process of learning.

At present, almost any web-based application may be labeled “collaborative.” Web technologies make possible many-to-many asynchronous and synchronous communication, enabling both time and/or place independence. Time and place independence are important because they offer online learning systems the opportunities to move from individualist modes of delivery to group oriented interactive modes (Davies, 1995). However, Internet tools such as chat, bulletin boards, or e-mail do not organize the interactions for learning (Rochelle & Pea, 1999), nor were they designed for building and sharing collaborative knowledge. Without advanced pedagogical preparation, these applications may not contribute to collaborative learning.

Web-based applications can be empowering, enabling collaborative learning among participants and facilitating the creation of virtual learning communities. However, the underlying theoretical framework to explain how collaborative learning or community building might occur in Web-based contexts does not yet exist. Further, there is little to no agreement

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3 See Appendix B for Terms and Definition
amongst researchers related to fundamental concepts associated with virtual communities (e.g., collaboration, communication, or learning) (Lipponen, 2002; Pea, 1996). While this ambiguity can be disconcerting, it is also exciting, reflecting the diversity of an emerging fields and paradigms for teaching and learning in virtual environments. It is necessary to review this emerging field from multiple perspectives to clarify ambiguity and embrace diversity. Through these efforts, we may be able to suggest new ways of understanding virtual learning communities, exploring what we mean by collaboration, communication, and learning, and thus enable the forward movement of the field.

The Theoretical Foundations of Virtual Community

Virtual learning communities are recent additions to the educational landscape. It is therefore important to explore possible theoretical foundations. Koschmann (1996) offers a new way of classifying the changes that can be observed in the field of Instructional Technology (IT) and related areas (e.g., virtual communities). Suggesting CSCL (computer support for collaborative learning) as a new paradigm in IT, Koschmann divided the historical evolution of IT into four paradigms: (1) Computer Assisted Instruction, (2) Intelligent Tutoring Systems, (3) Logo-as Latin, and (4) CSCL. Compared with the previous three approaches, the most distinguished feature of CSCL is the notion of learning as a social process (Koschmann, 1996). CSCL breaks with traditional instructional computing that is more individualistic in nature. Further, CSCL uses computer-mediated communication (CMC) to develop a shared knowledge base and promote common understandings.

According to Koschmann (1996), the intellectual heritage of CSCL was built on research traditions of different aspects of the social setting (e.g., language, culture). More specifically, he suggested three theoretical background of CSCL: socially oriented constructivist viewpoints (i.e.,
neo-Piagetians), Soviet sociocultural theories (e.g., Vygotsky), and situated/shared cognition (Greeno, 1997; Lave & Wenger, 1991). Studies in these traditions focus on social issues as the central context, seeking to understand knowledge construction and community building as shared processes.

In this section, we briefly describe two areas contributing to the theoretical foundation of virtual communities from a CSCL perspective. First, we will explore the social process of knowledge construction, seeking to explain how this occurs in a virtual environment. We next describe the concept of “co-inquiry” and how it contributes to the creation of virtual community.

The Social Process of Knowledge Construction: A Situated Cognition Perspective

Researchers and theoreticians have taken a variety of approaches in explaining how learning occurs. For many decades, objectivist perspectives (e.g., behaviorism, cognitive theories) dominated the landscape, emphasizing how to change the actions of an individual in order to enable learning and cognitive development (Driscoll, 1999). Several theories focused on the individual. For example, Piaget’s theories of assimilation and accommodation explained how individuals develop understanding about the world around them. Class management techniques and instructional objectives were also topics of focus, with practitioners seeking to improve the learning context for the individual within a group of students.

Other researchers explored knowledge construction from an interactive, sociocultural perspective. Bruner’s work in the late 1960s created a foundation for examining the impact of culture on knowledge creation. Vygotsky’s work also emphasized the role of context in learning, focusing on social interaction and learning (Wertsch, 1985). Perhaps the most well-known concept from Vygotsky’s work is the zone of proximal development (ZPD). As stated by Vygotsky (1978), “the [ZPD] defines those functions that have not yet matured but are in the
process of maturation” (p. 86). It is the interaction between the novice and the more knowledgeable other within the ZPD that enables the growth in the knowledge process.

Constructivism has extended Bruner’s and Vygotsky’s theories. A basic assumption of constructivist theory is that learners construct knowledge as they make sense of their experiences (Driscoll, 1999). Social constructivism takes it one step further, placing meaning making in a communal context. According to social constructivism, learning occurs as a result of social interaction. Further, social constructivism emphasizes the situated nature of knowing. Pea (1996) has referred to this as “distributed intelligence,” where learners work together in a particular context building shared understanding.

These two concepts, situated and shared cognition, have been used as theoretical frameworks to explain knowledge construction. Situated cognition goes beyond working together to achieve a common goal; it enables dynamic construction. Further, it is shared understanding, enabled by dialogue within a group setting (Brown, Collins & Duguid, 1989).

Perspectives related to situated and shared cognition have gained in their popularity in the last decade, particularly within virtual environments. As mentioned in the introduction, a strength of web-based technologies is their ability to enable many-to-many communication. This shared communication enables intelligence to be distributed amongst many learners, creating opportunities to build understanding in a global context.

The promises of shared knowledge construction are exciting for many, however, it is important to note that concerns have been raised related to the value of the “solitary learner.” Hopper (2003) warns that “groupthink” can have negative as well as positive consequences. He goes on to present a position that it is important to have a balance between collaborative learning environments and learning contexts in which the individual learner can stand independent from
the group. Given the diverse population of learners involved in virtual learning, it will be important to keep multiple pedagogical perspectives in mind as we continue to explore learning in online settings.

**The Virtual Community as a Community of Inquiry**

There are many definitions of “virtual community,” and each has its own value. We have found the definition by Woods and Smith (2001) to be informative. “Virtual communities are social aggregations that emerge from the Net when enough people carry on those public discussions long enough, with sufficient human feeling, to form webs of personal relationship in cyberspace; community is based in ongoing communication” (Woods & Smith, 2001, p. 110). According to this definition, community relies on a foundation of commonality, with enough quality and substance to the shared discourse to build and sustain a sense of community. It is important to remember that a participant’s sense of belonging to a virtual community is based on CMC; therefore, the interactions are not often immediate (as they are in face-to-face). Other characteristics are important in defining virtual communities, including: a minimum level of interactivity, a variety of communicators, common public space, and a minimum level of sustained membership (Woods & Smith, 2001).

One goal of virtual learning communities is to share existing information and knowledge and create new insights. The member of this community varies: from the non-experienced learner to the subject matter expert inside and outside of the community. The community is maintained only when members facilitate and support each other in terms of learning. In almost any form of online learning (i.e., both informal and formal), several conditions need to be met to maintain community. The conditions include: course or other forms of communication (e.g., workshop, forum) are available, and easily accessed; the “cyber” spaces are maintained in terms
of time and place; there are multiple participants with various level of membership; and there are different levels of interactivity (i.e., interpersonal or hyperpersonal). By including all of these features, community can be created and sustained.

Bruffee (1999) extends the idea of what is needed to sustain a virtual community. Bruffee argues that knowledge is a construct of the community’s form of discourse, which is maintained by locally agreed norms and subject to open conversation. In virtual communities, much of the knowledge is constructed in text-based formats. Writing, including active revising back and forth, is the core activity of the learning community (Bruffee, 1999). Writing goes beyond merely communicating an idea; it plays a key role in learning, which is a ‘social, negotiated, and consensual process’ (Harasim, 2002).

An interesting aspect of interaction in virtual communities is that it is mainly constructed through text, even though other forms of communication are available (e.g., auditory or visual). Further, text-based communication in virtual communities is different than other forms of written communication. The distinct features of electronic discourse include: multi genre, multi dimensional, multimedia, interactivity, (a)synchronicity, and hypertextuality (Davis & Brewer, 1997; Mann & Stewart, 2000; Yates, 1996).

The most exciting aspect of the written communication in virtual communities is that this electronic discourse is a new kind of language, showing hybrid features of both spoken and written language (Davis & Brewer, 1997; Mann & Stewart, 2000; Yates, 1996). The mode of electronic discourse is neither simply spoken nor written language. Language in this environment is typed and therefore like writing and contains exchanges, which are ‘often rapid and informal’ and therefore like talk. Thus, “it reads like and to a certain extent acts like conversation” (Davis & Brewer, 1997, p. 2).
Online ‘typewritten’ discourse is facilitated by group of people who work together on a consistent basis, exploring important topics to the community. The participants pursue dialogic, open, facilitated communication and interaction while learning. They expect others to read and write back, which makes it possible to sustain the community. They learn by communicating each other, and again, composing (writing) messages is the core activity in this process.

The importance of communication should not be underestimated. Learning is represented and observed in what members of the community write and post. Writing is vital to the knowledge construction in virtual learning community. Since language is a socially shared, naturally collaborative and constructive, every time we write, we try to construct, reconstruct, or conserve knowledge by verbalizing our idea to one another socially (Bruffee, 1999; Gee, 1999). Here, no one learner or subject matter expert has sole and proprietary control of knowledge. It is distributed and shared in various ways among participants. Collaborative learning develops the discussion by which communities of participants (knowledgeable peers) construct knowledge. Consequently, creating a virtual learning community is a process of learning, a community of (co-) inquiry.

Reconceptualizing Virtual Community in a CSCL Context

Since virtual communities were not viable until recently, it is critical to understand and describe the unique characteristics of a virtual community. Attempting to apply existing theories or predict similar levels of effectiveness to this field may not prove useful. To assist with understanding the complexity of virtual communities, it may therefore be useful to describe the meaning of collaboration, communication, and learning from a new perspective. In an effort to establish the meaning of virtual knowledge building community, these concepts are reconceptualized in this section as follows: collaboration as a social process of learning,
communication as a means of generating learning, and learning as a collective intelligence. Table 1.1 presents an overview of these concepts and characteristics; each is further described in the following sections.

Table 1.1

Collaboration as a Social Process of Learning

Collaborative learning is “a process of social construction of knowledge that takes place in the context of communities of inquiry” (Islas, 2004, p. 302). In a CSCL context, knowledge is socially constructed, and best supported through collaborations designed so that participants share knowledge and create artifacts incorporating features of group efforts, authentic context, and use of multiple resources. This is the most widely supported approach at present, especially with regard to the use of information technology.

People ‘talking’ with one another with a shared goal of building understanding constitute virtual learning communities. As described earlier, writing is the core activity in this process. While composing messages in computer conferences, the participants engage themselves in the difficult task of establishing norms for their community of ‘writers’ as they chose ways to write about socially shared subjects (Davis & Brewer, 1997; Harasim, 2002). Learning is no longer viewed as a mere transmission of knowledge from a teacher to a student, but a process of knowledge construction in which each participant contributes and benefits from the ideas shared by the group.

Collaborative learning in virtual contexts provides opportunities where participants have a variety of options and interaction with the content through synchronous and asynchronous discussions. In order to maximize the experience gained through collaboration, tasks need to be complex in design and students should work in groups to distribute the cognitive load and obtain
meaningful experiences through shared understanding (Hmelo et al., 1998). It is also critical that
the students are given opportunities for reflection. Research indicates that reflection enables a
deeper processing, encouraging learners to move beyond merely focusing on completing the
tasks (Royer, 1997).

Communication as a Means of Generating Learning

Computer technologies have a long history of supporting learning at a distance, ranging
from independent learning to interactive, dynamic learning environments (Bates, 1995). CMC is
enabled through a variety of Internet-based technologies to support learning (e.g., e-mail,
listservs, chat rooms, bulletin boards, virtual classrooms). In particular, CMC affords
opportunities heretofore unavailable in a single interactive medium (e.g., text, video, sound),
enabling the creation of rich environments for anytime/anyplace learning.

A central concept in communication in virtual learning environments is conversation.
“Conversations are people speaking together for particular purposes and seemingly with a
common language” (Jenlink & Carr, 1996, p. 31). Jenlink and Carr present a typology of
conversation that occurs in CMC. We highlight two types of conversation from their model:
discussion and dialogue. According to Jenlink and Carr, discussion can be defined as a
“…forum in which many… advocate their own individual position” (p. 31). Other
characteristics of discussion include: an adherence to individual perspective, negotiation,
competition and rigidity. This is perhaps the most common form of communication that is
shared in CMC environments.

Recent theories advocate moving away from competing to have one opinion prevail to
the building of shared understanding – that is, dialogue. When discussion provides an avenue to
support an individual position, dialogue is focused on building community. According to Jenlink
and Carr, dialogue “…is a form of conversation that can take place between two or more individuals, or in cases of reflective action, a person may engage in a self-dialogue” (p. 33). Both forms of dialogue – group or self – are possible in CMC, enabling learners to engage in the shared construction of meaning or to explore their own ideas independently. Each technique has the potential to assist with the generation of learning and understanding.

Closely related to dialogue is the concept of interaction. Hill et al., (2004) explore four types of interaction from the virtual learning literature (Hillman et al., 1994; Moore, 1989): learner-instructor (i.e., enabling feedback and opportunities to motivate and support the learner), learner-learner (i.e., the exchange of information or ideas between students), learner-content (i.e., interact with multiple materials), and learner-interface (i.e., the learners’ ability to use the communication medium facilitating the online course). All four types of interaction play important roles, enabling participants in virtual environments to learn and build understanding.

**Learning as a Collective Intelligence**

Creating a knowledge object is one thing whereas knowing and helping others to know is another. The first focuses on building infrastructure to share knowledge; the second, learning (Bereiter, 2002). In a virtual community of inquiry, communication tools enable collaboration by supporting the participants as they work independently on the same ‘tangible’ artifacts, such as documentation (e.g., archive of bulletin board as a result of discussion), or even drawings (e.g., sharing white boards for brainstorming or using concept mapping tools). When the cognitive load is distributed to the members of community in a collaborative frame, individual contributions matter. Further, sharing individual efforts and supporting a move toward shared experience is crucial for creating a collective intelligence. In this learning process, knowledge building and learning are so intricately interwoven that they cannot be discerned.
As a result of knowledge building in a virtual community, artifacts accumulate as collective intelligence. Harasim (2002) proposed a theoretical framework, providing a model of conceptual change and identifying three processes explaining the path from divergent to convergent thinking: idea generating, idea linking, and idea convergence. In this framework, individual participants generate ideas by verbalizing (e.g., composing and posting); individual ideas are linked by elaborating on each other’s perspective; and finally, the community actively engages the co-construction of knowledge based on shared meaning.

A review of literature indicates that the essence of collaboration is convergence: communicative knowledge (mutual understanding and social knowledge) and construction of shared knowledge (Brown & Palinscar, 1989; Bruffee, 1999; Cranton, 1996, Rochelle, 1996). As Harasim (2002) described in her conceptual model, “idea structuring, through gradual convergence, reaches a level of intellectual synthesis, understanding and consensus, agree to disagree, and/or co-production” (p.185) in collaborative learning on the web. In virtual learning community, participants engaging in a process of co-construction of knowledge through facilitated communication and interaction. Consequently, individual contributions are converged and approach to general consensus, and then produce “collective intelligence” as a result of learning.

Discussion

The opportunities to support for learning with Internet-based interactions are substantial. However, several challenges have been indicated. One challenge relates to the “temporal gap” (Hill et al., 2004) that can occur when communicating virtually. Certainly we have seen examples of the impact of delayed dialogue in asynchronous modes (bulletin boards, e-mail). Researchers have also explored the delays with synchronous technologies. For example, Garcia
and Jacobs (1999) refer to chat systems as "quasi-synchronous" communication tools. While only a slight delay may be experienced in the dialogue, it shifts the structure of the interactions to what might be experienced in “real-time.”

Another challenge relates to the facilitation of dialogue in virtual learning environments. Research indicates dialogue facilitation is a challenge for the instructor and learners (Gay, Boehner, & Panella, 1997). Yet another challenge relates to virtual communication. Influencing factors include the structure of the course, prior experience, class size, feedback, gender and ethnicity (see, for example, Vrasidas & McIsaac, 1999; Wolfe, 2000). As we continue to communicate and learn in virtual environments, it will be important to continue our research to uncover strategies and techniques for coping with and overcoming the challenges.

Conclusion

This chapter presents a conceptual framework for virtual learning communities. It is important to note that the current status of Web technologies does not guarantee nor predict meaningful interactions in terms of learning (Roschelle & Pea, 1999). Collaborative processes are overemphasized and generalized, making it difficult to evaluate the educational value and relevance of virtual learning environment.

It is also important to note that Web applications were not primarily designed for pedagogical purposes for building and sharing collaborative knowledge. Without advanced pedagogical preparation, it is difficult to predict the full consequence of this technology. Moreover, in designing and implementing the virtual learning community, strategies to resolve current challenges should be identified.

Virtual communities hold great promises for meaningful learning. If they are to reach these promises, we will need to continue our exploration of these environments. We hope the
framework we have outlined will assist with efforts to understand facilitation of learning in
virtual environments.

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**Table 1.1**

Reconceptualizing theoretical perspectives for virtual communities

<table>
<thead>
<tr>
<th>Concepts</th>
<th>Characteristics</th>
<th>Connections Amongst Concepts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collaboration</td>
<td>▪ Social process of learning</td>
<td>▪ Virtual learning community as community of co-inquiry and collaboration where knowledge is socially constructed and learning enabled via various means of communication</td>
</tr>
<tr>
<td></td>
<td>▪ ‘Writing’ is core activity</td>
<td>▪ Community of inquiry incorporates group efforts, authentic context, and use of multiple resources.</td>
</tr>
<tr>
<td></td>
<td>▪ Write about socially shared subject, establish norms</td>
<td>▪ Learning is a gradual convergence through interactive communication and facilitated collaboration</td>
</tr>
<tr>
<td></td>
<td>▪ Distribute the cognitive load, obtain meaningful experiences through shared understanding</td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td>▪ A means of enabling learning</td>
<td></td>
</tr>
<tr>
<td></td>
<td>▪ Conversation (dialogue and discussion) is central</td>
<td></td>
</tr>
<tr>
<td></td>
<td>▪ Dialogue is focused on building community; discussions support individual positions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>▪ Multiple forms of interaction</td>
<td></td>
</tr>
<tr>
<td>Learning</td>
<td>▪ Individual contributions reach intellectual synthesis and general consensus, enabling the creation of ‘collective intelligence’</td>
<td></td>
</tr>
<tr>
<td></td>
<td>▪ Convergence (communicative knowledge and construction of shared knowledge) as essence of learning</td>
<td></td>
</tr>
<tr>
<td></td>
<td>▪ Knowledge building and learning interwoven</td>
<td></td>
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</tbody>
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CHAPTER 2

WEB-BASED LEARNING AS A SOCIAL PROCESS:
A CRITICAL EXAMINATION OF THE RESEARCH

4 Han, S., & Hill, J. R. To be submitted to Distance Education.
Abstract

This article reviews research related to the social process of Web-based learning (WBL). The purpose of this article is to describe how WBL can be viewed as a social process and explore opportunities and challenges associated with research in this area. The paper examines the research in terms of types of interaction, levels of interaction, and patterns of interaction. Implications for research are considered.
Introduction

Substantial work has taken place in the area of Web-based learning (WBL) during the last decade. Significant strides have been made in many areas related to WBL: pedagogical strategies, learning techniques and even with the very technology used to implement WBL. Concerns have been raised, however, related to research in this area (Anglin & Morris, 2002; Berge & Morozowski, 2001; Fabos & Young, 1999; Hannafin & Kim, 2003; Reeves, 2003). Apprehensions have ranged from a lack of agreement related to best practices for teaching to a lack of agreement regarding the best learning theories for WBL. Collectively, researchers have indicated the lack of a compelling theoretical foundation from which to derive research in WBL.

Some researchers have made suggestions to try to overcome some of the theoretical challenges. Miller and Miller (2000), for example, recommended that practitioners of WBL have a strong theoretical foundation to guide their work, stressing that it is more important to be able to articulate why a particular theory was selected rather than worrying about the “correct” theory. However, the lack of agreement related to a set of “best theories” can make this challenging.

Others may argue that a "best theory" (or theories) for WBL is not necessary. Since this kind of learning was not available prior to the last decade, the authors of this paper have concluded it is critical to understand and describe the unique characteristics of WBL and how that impacts the use of existing theories. If we apply existing theories to the practice of WBL with the anticipation that similar levels of effectiveness may be realized, we may be setting ourselves up for disappointment.

Some researchers have worked to gain an understanding of WBL theory. For example, Laurillard (2002) has promoted the idea that the communicative media available on the Web can be a lens for establishing theory. Laurillard describes the media as having the specific task of
bringing people together to discuss ideas and ask questions. The resulting interaction may be
between instructor(s) and student(s), or between students, creating a ‘Conversational
Framework’ (i.e., learning process as an iterative conversation).

Other researchers have started to explore specific affordances associated with WBL and
how that might influence the development of WBL theories. Online collaborative learning is one
such area. Collaborative learning refers to a process of social construction of knowledge situated
in community of inquiry (Bruffee, 1999; Harasim, 2002; Islas, 2004). Knowledge is not
something that is delivered to the learner, but rather emerges from active interaction among
individuals who seek to understand and apply concepts and skills. According to some researchers,
the social construction of knowledge in WBL leads to deeper processing and understanding than
does learning individually (e.g., Bonk & Cunningham, 1998; Sorensen, 2004).

There seems to be a consensus among theorists, researchers, and practitioners that
collaborative learning can be successfully enabled by Web communication tools (see Bannan-
Ritland, 2002, and Hill, Wiley, Nelson & Han, 2003, for a review of the research). Researchers
and scholars have suggested Web-based collaborative learning enables in-depth collaboration,
consequently enhancing social interactions amongst students and providing opportunities for co-
construction of knowledge, with or without face-to-face meetings (de Jong, Veldhuis-Diermanse,
& Lutgens, 2002; Kirschner, Martens, & Strijbos, 2004; Reeves, Herrington, & Oliver, 2004).

Researchers have also designated areas of difficulty related to online collaborative
learning (Järvelä & Häkkinen, 2003). Researchers indicated collaborative processes are over
emphasized and generalized. Further, the Web-specific features associated with the collaborative
processes are not explicated (Pea & Roschelle, 1999). There has been discussion in the literature
specifically questioning whether asynchronous online collaborative learning enables learners to
create meaningful interaction and enable group processes (Alavi & Duftner, 2005; Pea & Roschelle, 1999).

The purpose of this article is to explore how collaborative learning is described and examined in recent WBL studies, especially in studies examining the use of asynchronous discussion. The article explores how different theories may be used to guide research and inform practice in online collaborative learning. We seek to integrate the major points drawn from current research and theory from a variety of perspectives so as to gain a better understanding of how learning is enabled by asynchronous modes of online collaborative learning. We will then use this understanding to identify opportunities and challenges for theory development and research in WBL.

We begin our discussion with a conceptualization of WBL as a social process from divergent perspectives (e.g., communication, learning). We then describe the opportunities and challenges associated with research in the area of WBL based on the analysis of research. Finally, we will explore implications for research practice.

Understanding WBL as a Social Process

A review of the literature indicates that the essence of collaborative learning is convergence. That is, learning is a gradual convergence enabled through communicative knowledge (mutual understanding and social knowledge) and construction of shared knowledge (Brown & Palinscar, 1989; Bruffee, 1999; Cranton, 1996; Rochelle, 1992). Accordingly, individual contributions converge and over time, the group approaches general agreement related to a topic or point of conversation. In this context, collective intelligence is a viable consequence of learning (Bruffee, 1999; Smith, 1994). With this as a foundation, further exploration of the foundations of WBL can be undertaken.
Foundations of WBL as a Social Process: Constructivist Learning Theories

Learning theories work to specify the conditions under which learning is enabled or hindered (Perraton, 2000). While there is not general agreement related to the "best" learning theory, several research and development activities for WBL environments have relied on the underlying theories of constructivism (e.g., Topping & Ehly, 1998; Tudge & Rogoff, 1989). We provide a brief review of constructivist learning theories to establish an underlying understanding of collaborative learning from two perspectives: neo-Piagetian perspective and Vygotskian Perspective.

Reconciling Cognitive Conflicts through Collaboration: A Neo-Piagetian Perspective

According to Piaget, learners think and acquire knowledge through their actions and successful actions precede conceptual understanding in their learning. From a Piagetian perspective, a learning environment should be designed to facilitate individual learners to initiate and complete their own activities, leading them to meaning making, problem discovery, and problem resolution (Driscoll, 2000; Lisi & Golbeck, 1999). Piaget believed that peer interactions are essential in helping learners move beyond egocentric thoughts (Driscoll, 2000).

Learning through interaction with peers, however, does not guarantee that the learners in the group share the same level of understanding. An individual learner brings important value to the group that enhances the quality of learning and level of understanding (Lisi & Golbeck, 1999; Toppig & Ehly, 1998). However, cognitive conflict can arise when there is a perceived contradiction between the learner’s existing understandings and what the learner experiences in the course of interacting with others (Lisi & Golbeck, 1999; Topping & Ehly, 1998). Cognitive development, as defined by Piaget, is a process where the learners reconcile their cognitive conflict as expressed by their different points of views (Forman & Cazden, 1985; Gilly, 1990). It
is this process that allows learners to infer meaning through collaborative learning even in a context of conflict.

Advancing Collaboration through Zones of Proximal Development: A Vygotskian Perspective

According to Vygotsky (1978), collaborative learning, either among learners or between learners and more knowledgeable others, is essential as learners advance through their zone of proximal development (ZPD). ZPD refers to the difference between the learner’s ability to engage in independent problem solving under expert guidance or in collaboration with more capable peers (Vygotsky, 1978). Vygotsky moves beyond a focus on the benefits of peer interaction, to the benefits of interactions with more knowledgeable peers. From a Vygotskian perspective, it is more important for learners to be exposed to a higher level of reasoning than their current level so that ZPD can be explored and confronted (Hogan & Tudge, 1999).

A Vygotskian perspective stresses that learners need to take each other’s perspective into account and come to a shared understanding of a problem (Hogan & Tudge, 1999; Wertch, 1985). Individuals bring their unique characteristics to any kind of interaction. These characteristics are socially grounded and also shaped from the individual's personal experience (Vygotsky, 1994). A Vygotskian perspective proposes that knowledge does not preexist, but is socially constructed first and then individually incorporated (Hogan & Tudge, 1999). That is, a sense of collaboration is not just learners simply working together or one person demonstrating solutions to the other; rather, learners are co-constructing the solution to a problem in a mutual decision–making process (Driscoll, 2000).

The Concept of WBL as a Social Process

From the earliest exploration in online education theory and practice, collaborative learning has been suggested to be a robust principle of WBL design and implementation. Many WBL applications have been developed based on the theory of collaborative learning (e.g.,
European Collaborative Learning Network Project, CL-NET, see de Jong et al., 2002; Computer-Supported Intentional Learning Environments, CSILE, see Hakkarainen, Lipponen, & Järvelä, 2002; Knowledge Integration Environment, KIE, see Bell, 2002). The features of Web-based technologies such as multilateral interaction (i.e., many-to-many), multimedia (e.g., text, audio, video), and multiple communication modes (i.e., synchronous and asynchronous) support more dynamic, yet complex interaction among participants. This enables the creation of an environment where participants share cognitive loads, co-create process and products, and come to a shared understanding.

Kahn (1997) defined WBI (Web-based instruction) as “a hypermedia-based instructional program that utilizes the attributes and resources of the Web to create a meaningful learning environment where learning is fostered and supported” (p. 6). This definition is a way of looking WBI as a “program,” including multiple resources and supports for participants in this specific teaching and learning tool. This definition reflects the evolution of Web technologies and its potential as a field of study. In other words, when it supports the teaching and learning process, the greatest potential of a Web-based application is considered as self-contained and a collaborative media.

Harasim (1990) described online education as “an environment for collaboration and intellectual amplification” (p. 39). The notion of learning as a social process has been added to this early definition, and this idea has been extended to ‘learning networks’ (Harasim, Hiltz, Teles, & Turoff, 1995) and more recently, ‘virtual community’ in last the decade (Harasim, 2002; Rheingold, 1993). Learning networks and virtual community stem from the use of computer-mediated communication (CMC) in an educational context as a result of combining telecommunication with computer technology and digital networks (Berge & Collins, 1995;
Romiszowski & Mason, 2003). CMC in its simplest forms concerns the process of exchanging thought, ideas, and information using a computer with telecommunication technologies. In this notion, a computer network is primarily an agent of communication and learning.

We found the diverse definitions and concepts informative for extending an understanding of WBL. A common idea in the definitions is the notion of human interaction in teaching and learning supported by the affordances of the Web. Our understanding of WBL focuses on how collaborative learning supported by Web-mediated technologies can enhance interaction amongst learner, and how collaboration and technology facilitate sharing and distributing of knowledge and expertise among group members (e.g., Koschmann, 1996; Lipponen, 2002).

A brief review of constructivist learning theories as well as multiple perspectives related to diverse concepts related to current understandings of WBL were presented to create a context for exploring the literature. To extend our understanding of the WBL, it is meaningful to examine the specific context in which the research occurs. In doing so, we focused on how social processes – interaction and convergence – are supported through Web technologies to understand the nature of the learning process.

Review of Research in WBL: Online Collaborative Learning

Research on online collaborative learning has focused on how interaction occurs in a social process. Interaction can be described differently from multiple perspectives (e.g., Anderson, 2003; Bannan-Ritland, 2002). In this paper, interaction is defined as active involvement in the social process of learning. The operational definition is primarily focused on interaction amongst participants in WBL, including learners and instructors. The conceptual frameworks related to interaction in WBL can be categorized with three main themes: types of
interaction, levels of interaction, and patterns of interaction. Research studies in each category have examined what interaction occurs and how interaction transpires. Table 2.1 summarizes a review of the research in this area. We will describe each category and review the research to date in the following sections.

Table 2.1

*Types of Interaction*

Our operational definition of the type of interaction can be described as the combinations of actors (e.g., learner, content, instructor) engaged in the interaction. From the distance education foundation, Moore (1989) identified three different types of interaction: learner-content, learner-instructor, and learner-learner. In brief, learner-content interaction is described as the individual learner’s construction of knowledge through the process of complying information into existing cognitive structures. Learner-instructor interaction describes how the instructor's strategies and support assists with the learner’s interaction with the course content. Learner-learner interaction indicates interaction occurring between two or more students without the instructor's presence (Moore & Kearsley, 1996).

Later, with the growth of the Internet technologies, Hillman, Willis, and Gunawardena (1994) presented the idea of "learner-interface interaction." Learner-interface interaction implies that the interface (i.e., technology affordances) contributes to interaction between the learner and content, instructor, and/or other learners. More recently, Anderson (2003) suggested a more comprehensive view of the types of interaction, adding instructor-content, instructor-instructor, and content-content interaction.

Instructor-content interaction relates to the instructional design process from the instructors’ perspective. Instructor-instructor interaction establishes a community of instructors
enabling the creation of intelligent network of instructors with professionals from multiple disciplines. Content-content interaction is based on an intelligent agent that offers assistance on various subject area in the same and different institutions (Anderson, 2003).

As briefly reviewed, the framework related to the types of interaction has extended with the growth of technology and the complexity of the learning context. The description of each type enables us to understand a range of interactions representing who (or what) interacts with each other in online learning systems.

Some comprehensive reviews of research (e.g., Bannan-Ritland, 2003; Hill et al., 2003) reported that in research examining each type of interaction, the primary concern focuses on human interactions, specifically interactions amongst learners and between the learner(s) and instructor(s). While the framework is useful, it is not readily applicable to specific contexts and types of learning (Anderson, 2003; Hirumi, 2002). Rather, we found this framework useful as an overarching structure that describes examples of interaction. In the examination of a social process of learning, the framework informs us of who to consider as "actors" in the process, including human interaction and the technological affordances.

*Levels of Interaction*

As mentioned, much of the research to date has focused on human interactions, especially learner–learner interactions. Specifically, researchers have investigated the different levels of interaction amongst learner (Bannan-Ritland, 2003; Hill et al., 2003). Our operational definition of the level of interaction is *the degree of quality and quantity of interaction*. Research in this area is grounded on diverse foundations (e.g., learning theories, communication theories, information systems research). In this article, we focus on reviews of research in regard to how
learning theories describe and examine hierarchical levels (i.e., cognitive development) of interaction amongst learners in a social process (see Table 2.1 for a summary).

From a constructivist learning perspective, Gunawardena, Lowe, and Anderson (1997) proposed five different levels of interaction, including sharing of information, exploration of inconsistency among ideas, negotiation of meaning, modification of proposed synthesis, and applications of newly constructed meaning. The underlying assumption related to the levels of interaction is that the learner moves through five levels as they construct knowledge. Each level includes complex and multiple subsets and the levels of interaction have been used as analysis protocols.

Gunawardena, Lowe, and Anderson (1997) conducted an empirical study on their model, analyzing an online seminar using the theory-based model they developed. The researchers debated online with 554 graduate students for a week, focusing on the topic of computer mediated communication, such as online interaction. At the conclusion of the debate, they examined the transcripts of the listserv for the seminar to determine whether co-creation of knowledge or negotiation of meaning had occurred through the accumulation of individuals’ knowledge. Through their analysis, they illustrated how the levels of interaction were observed in participants’ messages on the listserv. Further, they reported the first level (i.e., sharing of information) was the most prevalent type of message in terms of quantity.

Kanuka and Anderson (1998) applied Gunawardena et al. (1997)’s analysis protocol to observe the social cognitive processes and assess the learning in an online discussion forum in a training setting. Similar to Gunawardena et al. (1997), they also reported most of the messages students generated through the online discussion were at the first level (i.e., sharing information) of interaction. Other data sources (e.g., survey) in their study indicated that participants
perceived the online discussion as a "network of information." This helped confirm that the majority of interactions were created on the first level of interaction (i.e., sharing of information).

Other researchers have applied Gunawardena et al. (1997)’s analysis protocol in addition to Kanuka and Anderson (1998) (e.g., Hew & Cheung, 2003; Islas, 2004; Marra, Moore, & Kimczak, 2004). Other studies also indicated that the first level of interaction (i.e., sharing of information) was reflected in the transcripts of asynchronous discussions in WBL. Researchers in these subsequent studies expressed the value of detailing aspects of the interaction at each level, describing the broader framework (i.e., main levels) as useful for analysis of the data. However, challenges in applying the protocols were also expressed, including: unclear boundaries of each level and complexity of the protocols (Fahy, 2001; Kanuka & Anderson, 1998; Marra et al., 2004).

The primary challenge reported was related to the complexity of the subsets. Each level in the Gunawardena et al. (1997) protocol includes multiple subsets. For example, negotiation of meaning/co-construction of knowledge, a main construct in the protocol, contained five subsets (negotiation or clarification of the meaning of terms, negotiation of the relative weight to be assigned to types of argument, identification of areas of agreement or overlap among conflicting concepts, proposal and negotiation of new statements embodying compromise co-construction, proposal of integrating or accommodating metaphors or analogies). Overall, the protocol contains a total of 21 constructs. In applying the constructs, researchers reported that the pre-established analytic code does not enable differentiation of each category in a specific context. While Gunawardena et al. (1997)’s framework provides detailed description on each level based on extensive review of existing models (e.g., Henri, 1992), use of this framework may not allow
for a contextual analysis of the construction of knowledge (Kanuka & Anderson, 1998; Marra et al., 2004).

Other researchers have suggested different analysis frameworks. Järvelä and Häkkinen (2002, 2003) investigated different levels of interaction from a socio-cognitive perspective. They analyzed five developmental levels of the coordination of social perspectives taken in online environments:

- **Egocentric:** Learners present subjective and egocentric opinions and expressions without paying attention to other learner’s perspectives.
- **Subjective role-taking:** The discussion is constituted of a one-way conception of relating perspectives and learner’s responses to prior postings are similar.
- **Reciprocal perspective taking:** Learners recognize a variety of different perspectives; a two-way reciprocity of ideas and expressions is typical.
- **Mutual perspective taking:** Learners coordinate the perspectives each other, consequently, the topic in discussion is viewed from the third person or mutual perspective.
- **Societal-symbolic perspective taking:** Discussion moves toward multidimensional or higher levels of communication; in discussion learners conceptualize multiple mutual perspectives to societal, conventional, legal, or moral perspectives that all the individuals can share.

According to Järvelä and Häkkinen's framework, the higher the level of perspective taking reached, the greater the contribution to learning.

Järvelä and Häkkinen's 2003 study indicated that 36% of the messages were subjective role taking, 36% of the messages were mutual perspective taking, 20% of the messages were
reciprocal perspective taking, and 8% of the messages were egocentric. No messages were categorized as societal symbolic perspective. In addition, the researchers also reported that high-level discussion (i.e., theory–based discussion, 24%) was either in reciprocal perspective taking or mutual perspective taking, and progressive discussion (i.e., jointly knowledge building, 40%) was mainly in reciprocal perspective taking. The results of study indicated that the stage of perspective taking in online discussion was generally rather low regarding to the number of messages generated through the discussion.

Kang (1998), using a socio-cultural perspective on learning (e.g., Lave & Wenger, 1991/2001), conducted research on electronic collaboration in university settings. In her study, she also employed Walther's (1994, 1996) framework on a three–level matrix of the effects of electronic interactions (i.e., impersonal, interpersonal, and hyperpersonal interaction) from communication research foundations. She concluded that online environments provided more opportunities for increasing collaboration and social interaction among participants. During the early stage of the course, technological challenges and lack of social presence confronted students with impersonal effects of interaction, yet, over the semester, students expressed a sense of "closeness" that represents shared concerns and experiences. Moreover, students’ comments also revealed hyperpersonal (i.e., instances of connection) relationships and intersubjectivity that evolved over the semester. The researcher emphasized that it is not important whether the effects of interaction is personal or not, but rather the emphasis should be on how to implement and foster students’ electronic collaboration.

Cecez-Kecmanovic and Webb (2000a, 2000b), using a critical social learning theory (e.g., Habermas), extended the concept of collaborative learning as social interaction and developed a communicative model of collaborative learning. Within this framework, the researchers
investigated linguistic acts of graduate students in a Web-based course in terms of what linguistic acts refer to and how they contribute to the dialogue at the same time. They also explored how linguistic acts contribute to the construction and maintenance of collaborative learning processes. Emphasizing acts of communication in social interaction mechanisms, they categorized the linguistic acts constituting collaborative learning processes in two levels: linguistic acts and learner orientation. Linguistic acts consisted of the subject matter and the topic of discussion, norms and rules governing the process of collaborative learning, and personal experiences, desires and feelings. Learner orientation included orientation to learning, orientation to achieving an end, and orientation to self-presentation.

The studies by Cecez-Kecmanovic and Webb on levels of interaction proposed detailed and descriptive information on the quality of interaction in WBL. The studies provide a theoretical understanding of the levels of interaction demonstrated in the collaborative learning process. The proposed models reviewed above, are grounded in different research foundations (i.e., constructivist learning theories, communication theories) and present empirical evidence to support that it is important to understand how individuals present their ideas and how meaning is generated through messages in online discussions.

There are several challenges associated with the research related to levels of interaction in online learning. First, how different levels of interaction are influenced or supported as a social process is not yet fully described. It appears that analysis of individual messages is not sufficient to explicate the group process (i.e., convergence). Another challenge is the quantification of results (i.e., numbers of posted messages in each level). Enumerating the number of postings may tell us how much interaction occurred in terms of types of interaction (e.g., learner-learner), but it does not assist us in understanding how collaborative learning
occurs. Moreover, how to assess the interaction using the proposed model is not demonstrated. Future study needs to further analyze the complexity of interaction, and what different levels mean in the social process of learning.

**Patterns of Interaction**

Many researchers have concentrated on analyzing the individual messages in online discussion. Other researchers have explored the patterns of interaction amongst and between messages (Fahy, 2001; Garton, Haythornthwaite, & Wellman, 1999; Turoff, Hiltz, Bieber, Fjermestad, & Rana, 1999). Social network analysis is a method used to describe how patterns of relationships exist among participants, to analyze the structure of these patterns, and to discover what the affects of the interaction are on people and the context (Garton, et al., 1999). Our operational definition of the pattern of interaction is *an arrangement of interaction in a social context.*

Using quantitative methods, Yang and Tang (2003) investigated the effects of social networks (i.e., friendly, advising, and adversarial) on students’ performance in WBL comparing it to traditional educational context. Results from their study indicated that advising networks are positively related to student performance both in a traditional class and in WBL. They also reported advising and adversarial networks were good determinants for overall academic performance; however, adversarial networks were not influential on students’ performance on the WBL. In fact, adversarial networks were negatively correlated with almost all students’ performance in both contexts. Friendship network variables were not correlated to students’ performance.

Using a core-periphery social network analysis model, Beck, Fitzgerald, and Pauksztat (2003) examined the social factors in the development of communication networks. They
examined preservice teachers’ online discussion group which included 32 multiple subject teachers who were given the task of observing, reporting, in writing, activities in their mentor teachers’ classrooms. The researchers analyzed the contributions of the individuals in the group in terms of number of messages shared amongst group members. While results indicated no statistical differences between distinctive core and periphery sub-groups, the researchers reported core peripheral members were influenced by the time of the message posting. That is, an early posting increased the probability that a participant would get reply messages from the rest of the group; consequently this illustrated the centrality of the network. They also reported core members exchanged many messages with multiple others, while periphery participants exchanged fewer messages overall.

Fahy, Crawford, and Ally (2001) analyzed the interaction patterns in an online conference from an online graduate course, using an approach that focused on the transcript’s interactional and structural features. The Transcript Analysis Tool (TAT) was used to analyze interactional features, while structure elements suggested by social network theory were examined. Based on social network concept (Ridley & Avery, 1979 cited in Fahy et al., 2001), the structural features of interest in the investigation included the physical dimensions of the network, and the potential and actual levels of interaction revealed by the size, intensity, and the density. Interactional features were reflected in the TAT analysis of sentence types (questions, statements, reflections, engaging comments, and quotation/citations) found within the transcripts. Interactional features found in analysis of the postings that comprised the conference transcript included the kind of content exchanged in the interaction and the exchange of flow in the resulting interaction.
Fahy, Crawford and Ally (2003) reported that the size of the network was a major structural determinant of the feasible level of involvement for a given network. Analysis of the structural features demonstrated that as the size of the network grew arithmetically, the number of potential links grew proportionally. Density and intensity measures indicated high levels of variability in the participation and connectedness of network members. The TAT showed the proportions of five major types of sentences in the transcript corresponding to different modes of messages. In this study, the largest proportion of students’ sentences was direct statement, and the next largest category was reflections. The authors indicated this suggested that the predominant discourse type in this conference was expository, oriented to the transfer of information.

As indicated in the studies reviewed in this section, a social network analysis method provides an opportunity to examine more complex features of interaction in a social process and present the visualization of networked interaction. However, several questions still remain: What factors affected density, intensity, or participation in the data? What does density and intensity mean for the social process of learning? How are levels of interaction related to density, intensity, and participation? What is the contribution of each pattern in the social process? These questions needs to be further examined to explain how density and intensity of networked support and/or impact learning.

Themes and Discussion

This article explored the concept of collaborative learning supported by Web-based technology. A review of research provided insight into the types, levels, and patterns of interaction in WBL. Yet, researchers to date have not been successful in presenting findings that
describe a social process of learning (Alavi & Dufner, 2005). In the next section, we assess each category to identify opportunities and challenges for continuing research in this area.

Types of Interaction

The descriptions of the types of interaction are a useful first step for understanding dialogue in online learning environments. However, in a complex and dynamic context such as WBL, we need to reassess each type on a continual basis. For example, the discourse generated by participants in WBL is different from face-to-face classroom discourse (Davis & Brewer, 1997; Mann & Stewart, 2000; Yates, 1996). In this context, as a group of learners and instructor(s) interact, different resources are intertwined and learning is organized and controlled by human interaction and technology (i.e., interface). We cannot simply categorize the interaction as learner-learner, learner-interface, or learner-content when examining asynchronous discussion. While we can identify actors in this process, examining the underlying social processes of learning is a challenging task using the current technological infrastructure.

We do not believe we need to add different types of interaction to the framework. Rather, we propose that a new way of looking at the types of interaction is needed. As Hirumi (2002) proposed, to understand and investigate a complex learning environment such as WBL, we should consider each type of interaction within a specific context. Specifically, Hirumi suggested a "multi view" of the types of interaction consisting of three levels: individual learners’ self interaction, learner-human interaction and learner-non human interaction (i.e., resources, technology, content), and learner-instruction interactions.

This new way of looking at interaction should also include consideration of multiple levels of types of interaction (e.g., learner-learner, learner-content, learner-interface see Bell, 2002) as well as unique features of online interaction (e.g., vicarious interaction, see Sutton,
Research focused on interaction amongst group members, which is the critical component to understand student’s collaborative learning, is important. However, the different interactions afforded by the technology (i.e., synchronous and asynchronous) and how the technology influences the interaction, whether supportive or challenging, should be fully examined in the future research.

**Levels of Interaction**

As described earlier in this paper, the detailed descriptions of the levels of interaction have provided a descriptive analysis scheme that might assist with explicating the social process in online discussion. This does not mean the research to date successfully explored interaction as a social process. Researchers have analyzed how an individual’s message is conveyed in WBL; however, the research often ended with quantification of the results, such as how many messages of each level of interaction are generated. In studies to date, a set of pre-established “codes” was typically applied to the data set. This process is not sufficient to explain the social processes involved in the discussion. Further research is needed to explore how individual representation of meaning supports the group process and how each level of interaction is related to another.

Researchers have expressed concerns with existing analysis protocols (Fahy, 2001; Kanuka & Anderson, 1998; Marra et al., 2004). The question that then arises is: do we need to develop yet another analysis protocol? We believe the answer is not simply yes - or no. Rather, we recommend that the analysis be informed by the research design. The representation of the findings can then be used as a guide to examine the social processes of learning, rather than simply reporting what the individual messages contain. To accomplish the task, as Hannafin and Kim (2003) suggested, we need to ask a different questions such as how technology affordances enable collaborative learning experiences, and how collaborative learning is demonstrated in
discussion including explicit interaction (i.e., posted messages) and implicit (i.e., vicarious interaction) interaction.

Study of the levels of interaction is not easy to implement (Järvelä & Häkkinen, 2003). One reason why it may be so challenging is the lack of extensive data. Our research experience indicates that one single data set is not sufficient to examine the social process of learning. The triangulation of data may help in this regard. As Järvelä and Häkkinen (2003) suggested, transcripts of a discussion board can be examined along with transcripts from stimulated recall interviews and reflective group discussions after the session as well as individual learners’ reflection during the session. Further, as discussed earlier, to analyze a social process of learning, exploring appropriate research methodologies is needed, thus not restrict to interpret undiscovered characteristics of learning process.

Patterns of Interaction

One of the greatest benefits of employing social network analysis is the visualization of the interaction. Results of studies can be depicted with different nodes (representing participants) and links (representing different patterns of relationship among participants), including the size, density, and centralization of the interactions. While social network analysis provides an opportunity to examine complex and dynamic interactions in a group context, this method does not fully support the investigation of how the social process of learning occurs in different webs of interaction. One of the challenges in the process could be how we can reflect asynchronicity of interaction in the diagram. Without careful consideration of the unique attributes created by time, the technology system, and students’ behavior, the visualization of the interaction may not enable researchers to examine the actual relationships within the interaction. This needs to be explored in future studies.
The data analyzed to uncover patterns of interaction is also a challenge. Studies using a social network analysis of WBL usually take computer logs as an input and examine how the network is centralized and/or the density of the network. Analyzing the relationship of interaction does not enable us to examine what has been said, and what has been done by saying. For example, in an asynchronous discussion, one participant may reply to multiple participants and multiple messages at the same time. Without a detailed examination of students’ behavior and the content of the individual message, we cannot fully describe how or what interaction occurred. To overcome this challenge, as mentioned in a previous section, triangulation with other data (i.e., survey, interview) and different analysis methods (e.g., discourse analysis) are needed to describe the learning process.

Another challenge in analyzing patterns of interaction comes from the asynchronous mode of communication. In an asynchronous discussion, time independence exists; yet, multiple participants can be engaged in the discussion at the same time. When one student posts a message in response to an idea, others may be reading the previous message and not see the reply immediately. In the asynchronous mode, multiple participants may be creating messages at the same time, but the appearance of the message (i.e., posting) depends on the computer and network technology. Because of this, online discussion is often considered a quasi-synchronous mode of communication (Gracias & Jacob, 1999). As Beck et al. (2003)’s study showed the time of posting influenced the formation of interaction (i.e., centrality) in the discussion. However, as they indicated, it may not be possible to explain how the time factor influenced the social process in terms of quality; this should be further examined in future study.
Concluding Thoughts

As reviewed, different theories and research methods have been applied to extend our understanding of a social process within an online learning environment. After examining the theories that have been used to frame the research and how the research in this area has been conducted to date, we cannot simply infer that existing theory has not been successful to investigate a social process of learning. Rather, we conclude that the data analysis methods require more attention in future studies. In exploring different analysis techniques, we believe the research can move closer to an examination of not only what is said, but also what the saying enables in terms of learning.

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Table 2.1

Summary of the research in an online collaborative learning

<table>
<thead>
<tr>
<th>Views of interaction</th>
<th>Research Reviewed</th>
<th>Descriptors in the Research</th>
<th>Implications and Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Types of interaction</td>
<td>• Moore (1989); Moore &amp; Kearsley (1996)</td>
<td>Interaction between learner-learner; learner-instructor; learner-content</td>
<td>Identify combinations of actors engaged in interaction.</td>
</tr>
<tr>
<td></td>
<td>• Hillman, Willis, Gunawardena (1994)</td>
<td>Learner-interface interaction</td>
<td>Overarching frameworks for studying interaction</td>
</tr>
<tr>
<td></td>
<td>• Anderson (2003)</td>
<td>Interaction between instructor-content; instructor-instructor; content-content</td>
<td>Should examine different types from multiple levels in a social context</td>
</tr>
</tbody>
</table>

<p>| Levels of interaction | Gunawardena, Lowe, &amp; Anderson (1997) | Constructivist learning theories | Identify the degree of quality and quantity of interaction |
|                       | • Collaborative learning as interaction in a process of mutual knowledge construction | Collaborative learning as interaction in a process of mutual knowledge construction |
|                       | • Five levels of knowledge construction: sharing information; exploration of inconsistency among ideas, negotiation of meaning; modification of proposed synthesis; and applications of newly constructed meaning | Explicate the qualitative aspect of interaction as a group cognitive development |
|                       | Kanuka &amp; Anderson (1998) | Constructivist learning theories | Describing how individual message is demonstrate each level |
|                       | • Applied Gunawardena et al. (1997) and Henri (1992) | Newly identified themes: social interchange, social discord | Quantification of results: generally, low level of interaction reported |
|                       | • Newly identified themes: social interchange, social discord | Should examine intra-message (i.e. how messages are related) effects in a social process |</p>
<table>
<thead>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Järvelä &amp; Häkkinen (2002, 2003)</td>
<td>Socio-cognitive perspective (e.g., Selman, 1980)</td>
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<td></td>
<td></td>
<td>Collaborative learning as a social interaction and perspective taking</td>
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<td></td>
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<td>Five stages of perspective taking: egocentric; subjective role taking; reciprocal perspective taking; societal symbolic perspective taking</td>
<td></td>
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<td></td>
<td></td>
<td>Level of discussion: high-level discussion; progressive discussion</td>
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<tr>
<td></td>
<td></td>
<td>Collaborative learning as a social interaction and mutual construction of knowledge</td>
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<tr>
<td></td>
<td>Cecez-Kecmanovic &amp; Webb (2000a, b)</td>
<td>Critical social learning theory</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Collaborative defined as social interaction</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Level of collaborative learning: a linguistic act level (i.e., personal experiences, desires, feeling) and a learner orientation level (orientation to achieving an end, orientation to self-presentation)</td>
<td></td>
</tr>
<tr>
<td>Patterns of interaction</td>
<td>Yang &amp; Tang (2003)</td>
<td>Social network analysis</td>
<td>Identify an arrangement of interaction in a social context</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Examine effects of social networks (i.e., friendly, advising, adversarial) on student performance</td>
<td>Visualization of interaction patterns</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>Examine effects of size, density, centrality on interaction patterns</td>
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<td>Report quantification of the results</td>
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<td>Lack of understanding of qualitative aspect of interaction</td>
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<tr>
<td>Views of interaction</td>
<td>Research Reviewed</td>
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<td>Implications and Considerations</td>
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<tr>
<td></td>
<td>Beck, Fitzgerald, &amp; Pauksztat (2003)</td>
<td>▪ Social network analysis (i.e., core-periphery)</td>
<td></td>
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<td></td>
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<td>▪ Examine the contribution of individual and social factors in the development of communication networks</td>
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<td></td>
<td></td>
<td>▪ Describe the density and centrality of the network</td>
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<tr>
<td></td>
<td>Fahy, Crawford, &amp; Ally (2001)</td>
<td>▪ Social network analysis: influence of size, intensity, and the density on interaction patterns</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>▪ Transcript Analysis Tool (TAT): sentence types (i.e., questions, statements, reflections, engaging comments, and quotation/citation)</td>
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</table>
CHAPTER 3

COLLABORATE TO LEARN, LEARN TO COLLABORATE:
EXAMINING THE ROLES OF CONTEXT, COMMUNITY, AND COGNITION
IN ASYNCHRONOUS DISCUSSION

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5 Han, S., & Hill, J. R. To be submitted to Journal of Computing in Higher Education.
Abstract

The reported study explored how asynchronous discussion supported by a Web-based learning system facilitated collaborative learning. The participants in this study consisted of the instructors, facilitators, and the students in a master’s level course at a university in the South. Different sources of evidence were used in the study (individual and focus group interviews, and discussion board transcripts), and various methods were used to analyze the data (inductive analysis and discourse analysis). Three main categories with multiple themes emerged from the data as important for facilitating collaboration in online environments: context (i.e., structural support, active participation), community (i.e., a formation of membership, generation of social dialogue), and cognition (i.e., a social process of learning, communal facilitation). Implications for research and practice are described at the conclusion of the paper.
Introduction

Web-based learning environments (WBLE) provide a combination of computer and telecommunication technologies enabling learning without the constraints of space and often time. Recent research indicates that WBLEs, specifically asynchronous forms, offer affordances that can result in student learning as effective as face-to-face learning, students experiencing a satisfactory learning experience, maintenance of active student participation, and improved social relationships among participants (Jonassen & Kwon, 2001; Klobas & Haddow, 2000; Oliver, Omari, & Herrington, 1998). Research also indicates that collaborative learning can be well supported by the features available in most Web based learning systems (de Jong, Veldhuis-Diermanse, & Lutgens, 2002; Kemery, 2000; Rogers, 2000).

From the earliest exploration in online education theory and practice, collaborative learning has been suggested to be a robust principle for WBLE design and implementation (Harasim, 1990; Hmelo, Guzdial, & Turns, 1998; Islas, 2004). Many WBLE applications have been developed based on, and helped to advance the features of, collaborative learning (Harasim, 2002; Hill, Wiley, Nelson, & Han, 2003). Many studies report positive benefits of using technology for collaborative learning (e.g., enhanced social interaction and mutual construction of knowledge) (Harasim, 2002; Islas, 2004; Kanuka & Anderson, 1998). Yet, how WBLEs enable the generation and support of these interactions remains largely unknown. Further, while numerous studies have addressed the comparative advantages and disadvantages of computer supported or technologically mediated learning versus traditional, face-to-face learning environments (Barkhi, Jacob, & Pirkul, 1999; Jonassen & Kwon, 2001; Wegner, Holloway, & Garton, 1999), there has been little research enabling us to further our understanding of the learning processes that occur within these environments.
An underlying theoretical framework to describe the how collaborative learning occurs in a Web-based environment does not yet exist. One reason may be that to design effective environments for collaborative learning on the Web, it is important to conceptualize the salient features of the technology and learning in a manner directly relevant to pedagogical approaches and group processes associated with collaborative learning (Garrison, Anderson, & Archer, 2000; Kirschner, Strijbos, Kreijns, & Beers, 2004). Another reason may be that a detailed analysis of the nature of collaborative processes and dynamics through which learning occurs is seldom reported.

One solution to resolve these challenges could be the analysis of the content and flow of the exchange of messages among learners. In addition, we may also need to investigate the ways in which technological features can engage group dynamics that contribute to learning outcomes. This type of analysis may facilitate the interpretation of the meaning of the exchanges among team members, therefore enhancing our understanding of the way learners interact and learn collaboratively.

The purpose of this study was to explore how the discourse generated through asynchronous communication supported by a Web-based learning system facilitated collaborative learning. The main research question for the study was: “What factors indicate that collaborative learning is supported in a Web-based environment?” A review of the literature related to online collaborative learning is presented first. Next, the study itself is described. The article ends with a discussion of the results and implications for future research and practice.
Literature Review

*A Social View of Learning: Situative Approach*

Many contemporary educational research and theorists accept the idea that learning is social in nature (e.g., Bereiter, 2002; Bransford, Brown, & Cocking, 2000). From this perspective, learning is no longer viewed as a transmission of knowledge from a teacher to a student, but a process of knowledge construction in which each participant contributes to and benefits from the ideas shared by others. Such ideas are not new; the foundations of social learning theories include but are not limited to constructivist viewpoints (i.e., neo-Piagetians) and sociocultural theories (e.g., Vygotsky).

Three common ideas are typically associated with social theories of learning: learning occurs in community, knowledge emerges through a web of interactions, and intelligence is distributed among learners (Brown, Collins, & Duguid, 1989; Pea, 1993; Salomon, 1993). From this perspective (i.e., co-construction of knowledge), learning is signified by participation in a social process of knowledge construction (Lipponen, Hakkarainen, & Paavola, 2004). Further, collaboration becomes a “reaculturation process” (i.e., cultural change) (Bruffee, 1999) that supports learners, as they become members of knowledge communities.

Theories related to situated and shared cognition have gained much attention in the last decade. Situated learning has been used as a theoretical framework to describe the social construction of knowledge (e.g., Lave, 1997; Roschelle, 1996, Wilson & Meyer, 2000). In this view, the construction of meaning is tied to a specific context and purpose. Shared understanding enables learners to achieve a common goal and dynamic knowledge construction through interaction/collaboration within a group setting.
The situative approach contends that learning and cognition is an integral part of what is learned. From this situative point of view, Han and Hill (in press) defined a virtual learning community as a community of inquiry and briefly discussed the meaning of collaboration (i.e., as a social process of learning), communication (i.e., a means of generating learning) and learning (i.e., a collective intelligence) in a virtual community. Further, they described collaborative learning as “a social process of learning that takes place in the context of communities of inquiry” (Han & Hill, in press). Collaboration and learning in this context is therefore not just an individual effort, but also a collective effort based on distributed intelligence.

While situated learning theory informs how learning might occur in a virtual environment, it should be noted that the affordances of Web-based technology creates a distinct context. Most of the theories related to collaborative learning are based on models developed using face-to-face pedagogy (Bonk & Dennen, 2003). We may not know whether or how these theories developed from research on face-to-face educational settings might apply to a WBLE. Han and Hill’s (in press) description of collaborative learning concepts in a virtual environment reinforces the importance of understanding the process from a situated perspective. In the next section, different conceptual frameworks related to WBLE are described, including specific opportunities and challenges in conducting research in this area.

**Conceptual Frameworks for WBLE: Research-based Examples**

Recent research reported critical variables related to learning in WBLEs: pedagogical strategies, role of facilitator, seamlessness of technology, nature of the tasks (i.e., well-defined tasks) and group interaction processes (Arbaugh, 2001; Kanuka, 2002; McKenzie & Murphy, 2000). Different conceptual frameworks have used these five variables to describe learning in
WBLEs. For purposes of this review, the models selected are specifically focused on the social aspect of learning and distinctive features of the learning context (see Table 3.1 for a summary).

Table 3.1

Garrison, Anderson and Archer's model (2000) clarified the concept of virtual communities, describing it as a community of inquiry. This notion of community is important, as it recognizes that collaborative learning is more than a cognitive process. Further, they proposed that learning occurs in this setting as result of the interaction of three essential elements: cognitive presence, social presence, and teaching presence. Cognitive presence refers to the extent to which the participants in a community are able to construct meaning through sustained communication. Social presence refers to the ability of participants in the community to project their personal characteristics, thereby presenting themselves to the other participants as “real people” (c.f., ‘hyper-personal interaction’ (Walther, 1996)). Teaching presence refers to the design of the educational experience and facilitation. Garrison et al.’s model proposes that these elements should be combined with each other in any community of inquiry, stating that the interaction among the elements brings a distinct experience to the teaching and learning outcomes.

Garrison et al. also developed analysis protocols to assess the presence of the key elements during an online learning event. The analysis categories included: cognitive presence (i.e., triggering event, exploration, integration, resolution), social presence (i.e., emotional expression, open communication, group cohesion), and teaching presence (i.e., instructional management, building understanding, direct instruction). The protocol appears to hold considerable promise for understanding the development of virtual communities. However, to
date, the researchers have not linked the analysis protocols in their research, nor have they further defined or elaborated the categories.

Harasim (2002) also proposed a theoretical framework for how learning occurs in WBLEs. In her model of conceptual change, Harasim identified three processes to explain the path from divergent to convergent thinking: idea generating, idea linking, and idea convergence. In this framework, individual participants generate ideas by verbalizing (e.g., composing and posting); elaborating on each other’s perspective links individual ideas; and finally, the community actively engages the co-construction of knowledge based on shared meaning.

Harasim confirms what other researchers (e.g., Brown & Palincsar, 1989; Bruffee, 1999; Cranton, 1996, Rochelle, 1996) have indicated: the essence of collaboration is the convergence, namely, construction of shared knowledge.

Like Garrison et al. (2000), Harasim also developed an analysis protocol. The coding schemes in Harasim's protocol are based on her conceptual model and include: idea generation (e.g., initiation of idea, general information, opinions, examples), idea linking (e.g., agreement, shared understandings, elaboration on ideas), and intellectual convergence (i.e., summaries, extended shared understandings). Harasim pointed out there are indicators that address how messages are associated with each process (e.g., increased number of reply messages indicates that idea linking is occurring). In her research, she showed how this protocol could be applied to individual messages. For example, she presented how ‘summaries’ (see "idea convergence" in Table 3.1) could be found in a student’s message in a discussion forum. While she provided extensive analysis protocols, there is a certain level of ambiguity among the subcategories (qualitative change in nature of the discourse in "idea linking" in Table 3.1, for example).
Harasim (2002) has indicated that the subcategories should be further examined and fully described in future research.

Gunawardena, Lowe & Anderson (1997) proposed the Interaction Analysis Model for Examining Social Construction of Knowledge in Computer Conferencing. This model, built upon grounded theory principles, represents a constructivist view of learning and suggests an alternative definition of interaction that emphasizes functions as the vehicle for co-creation of knowledge. Using this model, the authors examined the transcript of a listserv generated by 554 subscribers (i.e., graduate students) for a week long online seminar, on topic of computer mediated communication (e.g., online interaction). The authors analyzed the transcript of a listserv for five indicators of interaction: cognitive activity, arguments, resources, evidence of change in understanding, and/or the creation of new personal constructions of knowledge as a result of interaction within the group. More specifically, Gunawardena et al.'s model specifies five phases of knowledge co-construction: sharing/comparing of information, discovery and exploration of dissonance of inconsistency among participants, negotiation of meaning or knowledge co-construction, testing and modification, and phrasing of agreement and application of newly constructed meaning. They also proposed sub categories for each phase. Using the model, the researchers analyzed each message posted to the listserv, marking it according to the phase it represented. Frequencies were then calculated for each of the codes.

According to Gunawardena et al., the primary purpose of the study was to develop an interactional analysis model for examining the social construction of knowledge in computer conferencing. However, the authors only described how each phase and sub categories of each phase could be applied to analyze transcripts of listserv discussions. Gunawardena et al. were unable to provide collective patterns related to the process of knowledge co-construction or the
contribution of individuals’ knowledge change to the process. Consequently, they completed the study with a quantified analysis of data (i.e., the number of posting that fell into each phase or category).

A quantitative analysis of the data is informative and as Gunawardena et al. mentioned, initial quantification of types of messages inform the researchers in terms of validation and theoretical foundations of the protocols. However, the quality of “exchange relations” rather than the quantity of exchange transactions may be a better focus for analysis if determining the quality of interrelationships is desired. In other words, revealing the quantity of each type of message may not be sufficient if the goal is to describe how interaction occurs. Therefore, it may be helpful to analyze the relationships and interactions among messages as well as the content of the individual messages.

**Opportunities and Challenges**

As indicated, recent studies report that asynchronous discussion may facilitate students’ learning, yet there is little empirical evidence to support this claim (Garrison et al., 2000; Marra, Moore, & Klimczak, 2004). One of the benefits from the models reviewed above is that these models are extensive and informative, since they integrate critical variables related to learning in WBLE. In addition, two of the models (Harasim, 2002; Gunawardena et al., 1997) are grounded on empirical studies and provide extensive reviews of existing theories and analysis protocols. Other researchers (e.g., Islas, 2004, Kanuka & Anderson, 1998; Swan & Shea, 2005) are also exploring these models (Garrison et al., 2000; Harasim, 2002) in an attempt to further the investigation of the interaction and learning process. In light of incorporating critical contextual variables and cognitive process of learning, and the focus on a qualitative investigation of the learning/interaction process, these models are great starting points for further research.
However, several challenges can be surmised from this review of the three models. First, by applying a conceptual framework to empirical studies, any one of the models reviewed may only be able to indicate the kind of messages that were generated during a discussion session rather than how learning occurred. This may be associated with a limitation of the frameworks themselves: they are more descriptive, rather than prescriptive. As Pea (1993) stated, “a descriptive approach examines how learners enact the cultural practices for designing, constructing, and displaying distributed intelligence in activity and a prescriptive approach investigates how learners should acquire such cultural practices” (p. 72). Thus, simply applying pre-established codes (i.e., protocols) may result in only partial success, failing to examine the learning process extensively.

There are other potential problems associated with applying pre-established coding schemes. As reviewed, each coding scheme lacks discrimination capability. That is, the pre-established analytic code does not enable the researchers to differentiate each category appropriately as a result of the complexity of the codes (Fahy, 2001). This relates to a third challenge: applying protocols established by other researchers may lead to simple quantification of the result (i.e., reporting types and numbers of postings).

A fourth challenge was also found when reviewing these three models. The dimensions of technology, mode of communication, and other related factors for technology-mediated collaborative learning may not be fully considered. As reviewed, the application of the developed conceptual frameworks tends to focus on analysis of the transcripts of discussion. It is difficult to find in an analysis of transcripts alone evidence that collaborative learning or interaction has occurred in an online environment. To confirm existing learning using Web technologies, the roles of technology, mode of communication and coordination, and other
salient factors (i.e., contextual indicators, social indicators) must be considered. The analysis schemes used for WBLEs must be robust and flexible so as to meet multiple needs.

Research Design

The focus of this study was to develop an understanding of how student collaborative learning was supported in asynchronous discussions. The design used for this research was case study. Case study as a form of research is defined as “the analysis of a single case or of multiple instances of the same process as it is embodied in the life experiences of a community, a group or a person” (Denzin, 1989, p. 34). A researcher would employ a case study method in order “to cover contexture condition, believing that those conditions are highly pertinent to her phenomenon of study” (Yin, 2003, p. 13). Furthermore, since a certain instance and context are not always discernible in realistic situation, the case study “copes with the technically distinctive situation and relies on multiple sources of evidence” (Yin, 2003, p. 13). Thus, a case study concerns a process of inquiry about the case, including the logic of research design, data collection strategies, and specific data analysis approaches, as well as the product of that inquiry (Yin, 2003). We proposed that the process of collaborative learning, especially in a WBLE, is intertwined with the context, and the tools with which participants communicate and interact, making case study an appropriate research design.

The Context: A Blended Technology Enhanced Learning Environment

The case in this study was a single Master's level course supported by a Web-based learning system (i.e., WebCT®). Sampling in qualitative research is not necessarily random, rather it is often purposeful (Patton, 2002). The selection of the context was purposeful; specifically, the selection of the research context was determined by case sampling (Goetz & LeCompte, 1984). Case sampling involves providing a profile of attributes possessed by an
average case. First, the class was group-oriented; that is, the primary focus revolved around group activities and projects. Second, the primary implementation of the course was through asynchronous discussion in bulletin boards. Third, participants entered the course with both homogeneity (e.g., many are school teachers and seeking instructional design knowledge) and diversity (e.g., various technology experience and Web-based learning experience). The three characteristics (i.e., group orientation of the class, asynchronous discussion as primary implementation method, similarities and differences of the participants) were important for examining the process of co-constructing knowledge, and for investigating student collaborative learning.

The implementation of the course, based out of a research university in the South, took place during a short session in the summer (four weeks). The participants included the university instructor (n=1; more than seven years of WBLE experience, the second author of this paper); doctoral students as facilitators (n=2; one with some Web-based teaching experience, the first author of this paper); K-12 teachers and school media library specialists as students (n=23) (see Table 3.2 for an overview of the student participants).

The participants were dominantly female (n=22) and Caucasian (n=21). Most of the students were working full-time in a K-12 environment (e.g., teachers or school media library specialists). At the time of the study, the majority of the students (n=21) had taken at least one other course online via an asynchronous Web-based tool. There were six different project groups (n=3-4) and two groups were paired as a discussion group, consequently, there were three discussion groups (n=6-8).

Table 3.2
The goal of this master’s level course, "Instructional Design," was to provide an introduction to the process of instructional design within a hands-on context. The course was offered via sixteen "meetings" within a blended technology enhanced learning environment. In a sense, each day during the May term equals about a week in the regular semester. Students were expected to complete individual activities (i.e., ID reflection), with a culminating activity: a group project for a client (i.e., IDAs, Instructional Design Activities). ID reflection was designed to address topics related to fundamental understanding on instruction design from individual student’s experience and perspective with reading course materials. IDAs was designed to assist team activities allowing students to practice authentic instructional design activities in hand-on context. Given the short duration and pace of the course, the learners were encouraged to come to the course with an idea for the group project they would complete.

During the course, participants experienced several teaching methods, such as face-to-face workshops, synchronous Web-based learning sessions (i.e., chat and virtual office hour), and asynchronous Web-based learning sessions (e.g., e-mail and discussion board). Face-to-face workshops were held to provide logistical assistance, preview course content, and provide opportunities to complete group projects within a classroom and computer lab environment. Synchronous Web-based communication (i.e., chat rooms) supported by WebCT® (http://www.webct.com) provided opportunities to ask questions and discuss the course content and facilitate real-time group interaction. Asynchronous Web-based communication (i.e., discussion board) supported by WebCT® and e-mail systems allowed participants to discuss various topics throughout the course between face-to-face workshop sessions. The asynchronous Web-based learning system used in this course consists of different features to support students

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7 See APPENDIX C for Course syllabus
learning in various ways (e.g., opportunities to share information, present & critique each others’ work, discuss course related issues, and reflect on the instructional design process).

The first author of this article was a facilitator of the course; her primary responsibility included supporting students to complete their individual assignment and group projects and moderating the asynchronous discussion during the course. The first author also was responsible for data collection (i.e., interviews, a focus group interview, transcripts of discussion board) and principal data analysis. The second author was the major instructor of the course and her primary responsibility included course design, implementation, and evaluation during the course.

Data Generation Methods

Various sources of data were used in this study: transcripts of interviews⁸, transcripts of discussion board, mid-term surveys⁹ and final course evaluation. A variety of data sources were considered important to identify critical indicators that facilitate students' learning. A focus group interview with one group (three individuals), seven 30-45 minutes in-depth interviews with one instructor and one facilitator after the course, and five students (40 % of student population) were conducted during the course. In conducting the interviews, one of the researchers (first author of this paper) asked the individual participants questions about their individual and collaborative learning experiences in this course. The researcher also asked the instructor and one of the facilitators questions about their teaching activity and observation of students learning. The individual interviews and focus group interview were audio taped and transcribed. The researchers participated in each face-to-face workshop, asynchronous discussion boards, and virtual office hours supported by WebCT®. The transcripts of discussion board discussion were collected as a compiled text file at the end of the course.

⁸ See APPENDIX D for Interview protocols
⁹ See APPENDIX E for Mid-term survey
Data Analysis

The analysis process was complex and included a variety of methods (see Figure 3.1 for a depiction of the analysis procedure).

Figure 3.1

The research question (i.e., “What factors indicate that collaborative learning is supported in a Web-based environment?”) guided the analytic process. Research questions are one strategy used to organize and manage research data. This is particularly useful for qualitative research where data related to a particular research question is not always found packaged together in exactly the same manner across different data sources (Coffey & Atkinson, 1996). The initial analysis focused on inductive analysis methods. Inductive analysis, specifically of transcripts of interviews and the focus group, informed and provided main categories (e.g., context, community, cognition), for further exploration. Three main approaches were used in the inductive analysis process: meaning condensation, meaning categorization, and meaning interpretation (Kvale, 1996). Meaning condensation involves the reduction of long statements into more concise formulations. Meaning categorization entails coding the text into categories. Meaning interpretation transforms what is directly said in a text to relations of meaning not immediately apparent in a text. The interpretation is achieved by a theoretical stance, recontextualizing what is said in a specific context.

Discourse analysis was the primary analysis method used for the discussion board transcripts. There are multiple perspectives on discourse and discourse analysis (Gill, 2001; MacLure, 2003; Wood & Kroger, 2000); in this study, discourse was defined as “a means of constituting cognition” (Resnick, Pontecorvo, & Säljö, 1997, p. 2) from situated cognition viewpoint. An important assumption in discourse analysis is that “a primary function of human
language is to scaffold the performance of social activities and to scaffold human affiliation within cultures and social groups and institutions” (Gee, 1999, p. 1). From a discourse analysis perspective, knowledge is socially constructed, and language is constructive and situated within social context (Gee, 1997, 1999; Gill, 2001). Knowledge building and/or meaning making is an integral part of social context and culture and key themes of discourse analysis to explore the relationship among content of the texts and context where in the meaning is occasioned (Gee, 1997, 1999; Gill, 2001).

Compared to existing models reviewed in a previous section, the analysis of this study focused on qualitative aspects of interaction and learning. That is, *classical* content analysis that applies theory-based analysis protocols to the data and reports quantified results were excluded in this study (c.f., see Bauer, 2001 for review of content analysis and classical content analysis as qualitative research methods). As other scholars often do not consider content analysis as discourse analysis (e.g., Wood & Kroger, 2000), the method that has been applied in this study attempted to overcome challenges in existing models and establish a data-grounded and theory-guided analysis approach.

Specifically, the analysis procedure was guided by Gill (2001)’s introductory chapter on discourse analysis, including, reading and interrogating the text, choosing text for in depth analysis, and open coding. All transcripts of asynchronous discussion board were read, reread, compared, and contrasted. In this process, several main categories from the data were eliminated or collapsed together as they were considered as overlapping or repetitive.

For in-depth analysis, the transcripts of one discussion forum from one group (n=8 participants, combination of two project groups, Big Bird and Barney) were selected. The selected discussion group was based on the amount of data provided by the group making it an
‘information-rich case’ (Patton, 2002). Specifically, the majority of the participants in discussion
group voluntarily participated in interviews (n=3) and a focus group interview (n=3). Further, the
amount of data from the bulletin board was significant. This group generated 170 message
directly related to course content, an average of 21 per participant. The total number of messages
was 16% more than the next closest group who generated 105 messages.

The fundamental unit of analysis (c.f., Henri, 1992) was the individual message and
initial analysis was directed at identifying the purpose of each message (e.g., define goals,
modify goals) and strategies used in composing message (e.g., questioning, illustration).
Analysis focused on how the learning process was presented in an individual message(s) (e.g.,
type initiation, integration) and the learning outcome through the discussion (e.g., shared goals,
negotiated meaning). Finally, emerging patterns were integrated and the nature of the discourse
was identified. Table 3.3 summarizes the data collection and analysis processes.

Table 3.3

Triangulation and peer examination were employed to establish credibility and
transferability of the study (i.e., internal validity and external validity (see Krefting, 1991)).
Triangulation results from “combining different ways of looking at [the data] or different
findings” (Silverman, 2000, p. 177). Triangulation strategies used in this study included the use
of multiple participants, multiple researchers, multiple data sources, and multiple methods. Two
peers examined the natural data set (i.e., interview and discussion transcripts) and reviewed the
categories and themes for authenticity from the data. Along with the triangulation and peer
examination, to certify the consistency with which categories are assigned to the same category
by different researchers and by the same researcher on different occasions (i.e., reliability or
dependability (see Krefting, 1991; Silverman, 2001)), a code-recode procedure (i.e., constant comparative analysis, (see Glaser & Strauss, 1967)) was also employed.

Findings

The findings have been organized in several ways to guide an understanding of the results. First, the six themes resulting from the analysis are organized according to three main categories: context, community and cognition. Multiple indicators, as total of 19, of the categories that support students’ collaborative learning in WBLE were identified from the data. Table 3.4 summarizes the categories, themes and indicators. We explore each of the main categories and themes in the sections that follow.

Table 3.4

Context

Context “is provided by the history of the situation, past interaction sequences, and the anticipation of future interaction sequences” (Vrasidas & Glass, 2002, p.34). From the situative perspective, “there is no separation of knowing from that which is known; rather, there is an assumption that practice, meaning, and identity constitute and are constituted within context” (Barab & Kirschner, 2001, p. 6). Factors related to the context where learning occurs are a crucial source of data as they inform how learning occurs, how learning is perceived, and how different factors are related. The main categories for context include structural support and active participation.

Structural Support

Providing support for students was a central theme from the data. Structure is defined as “the instructional strategy that provides the framework for the learning activity” (Fisher, 2000, p. 82). Nine participants in interviews and a focus group interview indicated that structural support
was particularly important at the beginning of the class when students were more likely to experience frustration and apprehension. For example, participants indicated that the time intensiveness and online features of the class were the biggest challenges. However, participants expressed that during the course, several structural supports, were useful in guiding them to establish and achieve their own goal and tasks for the class. Students’ perception of the success of the course developed over time and was indicated by the following: use of small discussion group and the multiple modes of the communication.

*Use of small discussion group.* One way structural support was provided in this course was by dividing the class into a small discussion groups (8 or less participants per group). The participants indicated use of small discussion groups as one of the most valuable class experiences. For example, Jane who took two courses offered by WebCT prior to this course stated: “I never felt connected with it [an online discussion] as much as I did this time and I think that the reason I felt so connected with the discussion this time was because we had our little groups and it wasn’t like everybody was answering to it.” Chloe who was in the first semester of the program also stated: “I thought it was good to have a small group that you read theirs [messages] and they read yours as opposed to having to give feedback on the whole class. I think that would have been a little bit overwhelming…” As Jane and Chloe stated, in addition to helping with the overall nature of the class, the use of small discussion groups also appears to have supported students with engaging in more in-depth discussion and building a sense of community.

*Multiple modes of communication.* Eight participants in interviews and a focus group interview described that they benefited from different opportunities and modes of communication. In this class, the majority of the communication occurred in asynchronous
discussion boards and weekly face-to-face workshops. Instructors encouraged all the students in the class to use WebCT® as a ‘one-stop’ place for information, resources, discussions, and assignment. Three participants in interviews reported that a concentration of all class information in one place (i.e., WebCT®) as useful and supportive.

For example, Miranda who was an experienced learner in using WebCT stated: “I like WebCT because all the information is there when I need to or if I’m inclined to, I can go and read what other people have said so in that respect I like knowing that that is there.” Another student stated in the mid term survey (not named because the survey was anonymous): “I really like the Website. It helps get me organized for the day and the week, and it helps keep me focused on what I need to be doing right then… Again, keep me on track, and it makes me feel good when I can check something off.” However, there was concern expressed regarding the design of the course web site. For example, one student mentioned in the mid-term survey, “I don’t think the course web page is user-friendly; the WebCT is easier to get to what I need.” As the earlier student indicated, it was perceived that the WebCT site included important information; an individual information page (i.e., course web page) was perceived as not readily useful.

Several other communication strategies were used to support the students during the course. Virtual office hours were held twice a week to support students learning and completion of their projects. The university instructor sent out CSM messages (i.e., ‘could, should, and must’) each week and most participants indicated that they found the messages were useful for managing their time, tasks, discussion, and learning. In addition to CSM messages, the facilitators were also willing to provide immediate responses for email messages from students
(within 24 hours), and five participants who complete mid-term survey indicated that instant responses for their questions were very helpful during the week.

Participants also reported that they used informal communication modes in addition to the ‘formal’ communication methods. The informal communication modes were student driven, primarily task-focused and occurred voluntarily. For example, participants reported that the majority of the small groups in the class used the chat room feature of WebCT® to brainstorm and make decision for their projects. Karin who had no experience in using a chat room before the class stated during the interview, “Chat room was a way of catching up and reassuring ourselves.” Jane also mentioned that, “We even had fun on it, we were cracking jokes with each other.” As Jane stated, in addition to completing work, many of the students in the entire class used the chat rooms for informal discussions (e.g., sharing individual experiences in this class and their work or even daily life). In interviews, one participant indicated that her group found frequent use of emails helpful. Yet another participant indicated her group used phone calls for group projects and related discussion during the interview.

Participants indicated that their informal communication was a meaningful learning experience. For example, Jamie who initiated the idea of using a chat room for group work mentioned during the focus group interview, “… [voluntary] chat rooms were more discussion [compared to discussion board].” Then Julie (in the same group with Jamie) added, “Because we were getting an immediate feedback [on group project].” during the focus group interview, “I don’t think it can be a real, true discussion board. But we fed off of each other’s ideas.” While the discussion board allowed students to discuss topics related to course content and group tasks, participants perceived the occasional use of a chat room was more effective in terms of immediate feedback.
Active Participation

Active participation was another theme within the category of context. We define active participation as participation in a collaborative process of learning. Participation is a crucial element; otherwise collaboration may not occur (Ingram & Hathorn, 2004). The data indicated four primary indicators of active participation: generation of messages, open nature of communication, active observation, and awareness of others. Each is described in more detail below.

Generation of messages. One indicator of active participation was the generation of messages. During the four weeks of the class, a total of 621 messages were generated. The majority of the messages generated via asynchronous discussion board (87%) were directly related to course content and students posted 74% of the messages in the entire class. Many researchers have used the number of messages as a way to indicate participation (Ingram & Hathorn, 2004; Vrasidas & McIssac, 1999). Quantity of messages can be regarded as a critical indicator of the level of participation. However, as Harasim (2002) indicated, the number of messages or message size posted is neither the best nor worst indicators of learning effectiveness and engagement. Given the various opinions in the literature, the number of postings should probably not be the only indicator of participation.

Open nature of communication. In terms of the nature of participation, some participants perceived the participation in the WBLE as open (i.e., equal opportunity) and flexible (in terms of time and place) discussion. For example, Carrie who described herself as a quiet learner in the face-to-face classroom, mentioned during the interview,

I think it would be harder [if this class didn't have online discussion] because I think you would have one or two people that did all the talking… you’d be sitting still… listening
to everybody to their stuff that we did on the discussion boards… I like it [online
discussion] better [than face-to-face discussion] because if I can do my part, go do
something I need to do and come back and see if anybody responded, or the next day and
check it again… we would’ve been here like all day long.

As Carrie qualified, the discussion is captured as text and participation can be distributed across
time, consequently extending the opportunity to contribute the discussion. In that way, as Carrie
described, more participants can be involved in discussion different from face-to-face discussion.

*Active observation.* One indicator of active participation that occurred within the
discussions was “active observation.” Active observation, or vicarious interaction (Sutton, 2001),
involves students’ participation in online discussion by reading the postings, not just by
generating the messages. One sign that active observation was occurring was the number of
messages that were read by the participants in the discussion board. The total number of
messages read by participants was 5576 (242 on average). While these numbers simply indicate
that participants opened the message, it does not mean that the participant was not actively
engaging the content (Sutton, 2001). As indicated in the literature, simply reading a posting does
not always necessarily lead to responding (Goldman, Crosby, Swan, & Shea, 2005).

Active observation was also confirmed at present by the participants during the
interviews. For example, Chloe was ranked as the most frequent readers during the course.
Records from the WebCT database indicated that she read 574 messages (average 242, in the
entire class members) during the course, yet she was not the most frequent poster. Chloe stated
during the interview, “I tried to read all of them [messages generated by other groups]… I
thought that they would also bring up things that our group hadn’t thought about. It was kind of
nice to read some different point of view…. [but] I never responded, I was just a silent observer."
As Chloe mentioned, students still participated in discussion, not by responding, but by reading the postings.

*Awareness of others.* Awareness of others means that the participants in the discussion are composing and posting messages with an awareness that they will be “read” by other participants (Davis & Brewer, 1997; Werry, 1996). When one is aware of others in an asynchronous discussion (i.e., one-to-many communication), it means that participants assume that others may respond to their messages. Furthermore, the participants may monitor their learning by observing how others respond and what they do with the information that is shared.

For example, Jane posted her message at the end of a discussion during the week, starting the statement, “I know I am so late responding and this may not be read but I wanted to comment.” As she expressed, the discussion moved forward to next topics, and she assumed that others would not check the previous discussion thread. Miranda provided another example. She indicated that she often found the discussion challenging during the course, as exemplified by the following statement during the interview, “…for the most part it didn’t feel like a discussion and in some cases I didn’t get any feedback so it wasn’t.” As Miranda indicated, a participant may feel that a discussion has not occurred during the course if her messages are not always responded to by others. These statements clearly point out a student understands, and may even want, others to read the messages posted when she is engaged in the discussion.

The participants also exhibited awareness of others in acknowledging the larger course context. For example, awareness of others functioned to trigger student initiation in the discussion boards. In one of the asynchronous discussion boards, Sean one of the group members of Big Bird wrote, “Hi, all. I noticed that the other two forums had the question for the discussion board posted. I’m going to assume that our forum is discussing the same material.”
There were ‘guiding questions’ for each discussion during the week, and one of the primary roles of the facilitators was to post and start the discussion. However, as quoted above, participants were willing to take this responsibility and begin their discussion with guiding questions or student-generated question. Because she was exploring other discussion boards, and was aware of others' behavior, the participant took a lead with moving her group forward.

Students also indicated that they would not want to miss what others are thinking, as exemplified in Chloe’s statement quoted above. In this study, most participants found the use of small groups for discussion was positive and helped support their learning. However, there was also concern that they would miss different perspectives from other groups and individuals in the class. Like Chloe, Julie who also showed high rate of reading the messages (i.e., 370) mentioned, “we probably missed out on a lot of ideas." Julie and Chloe’s statements indicate that participants did not want to miss other groups’ discussion when each participant was involved in own discussion group. They were aware of other groups were discussing in different forums, consequently, this led them participate in other forums, but not posting, rather, reading the discussion.

Awareness of others and acknowledgement of other's behaviors also helped to facilitate group awareness of their participation (e.g., level, quality). For example, Jamie, one of the group members in Barney posted the following to the discussion board “Hey have Big bird [group name] and Barney [group name] noticed we are the most “talkative” bunch with postings…hm…wonder why…?” This serves as another example of how awareness triggered students’ initiation. Davis and Brewer (1997) have indicated that these forms of awareness not only help with immediate participation in online discussions, they also create habits of observation that can assist in other forms of communication as well (e.g., face-to-face
interactions). The notion of ‘awareness of others’ is also an important indicator that provides a better understanding of the social process of learning in terms of community building in WBLE, which we describe in next section.

Community

The idea of communities has received much attention in online learning research (see, for example, Palloff & Pratt, 1999; Reisman, Flores, & Edge, 2004; Renninger & Shumar, 2002). Several definitions of community have been explored in the literature. For purposes of this study, community is defined as “groups that emerge when enough people interact and form webs of personal relationship” in an online context (Han & Hill, in press).

Another important aspect of community for this study is that it evolves according to the needs of its members (Bruffee, 1999). One way a sense of community can evolve is through ongoing communication. The communication serves as a constant stimulus to engage in the social process of learning (Bruffee, 1999; Jelink & Carr, 1996; Wood & Smith, 2001). Participants engaged in class activities and discussions draw upon their own experiences to link with, extend, or debate the discussion focus. Participants in this study reported they perceived a sense of community was built during the class specifically through asynchronous discussion and group work. Two primary indicators were found in the data to support the development of community: a formation of membership and generation of social dialogue. Each will be described in the following sections.

A Formation of Membership

*Group cohesiveness.* A strong and supportive group appeared to be a key contributor to building a sense of community within the course. Most participants indicated that they valued
the group discussion. As stated by Debb, one of the group members in Big Bird, in the discussion board:

I would like to say that, … I’m so honored to get to know such a great group of knowledgeable people! When I become a MS [media specialist], I certainly hope I’ll being seeing all of you in lots of media situations, and it would be wonderful to have your input when I’m struggling. I just love the communication.

The discussions not only helped to support learning, it also assisted in sustaining individual and group relationships. In interview, Jane also stated that,

It’s kind of hard sometimes to fit in when you don’t come from an educational background. When you get involved in the discussion boards you feel like you fit in. Because the groups welcome your comments and respond to your comments and I think that really helps to integrate all walks and different paths that people have come to this class.

As Jane indicated, “rapport” built upon ongoing conversations with group members stimulated her participation in the class and helped to facilitate developing a sense of community.

*Cultural change.* A willingness to accept different cultures and finding shared experiences are key factors in developing and forming membership in virtual learning communities (Woods & Smith, 2001). Even though the majority of the participants were homogeneous in terms of the context from which they came (i.e., K-12 teachers or school media library specialists), they still entered the course-related conversation, speaking different languages that reflected different backgrounds and/or the specific school communities of which they were members. For example, currently all participants are involved in K-12 context, however, those who did not have educational background reported lack of familiarity with the
culture and appear unwilling to participate in the discussions at first. However, as the course continued, it appeared that all of the participants, regardless of background, were able to share diverse cultural perspectives and then were also able to adapt them to the shared culture.

Formation of membership did take individual efforts and time even with given time intensiveness (i.e., four weeks). Nine participants in interviews and a focus group interview indicated they were apprehensive toward participating at the beginning of the class as they were unsure of the course content and/or different backgrounds of the participants and how that might align with their own background. Jane described her experience at the beginning of the class, “Sometimes I felt like I couldn’t jump into the conversation… I didn’t really comment cause I didn’t feel like I could jump into it for some reason.” Then, she described how her experience changed over time:

It [the discussion board] helped me understand where people were coming from and it reinforced what I was reading…They might say something that might trigger me to say something and it seemed more funneled and I wanted to go back and see what this person had to say instead of having to flip through you know fifty or so messages. It seemed more; I wanted to participate a little bit more because it was with a group of folks that I had started a rapport with.

Jane's experience serves as a good example of how perceptions of membership can develop over time.

Use of member specific "jargon." Another indicator of membership formation was repetitive use of member specific jargon (c.f., Membership categorization devices, Silverman, 1998). Member specific jargon was frequently employed by participants to specify the context, define the meaning, and express identities that would primarily be meaningful to those in the
group (Silverman, 1998; Wortham, 2004). The following is an example of the use of the member specific jargon from the discussion board:

Unfortunately, we very rarely get asked by the county or even our own administrators about what we like and don’t like in our curriculum. There are opportunities to serve on county committees to assess the AKS (QCC’s) so I guess that is the way that they determine feedback. Doesn’t seem like the best solution to me (Alice).

The example can be described as use of specific jargon already known and shared amongst participants. Member specific jargon is used to express a shared context for participants in a broad sense. That is, general meanings (e.g., our administrators, county committees, our curriculum, QCC-Quality Core Curriculum) are interpreted from schoolteachers and/or school library media specialist perspective. Julie also provided another example: “Just wondering… but as we will be (and some already are) Media Specialists, we will be more in the position of helping teachers make instructional objectives.” As indicated in the two examples, as media specialists the participants described their role (e.g., helping teachers) in relation to a different group of people in school settings (e.g., other teachers, committee). Further, they identified resources and standards that may impact their job (i.e., QCC, our curriculum).

Participants like Jane, who was formerly trainer in the human resource department and now transitioning to the media specialist position faced anxiety at the beginning of the class with the frequent use of initials to discuss various aspects of their projects (e.g., QCC; Iowa Tests of Basic Skills, ITBS) in multiple contexts (i.e., in class, in discussion board, or in their group tasks). As Jane stated during the interview,

So I learned some things while I was there about that teachers are required to do and the classroom I’m learning a lot more about QCC’s as people talk about them… It introduced
some new concepts sometimes because it introduced some things that I had not know about in the teaching world because I’m not from [an] educational background.

Jane learned about a new culture and specific meanings of context from other participants in use of asynchronous discussion board.

The importance of formation of membership is that it acknowledges there are differences amongst people and creates conditions in which participants can negotiate the boundaries between the communities where a participant belongs and the one where the others belong. One goal of this community was to help participants become fluent in the discourse of the knowledge community and to make it normal discourse for them as well. Furthermore, the formed and shared membership becomes a basis for developing a connection, and therefore building a sense of community.

*Generation of Social Dialogue*

Social dialogue is described as a means of providing opportunities for participants to present their personal background, belief, and characteristics (Collison, Elbaum, Haavind, & Tinker, 2000; Jenlink & Carr, 1996). Social dialogue appears to have become a key contributor to the learning experience in terms of providing stimulus to engage in discussion and developing social presence. Each is explained more detail in the following section.

*Stimulus to engage in discussion.* Some participants indicated that simple agreement or encouragement postings on the discussion board helped to sustain their motivation and build a sense of community. Jane provided some insight into how the more socially focused postings assisted with feelings of belonging: “Or they would say, “well yeah I think that’s a great point that this person made” and make the folks who were not really in education feel like they could
contribute to the discussion.” As Jane indicated, participants in an online discussion may find that messages provide the stimuli to continue contributing to the discussion.

Karin who was a former public librarian and currently in the first year of career in a school context provided another example when she stated in the discussion board:

…I’m trying to adapt everything I’ve learned (and taught) in public libraries to this new setting…Most of the time I felt like I’m treading water to survive this first class, so it made me SO happy Saturday to bring something to the table. My teammates made me feel like I’m making valid contributions!

Karin generated the social dialogue in the content related message and expressed how others’ responses of her message and acknowledgement of her contribution provided stimuli to engage in the discussion. While simple acknowledgement is not regarded as a meaningful interaction (Ingram & Hathorn, 2004), as shown in data, social dialogue encouraged participants to participate in the discussion.

*Developing social presence*. The data indicated that the use of social dialogue also assisted in building a supportive relationship with group members and a sense of ‘social presence’ (Garrison et al., 2000). As stated by Karin who was in the first semester of the program:

It [discussion board] is an important component into making us feel like a community, even when I’m isolated and at home, everyone is all around us geographic region and yet when I go on there and I see a part of a conversation, it has a way of, pulling us in and letting us still be in one community. It’s a big community building. It’s very much of a community-building tool when we’re all suffering.
Social dialogue appears to have reinforced the learning experience and further assisted with the development of a sense of community.

As a result of community building during the course, participants also reported that use of discussion board enabled them to develop collaborative learning skills. For example, Miranda mentioned during the interview, “I know that I tend to be the kind of loner who likes to work alone a lot… there was a lot of collaboration in the class and I’m getting used to it and the ladies I worked with in this class were really easy to get along with and get it done kind of people who all seem to get along ok, and that part was really good.” Jane also mentioned something similar during the interview, “I value the interaction in the group and my learning style is an individual so that’s a big change for me and I learned so much.” As participants described, despite individual’s preference (i.e., learning style), in group learning context, they not only experienced collaborative learning, they also uncovered collaborative skills to learn.

**Cognition**

WBLEs can provide an environment for exploration and sharing of ideas, where learning is a collective and participatory process. While collaboration and group learning can be emphasized, individual learning remains an important, and necessary, consideration for the advancement of knowledge as a group (Salomon, 1993). Any form of technology-mediated communication relies on language on some level. Asynchronous communication is highly text-based (i.e., written and typed language); thus writing is a core activity. Participants write about socially shared topics (i.e., course content and tasks) and individual understanding is presented in a social context. Cognitive indicators serve to illustrate how individual as well as group learning occurs in this context. Two main themes related to cognition resulted from data analysis: social
process of learning and communal facilitation. Each is described in more detail in the following section.

Social Process of Learning

Sharing perspectives. Since face-to-face workshops focused on hands-on experience with instructional design techniques and teamwork, the asynchronous discussions were the primary means of discussing content in this course. Participants perceived that the use of asynchronous discussion reinforced their individual learning and also enabled them to connect individual reflection to in a collaborative environment. In addition, participants also reported that the online discussion expanded their existing knowledge by providing a forum for sharing different perspectives.

In order for individual learning (e.g., self-reflection) to occur, the environment should provide the support and the ability to share ideas and critically reflect on the discussion presented and on personal understanding (Palloff & Pratt, 1999). Jane qualifies how participation in discussion supported her individual learning.

When we were discussing that particular topic, it helped me relate that back to what we were reading and then discussing on discussion boards and then other people’s thoughts… so the discussion board was that forum where I could go and instantly learn something new and then reinforce something that I had been reading or talking to someone about.

As Jane stated, individual understanding is being signified by a participation in a social process of learning than individual exertion. Similarly, Chloe also mentioned that,

I think the [discussion board] helped broaden [my knowledge]…posting ideas and having people write back to you what they thought or your being able to post what you thought
about what they mention because a lot of things that people would say hadn’t even crossed my mind yet. And it was a good way to share information or ideas…

Chloe’s statement also indicates how individual learning is supported by group discussion. Sharing different perspectives appears to have enabled this connection; consequently, knowledge emerged through the interactions as interwoven understanding. The examples above indicate that participants perceived their learning through the asynchronous discussion as a social process. As Palloff and Pratt (1999) described, the learning experience in WBLE can be a “mutually empowering act” (p. 26). Individuals present their own reflection and understanding in posted messages during the discussion, and these distinctive messages connected through interaction (i.e., read and respond) among participants.

Convergence. As Harasim (2002) described in her conceptual model, “idea structuring, through gradual convergence, reaches a level of intellectual synthesis, understanding and consensus, agree to disagree, and/or co-production” (p. 185) in collaborative learning on the Web. In online learning contexts, participants engage a process of co-construction of knowledge through facilitated communication and interaction. Consequently, individual contributions emerge and approached general consensus, producing “collective intelligence” as a result. The following example is a condensed version of the of discussion board, indicating how convergence is found in the data.

In previous threads, participants discussed the concept of goals and objectives, as follows:

Do you guys think that sometimes we blur the line between goals and objectives? For instance, I conducted a workshop for my women’s organization called in Pursuit of Goals. In that workshop we looked at overall goals as a bumper sticker or where do you
want to be, what do you want to achieve. Objectives were the steps to get you to where you want to be. But my question is how do you make sure you have a distinction between goals and objectives or do you guys see them as the same thing? (Jane)

[replied to Jane’s message above] Jane, the distinction between goals and objectives is sometimes (often) blurred for me. I think your idea is good, that goals are the big ideas. You have to keep that idea in the forefront of your mind. (Debb)

Later in the discussion, Annette, one of the group members in Barney posted the messages based on others’ ideas and general agreement on the idea,

I think I like the way Jane has described it in a post further down: the goals are the “big” things… and the objectives become more like steps forgetting to the goals. … the idea of goals as being the overarching, framing ideas behind a sort of “to do” list of objectives, makes some sense to me.

Alice, one of the group members in Barney also concurred by stating, “I also think that Jane described the goals and objectives how I perceive them… goals are the big picture of what I want to accomplish and the objectives as the steps I need to take to accomplish the goals…” It should be noted that one statement in the discussion board does not readily indicate the process of convergence and/or the resulting collective intelligence based on the discussion. Rather, examination of the continuous discussion is needed to understand how participants approach the conclusion.

Discussion saturation. As some students stated during the interviews, there were “discussion saturation” points in the discussion groups. Jane provided a good example of this:

Everybody seemed to cover what I wanted to say before I could get to it… I was like OK well we’ve commented on that enough and I read them but there was some that I didn’t
jump in and I, I felt comfortable not doing that… I just really soaked in what everybody else was saying and I felt that that was what that discussion board was for, you know. As indicated in Jane's statement, when participants perceived the topic is discussed enough and well developed, they are not willing to make superfluous comments.

Discussion saturation is also related to a challenge associated with managing online discussions: time constraints. This challenge is two-fold. Like any form of class discussion, there comes a time when the discussion has to stop. For example, the participants had three days for discussion of a certain topic, and after that time it had to end from so that another topic could be discussed. The other side of the challenge relates to the ‘asynchronicity’ of the discussion. As stated by Miranda: “And for the most part if you as a person did not post early and put all that stuff out there. Then it really felt like it was just becoming redundant everybody was saying the same thing.” This may be particularly relevant when the discussion was redirected, or another topic of discussion was started. The participant may not be willing to make an effort to participate under these circumstances.

**Communal Facilitation**

In general, the discussion boards reflected the task-focused nature of the class; consequently, it focused on course content and/or group tasks. While the instructors served as "official" facilitators in the course, the participants also engaged in communal facilitation; that is, the members of an individual group would help to shift and move the conversation during a particular online discussion. Five types of communal facilitation were identified from the data: goal setting, reflection, connection, original reformulation, and re-direction (see Table 3.5 for an overview; see Han & Hill, 2005, for more detail).

Table 3.5
**Goal setting.** Goal setting was used to define the goal(s) of a discussion, which in turn framed the topics of the discussion. Employing goal setting in their messages, students initiated ideas and presented guiding questions for the discussion. Asking questions, providing summaries and/or quotes were common strategies for this type of communal facilitation. For example, Jamie wrote in the beginning of the discussion:

Do teachers have time to select, identify, locate reviews on, preview and then validate materials? How much of this is the media specialist’s job? How are would a media specialist be expected to go to “find something on the planets” say?

If the message read, replied, and moved the discussion forward to new areas, it was considered to be a good indicator of goal setting.

**Reflection.** Reflection was used to represent an individual's understanding of a particular topic within ongoing discussion. During the discussion, individual learners can enhance existing knowledge through individual reflection. Illustrations, explanations, and quotes were common strategies for this type. Julie provided an example of reflection:

I guess it does seem a bit unnatural to officially classify a learning task, but I think that most teachers do it naturally. I think that the purpose is to make sure that your lessons are leading to higher order thinking and you aren’t simply teaching the same general skills over and over again with different content. It is also important so you teach in a logical order… that a higher order skills is not taught before a lower one (does that make sense?)

If the message is shared among participants and other students present their reflective thinking on the topic(s), the expected result of discussion is shared accounts.

**Connection.** The purpose of connection was to associate individual learning with collaborative learning. In this type of discourse, students shared different perspectives and
evaluated others' opinion(s). Agreement and questioning were often used for connection. The following is an example from the discussion board:

Right, Sean. Any instruction that doesn't address the needs of the learners, whether they're kids or grownups, is going to be doomed. I guess my question would be how much of this kind of needs assessment has to be done inductively and how much can be done deductively. I don't think we have to re-invent the wheel with each group of learners--I think some pretty good "predictive induction" (which I guess would be a left-handed way of describing deduction!) is a part of every teacher's experience. There's also the research literature, which can help us plan and predict even when we don't our kids' needs yet. In these days of test, test, test, we're going to have less and less time to do the careful kinds of inductive needs assessment that we know our students deserve. I think we should be looking hard at how deductive methods of assessment can help us survive in this harsher climate. As always, we need both.

In general, this thread moved from simple agreement to confirmation of the idea, thus enabling participants to reach mutual agreement.

*Original reformulation.* Original reformulation was used to test existing knowledge or create new knowledge. Employing original reformulation in their messages, learners integrated the different points of view, extending and expanding understanding. Alice provided a good example of original reformulation:

Just wondering… but as we will be (and some already are) Media Specialists, we will be more in the position of helping teachers make instructional objectives. We will not actually write them unless asked in the in-depth level. It sounds like we are support
people. Do you not find that a teacher would go to their grade level teachers first before they would come to the MS? Just wondering if I understand this.

Questioning, argument, and reviewing were common strategies used for original reformulation. This type of message generates discussion that tests the original message against personal experience; consequently, students may generate a negotiated meaning as they seek to apply the information in a specific context.

Re-direction. Re-direction was used to alter or modify goals. Within the same discussion thread, participants, including instructor and students, modified and re-defined goals based on extended knowledge. This type of message helped to facilitate and open new threaded communications. Summary, evaluation, and questioning were strategies frequently used to re-direct the discussion, as illustrated in the following thread of a discussion board:

Being not from an educational background, I find it interesting how people place such emphasis on the standards. It reminds me of the emphasis placed on the bottom line in accounting...did we make or lose money? That was all they cared about...how they did.'

[direct quote to here] Great parallel, Alice!! It really is about the bottom line in many ways...how did they do on the test, how does it compare to others (learner, schools, school districts, states, countries, planets.... oops! got carried away!! ;-) It makes me wonder if this is an underlying theme in our society overall...bottom line. And how much of that is influenced by those in positions of power and their perspectives on the world.

Any thoughts on this one?

In this message, the instructor, Jo, tried to extend the Alice’s idea and formulate a question for further discussion. This message attempted to modify the goal of the present discussion and
move forward to different topics. If the shared message generates new discussion topics, the result of the discussion may generate emerging themes.

As illustrated in the examples, individual messages in the discussion were read, interpreted, and responded to by other participants. Each message in an online discussion has a certain intention and is shared amongst participants (i.e., read and responded), thus facilitating discussion. Discussion postings functioned as tool of facilitation as well as carrier of individual reflection.

Discussion and Implications

This study explored the following research question: “What factors indicate that collaborative learning is supported in a Web-based environment?” Data provided initial indications that asynchronous discussion facilitates collaborative learning. The emerging themes from the data were categorized into three main categories: context, community and cognition. Each category incorporates the multiple themes with indicators from the data to represent the themes. In summary:

**Context** included structural support (e.g., use of small group discussion, multitude of communication) and active participation (e.g., open nature of participation, and awareness of others).

**Community** included a formation of membership (e.g., cultural change, use of member specific jargon) and generation of social discourse (e.g., stimulus to engage in discussion, developing social presence)

**Cognition** included social process of learning (i.e., sharing perspectives, convergence, discussion saturation) and communal facilitation (i.e., different types of discourse).

Overall, the data indicate that WBLEs can represent the foundational ideas of social learning theories: learning occurs in the community (Wenger, 1998), students’ learning is situated in social/cultural context (Brown et al., 1989), and the learning process and outcome is shared/distributed across the learners (Salomon, 1993).
Context

As the data indicated, the learners’ experience and learning process was situated in the WBLE context. Structural support and active participation is not separate from the learning itself; rather structure and participation constituted and supported the learning process (Barab & Kirschner, 2001). In this course, multiple participants, time intensiveness, and emphasis on group process constituted the specific context that impacts students’ learning and the nature of the discussion. These contextual foundations were also closely related to building a community of inquiry. Specifically, active participation was triggered by awareness of others along with active observation. As described in findings section, members of each group were aware of other groups’ discussion, consequently, they made attempt to join and read the discussion in the different forums. This awareness also signified the formation of membership and generated social discourse during the course.

Community

Participants described the asynchronous discussion as a means for community building, and a “reculturative process” that assists students as they become members of knowledge communities whose common quality is different from that of the knowledge communities to which they already belong (Bruffee, 1999). Sharing different perspectives through discussion enabled learners to bring their background and experience to the group, enabling and nurturing the creation of a new community. Individual contributions are equally valuable to group process in this culture (Garrison, 1992). In addition, building community through forming membership and creating culture also empowered the collaborative learning process. As stated by Palloff and Pratt (1999), sharing multiple viewpoints does not stop at participatory level (i.e., social ground),
it also allows for learners to be responsive as well as reflective on given topics during the discussion.

**Cognition**

In WBLEs, knowledge is constructed through networked interactions and is distributed and mediated among learners. As data indicated, the nature of the online discourse is described as ‘communal facilitation’ and the individual contribution reaches co-construction process by connecting to the community’s culture and other participants’ perspectives. We also witnessed from the data how the social learning process establishes the collective intelligence with an equal emphasis on individual contribution and group process.

As indicated in the literature, language is a social artifact, intrinsically collaborative and constructive, every time we write, we try to construct, reconstruct (or conserve) knowledge by explaining our beliefs to one another socially (Bruffee, 1999). Using different strategies, individual participants enable others to share, understand, and respond to messages. For example, in goal setting, a student asked a question to get the discussion started. In another instance, as in the examples in connection and original reformulation, students presented arguments to negotiate the meaning. In each example, the goal of the message was two fold: to present individual understanding and to get involved in the discussion.

Communal facilitation can also be described as ‘the process of grounding’ (Kirschner et al., 2004). The discussion starts as a participant makes unshared knowledge explicit (i.e., verbal or written) to other members of the community. Then, other participants read and reflect, responding to the original message. The initial idea is understood and interpreted based on other participants’ perspectives, and the discussion may continue until mutual understanding is achieved.
These emerging patterns do not imply that the five types always come in this sequence. For example, not every thread began with a ‘goal setting’ type message. Many were initiated with a ‘reflection’ or ‘connection’ message. Several features of interactions in WBLEs may explain why the types of messages do not occur in a particular sequence. One is that current computer conferencing technology supports the linear, hierarchical organization of discussion messages. That is, the turn-taking system is partially controlled by the technology; consequently, it generated a different order of interactions, one based on the convenience of the system rather than the actual flow of the dialogue.

The system issue is also closely related to the asynchronicity of the discussion. The temporal gap between the posted messages and topics might have been addressed in a different context (i.e., email, chat room). Yet another reason may be time constraints of the course. Within a given time frame, the class moved forward to the next topic, and then the discussion may not be continued. Or learners simply generated two or three types of messages during the discussion and did not generate other types of messages.

The contribution of individual messages was identified as “communal facilitation” and it is further examined in Han and Hill (2005). It should be noted that we do not propose that the types be applied to the discussion as “codes.” The five types of messages may help identify how the discourse is generated through the discussion and how the discourse is socially interwoven to provide a better understanding of how individual learners facilitate and contribute to the discussion.

Challenges Associated with Implementation

While the participants reported a successful experience, challenges associated with implementation of WBLE were also identified from the data. For example, while the majority of
the students found the instructors’ assistance and positive attitude were supportive ("I think Jo is real knowledgeable… she’s real organized with the everything she can do… she’s not a dictator. She lets everybody get their input"); [Jo] provided a very structured class environment both in the classroom and online. This is a large part of what made this a successful course”, from the final evaluation), others wanted more structure than what they perceived was provided. As stated by Miranda: “I had hoped that we would have gotten more information via instructor…I almost felt like it was kind of like a do it yourself class, you know.” The student-centered nature of the class has been reported as a successful factor in online learning by other researchers (e.g., Bonk & Cunningham, 1998; Oliver & Herrington, 2000). Clearly in the last twenty years, we have seen increased movement toward the self-direction and self-regulation of learning regardless of the context (i.e., online or face-to-face). However, as some of the participants in this study pointed out, all students have not yet recognized the value associated with a student driven learning environment. More research is needed to further our understanding of how to best facilitate a variety of learner needs and preferences within an online learning context.

Another challenge associated with participation in the online discussions was use of the chat rooms where every participant was involved. There was one time, during the second week’s face-to-face workshop, when participants had a chat room discussion with the instructor while she was located in another state. The original idea of the chat room activity was to support students (e.g., opportunities to ask questions) with the absence of the major instructor. While this technique has been recommended by others working in online contexts (e.g., Palloff & Pratt, 1999), many participants in this study found the experience uncomfortable. A large number of students were involved in the chat session (i.e., 23 students), making the management of the
discussion challenging. Further, there were not many “burning” issues at the time of chat room discussion, making the conversation somewhat unfocused. More research is needed so that we can further extend our understanding of how best to use various communication tools to facilitate learning at different times during an online learning experience.

Yet another area in need of further research relates to team processes. In the face-to-face mode of communication, technology and task must be integrated with team processes (e.g., discussion, role playing, debate, group projects, etc.) in order for collaborative learning to occur (Bonk & Dennen, 2003). In the case of technology-mediated communication, we are concerned with nature of online discourse that reflects collaborative learning whereby technology, group efforts, tasks, and the time are intertwined within the learning context. This interplay makes research and development in this area even more complex because the process of learning in WBLE is different from that of face-to-face. Several areas are in need of further exploration to strengthen our practices.

Implications for Practice

From the data, we found each category (i.e., context, community, cognition) to be a rich resource for practice in terms of empowering the learning in WBLE. In terms of context, we recommended the use of small discussion groups to reduce challenges in managing the large number of messages generated during the session (i.e., course, seminar) and to support students with engaging in more in-depth discussions. Small groups also appear to support building strong group relationships and a sense of community. In addition, use of multiple modes of communication assists active participation, group-focused activity, and dynamic interaction among learners. As an instructional strategy, to design the course website with a concentration of
all class information in one place and guide them with CSM message (i.e., could, should, and must), is also recommended.

Nurturing the culture of community appears to be a key contributor to the perception of a successful learning experience (Palloff & Pratt, 1999). To accomplish this, encouraging participants to share background and experiences formally (i.e., content-focused discussion) and informally (i.e., use of “chit chat” space) is suggested. As data indicated, generation of social dialogue may encourage participants to engage in discussion, enabling the development of social presence.

In terms of cognition, it is crucial for participants to be engaged in meaningful discussion and facilitate the discussion with each other (Ingram & Hathorn, 2004). We believe the five types of online discourse can support understanding and learning in WBLE, particularly when participants communally facilitate the discussion. Even though current realities may impede group dynamics in WBLE (e.g., time constraints, technological capabilities), the consistent use of communal facilitation may sustain interaction and co-construction of knowledge.

We also found considerations for when we design, develop, and implement WBLEs. First, as stated as one of the challenges, students may find the WBLE is challenging, because of self-directed and self-regulated nature of the context. As instructor and co-learners, we should encourage students to be involved in student-centered learning with immediate and frequent feedback and sharing cultures (Arbaugh, 2001). In addition, to support each participant with contributing to community individual learning styles and experiences and create community culture together is important.
Recommendations for Future Research

One area that should be considered for future research is the relationship among identified themes, categories, and indicators. That is, future research focused on how two or more indicators might affect how learning occurs in WBLE is needed. The themes explored in this study are grounded on students’ perception and experience, thus, how these affect their actual learning should be examined. As Swan and Shea (2005) remind us, research on the gap between perceived learning and actual achievement is needed. Student participants in this study pointed out they learned a great deal of knowledge, about how to apply that knowledge to their future practice, and every participant passed the class with high score (e.g., grade A). The level of achievement was not a crucial factor in this case; however, future research attending to perceived and actual learning is needed.

As we pointed out in a previous section, observation and analysis of how learning occurs in WBLE is a challenging task. Students’ learning might be partially reflected in asynchronous discussion (Sutton, 2001). However, responses to the messages are not always posted. Even if the message was shared (i.e., read by other participants), if it is not responded to explicitly, we may not able to observe whether mutual understanding or agreement has occurred. If we are to support knowledge-building discourse in educational settings, we need to establish the construction of knowledge as a social activity, with new ideas and information brought into the discourses of a community that shares goals for knowledge advancement and recognizes contributions. Further analysis of discussion should focus on examining the cognitive process of individual messages as a collection of concepts and procedures within a social context.

Finally, as mentioned earlier, more research is needed so that we can further extend our understanding of how to fully benefit from a variety of communication tools to facilitate learning.
at different times in online learning experience. To accomplish this, we need to examine the structure of different technologies and how they contribute to social and cognitive processes as well as individual and group processes (Strijbos, Kirschner, & Martens, 2004). Moreover, we need to develop technology that can help organize and structure the discussion in a variety of ways (Alavi & Duftner, 2005; Swan & Shea, 2005). In doing so, the technology may be able to support thick discourse, sustaining it through interruption (i.e., delayed response) and across distances, providing continuity over time.

Conclusion

In summary, the results of this study presented three key categories for facilitating collaboration in WBLE: context, community, and cognition. Even though research and development in this area is somewhat hampered by current challenges in the implementation of WBLEs, the lack of compelling theory, and the complex interplay of the variables, themes as enhancers and detractors of collaborative learning emerged. We believe theses themes are a robust ground to further develop and refine existing theory and serve as a foundation for future research.

References


Table 3.1

A summary of conceptual frameworks of online learning

<table>
<thead>
<tr>
<th>Model</th>
<th>Categories/Themes</th>
<th>Subcategories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Garrison, Anderson, &amp; Archer (2000): A model of community of inquiry</td>
<td>Cognitive presence</td>
<td>Triggering event; Exploration; Integration; Solution</td>
</tr>
<tr>
<td></td>
<td>Social presence</td>
<td>Emotional expression; Open communication; Group cohesion</td>
</tr>
<tr>
<td></td>
<td>Teaching presence</td>
<td>Instructional management; Building understanding; Direct instruction</td>
</tr>
<tr>
<td>Harasim (2002): A model of conceptual change</td>
<td>Idea generating</td>
<td>Initiation of idea; General information; Opinions Examples</td>
</tr>
<tr>
<td></td>
<td>Idea linking</td>
<td>Agreement; Shared understanding; Elaboration on ideas</td>
</tr>
<tr>
<td></td>
<td>Idea convergence</td>
<td>Summaries; Extended shared understandings</td>
</tr>
<tr>
<td>Gunawardena, Lowe, &amp; Anderson (1997): Interaction analysis model</td>
<td>Sharing/comparing of information</td>
<td>A statement of observation or opinion; A statement of agreement from one or more participants; Corroborating examples provided by one or more participants; Asking and answering questions to clarify details of statements; Definition, description, or identification of a problem</td>
</tr>
<tr>
<td></td>
<td>Discovery and exploration of dissonance or inconsistency among participants</td>
<td>Identifying and stating areas of disagreement; Asking and answering questions to clarify the source and extent of disagreement; Restating the participant’s position, and possibly advancing arguments or considerations in its supported by references to the participant’s metaphor or analogy to illustrate point of view</td>
</tr>
<tr>
<td></td>
<td>Negotiation of meaning or knowledge co-construction</td>
<td>Negotiation or clarification of the meaning of terms; Negotiation of the relative weight to be assigned to types of argument; Identification of areas of agreement or overlap among conflicting concepts; Proposal and negotiation of new statements embodying compromise, co-construction; Proposal of integrating or accommodating metaphors or analogies</td>
</tr>
<tr>
<td></td>
<td>Testing and modification</td>
<td>Testing the proposed synthesis against “receive fact” as shared by the participants and/or their culture; Testing against existing cognitive schema; Testing against personal experience; Testing against formal data collected; Testing against contradictory testimony in the literature</td>
</tr>
<tr>
<td></td>
<td>Phrasing of agreement and application of newly constructed meaning</td>
<td>Summarization of agreement(s); Applications of new knowledge; Metacognitive statements by the participants illustrating their understanding that their knowledge or ways of thinking (cognitive schema) have changed as a result of the conference interaction</td>
</tr>
</tbody>
</table>
Table 3.2

An overview of the student participants in interviews

<table>
<thead>
<tr>
<th>Name</th>
<th>Gender</th>
<th>Experience</th>
<th>Group</th>
<th>Current Job</th>
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<tbody>
<tr>
<td>Alice</td>
<td>Female</td>
<td>3rd online/hybrid class</td>
<td>Barney</td>
<td>Media specialist in elementary school</td>
</tr>
<tr>
<td>Carrie</td>
<td>Female</td>
<td>1st online/hybrid class</td>
<td>Cookies</td>
<td>Elementary school (resource) teacher</td>
</tr>
<tr>
<td>Chloe</td>
<td>Female</td>
<td>1st class in the program</td>
<td>Bear Cat</td>
<td>High school teacher</td>
</tr>
<tr>
<td>Jamie</td>
<td>Female</td>
<td>3rd online/hybrid class</td>
<td>Barney</td>
<td>Media specialist in elementary school</td>
</tr>
<tr>
<td>Jane</td>
<td>Female</td>
<td>3rd online/hybrid class</td>
<td>Big Bird</td>
<td>Recruitment specialist in the county school district</td>
</tr>
<tr>
<td>Julie</td>
<td>Female</td>
<td>4th online/hybrid class</td>
<td>Barney</td>
<td>High school teacher</td>
</tr>
<tr>
<td>Karin</td>
<td>Female</td>
<td>1st class in the program</td>
<td>Big Bird</td>
<td>Media specialist in elementary school</td>
</tr>
<tr>
<td>Miranda</td>
<td>Female</td>
<td>4th class online/hybrid</td>
<td>Bear Cat</td>
<td>Elementary school teacher</td>
</tr>
</tbody>
</table>
Table 3.3

*Data collection and analysis process*

<table>
<thead>
<tr>
<th>Methods</th>
<th>Strategies</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inductive analysis (Kvale, 1996)</td>
<td>• Meaning condensation</td>
<td>• The transcripts of interviews &amp; a focus group interview</td>
</tr>
<tr>
<td></td>
<td>• Meaning categorization</td>
<td>• The transcripts of asynchronous discussion board</td>
</tr>
<tr>
<td></td>
<td>• Meaning interpretation</td>
<td>• Mid-term survey</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Final evaluation</td>
</tr>
<tr>
<td>Discourse analysis (Gill, 1997)</td>
<td>• Forming question</td>
<td>• The transcripts of asynchronous discussion board</td>
</tr>
<tr>
<td></td>
<td>• Choosing the text</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Reading and interrogating the text</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Coding</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Meaning Interpretation</td>
<td></td>
</tr>
</tbody>
</table>
Table 3.4

Emerging themes of collaboration in WBLE

<table>
<thead>
<tr>
<th>Categories</th>
<th>Themes</th>
<th>Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Context</td>
<td>Structural support</td>
<td>Use of small discussion group</td>
</tr>
<tr>
<td></td>
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<td>Multiple modes of communication</td>
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<td></td>
<td>Active participation</td>
<td>Generation of messages</td>
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<td></td>
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<td>Open nature of participation</td>
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<td>Active observation</td>
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<td>Awareness of others</td>
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<tr>
<td>Community</td>
<td>A formation of membership</td>
<td>Group cohesiveness</td>
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<td></td>
<td></td>
<td>Cultural change</td>
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<td></td>
<td></td>
<td>Use of member specific jargon</td>
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<tr>
<td></td>
<td>Generation of social dialogue</td>
<td>Stimulus to engage in discussion</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Developing social presence</td>
</tr>
<tr>
<td>Cognition</td>
<td>Social process of learning</td>
<td>Sharing perspectives</td>
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<td></td>
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<td>Convergence</td>
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<td>Discussion saturation</td>
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<td></td>
<td>Communal facilitation</td>
<td>Goal setting</td>
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<td>Reflection</td>
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<td></td>
<td>Connection</td>
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<td></td>
<td></td>
<td>Original reformulation</td>
</tr>
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<td></td>
<td></td>
<td>Re-direction</td>
</tr>
</tbody>
</table>
Table 3.5

*Communal facilitation of online discourse*

<table>
<thead>
<tr>
<th>Themes</th>
<th>Description</th>
<th>Examples</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal Setting</td>
<td>Establish goal(s)</td>
<td>Idea initiation</td>
<td>Shared goals</td>
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<tr>
<td></td>
<td></td>
<td>Questioning</td>
<td></td>
</tr>
<tr>
<td>Reflection</td>
<td>Represent individual understanding</td>
<td>Reflection</td>
<td>Shared</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Illustration</td>
<td>account</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Explanation</td>
<td></td>
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<tr>
<td>Connection</td>
<td>Associate individual understanding within a collaborative context</td>
<td>Sharing different perspective</td>
<td>Mutual</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Agreement</td>
<td>agreement</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Questioning</td>
<td></td>
</tr>
<tr>
<td>Original reformulation</td>
<td>Challenge existing knowledge and create new knowledge</td>
<td>Integration</td>
<td>Negotiated</td>
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<td></td>
<td></td>
<td>Expand</td>
<td>meaning</td>
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<td>Argument</td>
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<td></td>
<td></td>
<td>Reviewing</td>
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<tr>
<td>Re-direction</td>
<td>Alter/modify goal(s)</td>
<td>Summary</td>
<td>Emerging</td>
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<td></td>
<td>Evaluation</td>
<td>themes</td>
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<td>Questioning</td>
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Figure 3.1 Data analysis procedure
CHAPTER 4

LANGUAGE THAT IS SHARED, SITUATED, AND DISTRIBUTED:

EXAMINING INTERACTION PATTERNS AND TYPES OF DISCOURSE

IN ASYNCHRONOUS DISCUSSION\(^\text{10}\)

\(^{10}\) Han, S., & Hill, J. R. To be submitted to *Journal of Asynchronous Learning Network*. 
Abstract

This article describes a study exploring how students’ learning is reflected in asynchronous online discussion. The study examined different interaction patterns and different types of discourse generated in an asynchronous discussion board supported by a Web-based learning system. In examining online group discussions using discourse analysis, this study reflects a fundamental change from viewing online discourse as an individual process to a social process. A primary goal of the article is to illustrate how the investigation of online discourse furthers our understanding of social processes and online learning. The authors also describe the methodological issues related to the analysis of online discourse and discuss implications for research and practice.
Introduction

The Web continues to offer new opportunities for educational practice. Researchers studying the use of the Web for learning are also beginning to explore the larger implications of this technology. Researchers have indicated that the socio-cultural implications of the use of the Internet are important to explore (e.g., Bruckman, 2002). Recent studies have reported the benefits of using the Internet for collaborative learning (de Jong, Veldhuis-Diermanse, & Lutgens, 2002; Kemery, 2000; Rogers, 2000). Two areas of particular interest are social interaction and co-construction of knowledge (e.g., Islas, 2004; Kanuka & Anderson, 1998). Researchers in these areas indicate that Web-based learning environments (WBLE) enhance social interaction amongst participants and provide opportunities for mutual construction of knowledge (Järvelä & Häkkinen, 2002; Kanuka & Anderson, 1998).

Despite the growing interest in and research on collaborative learning in online environments, the nature of the social interaction and the processes associated with the mutual construction of knowledge remains largely undiscovered. For example, a variety of interaction types are well elaborated in the literature (e.g., Anderson, 2003; Hill, Wiley, Nelson, & Han, 2004), but most descriptions of the interactions exist in describing relationships (e.g., learner-learner, learner-instructor, learner-content, instructor-content, learner-interface) in various technology-mediated contexts. These descriptions enable us to better understand where interaction exists and what interaction occurs. However, there is little exploration in terms of the qualitative aspects of interaction such as how the interaction occurs, how the interaction is situated in a variety of contexts, and the distinctive nature of each type of interaction (e.g., how learner-learner interaction is reflected in online discussion boards).
One way research related to this area might be accomplished is to explore the interactions that occur during online learning. The discussion generated and transcripts created by online learning might yield important insights related to how knowledge creation and distributed learning occurs online. As analysis of online discourse is an emerging field (Marra, Moore, & Kimczak, 2004), recent studies (e.g., Cecez-Kecmanovic & Webb, 2000; Fahy, Crawford, & Ally, 2001; Gunawardena, Lowe, & Anderson, 1997; Vrasidas & McIsaac, 1999) have only been partially successful in reporting students’ perceived learning and satisfactory experience; and what types of messages are generated in the course of discussion. We need to further explore how the nature of online discourse reflects collaborative learning whereby technology, group efforts, tasks, and time interact dynamically within the learning context.

The purpose of this study was to investigate how student collaborative learning was reflected through asynchronous discussion. The primary research question guiding the study was “what is the nature of group discourse in a Web-based learning environment supported by computer conferencing?” This question was addressed by two sub questions: “how is group interaction depicted in online discourse?” and “how does online discourse contribute to the learning process?” We begin with a review of the foundations of social learning theory, followed by describing the social/technological dimensions of online discourse. Next, we describe the study and major findings. We end with a discussion of implications for research and practice.

Conceptual Framework

How knowledge is acquired and shared is an important aspect of any learning situation. It is particularly important in online learning where the very nature of what is learned and how it occurs has been called into question by researchers (e.g., Alavi & Duftner, 2005; Järvelä & Häkkinen, 2003). Social learning theory (i.e., situative perspective) offers a unique insight from
which to view online learning. From this perspective, learning is situated in a specific social context (Brown, Collins, & Duguid, 1989; Wenger, 1998), and cognition is distributed across individuals, tools, and artifacts (Salomon, 1993; Pea 1993, 2004). In an online learning context, knowledge is socially constructed in primarily written formats and learning is enabled via various means of communication. Knowledge and learning occur in a gradual convergence through interactive communication and facilitated collaboration.

Further, from a situative perspective, there is no separation of knowing from that which is known; rather, there is an assumption that practice, meaning, and identity constitute and are constructed within context, suggesting dialectic relations among practice, meaning, and context (Barab & Kirshner, 2001; Kirshner & Whitson, 1997). The online discourse generated by asynchronous discussion cannot be separated from the technology (i.e., online course management systems) or the social context (i.e., class). The discourse is partially controlled by technological affordances, the learner(s), and the context. The interactions are dynamic, such that the writing of one person can only be described and understood in relation to the response of the other persons, and in relation to the situational and temporal circumstances in a community of learners (Salomon 1993, 1998).

The distinction between technological and social dimensions provides a unique view from which to examine the complex and multifaceted nature of learning process in a WBLE. There are both technological and social dimensions of learning (Pea, 1993; 2004). The technological dimension emerges from a specific context enabled by the technological affordances. The social dimension is constructed from the collaboration between the participants. Each is further explored in the following sections.
One of the greatest potentials for technology-mediated communication is its ability to provide an infrastructure to enable group and collaborative learning (Chee-kit, 2002; Inglis, Ling, & Joosten, 1999; Ryan, Scott, Freeman, & Pate, 2000). Computer conferencing typically involves interaction amongst a group of participants. A user can log on and read the contributions (i.e., messages) of other members of the group, respond to the message(s) posted or create a message for a new thread. Most current conferencing tools (e.g., WebCT®) allow the inclusion of other media like pictures and links to web pages or other information in a message. The systems also include additional features like the ability to organize the messages by author, topic theme, keywords, or chronological order.

A threaded discussion is a simple form of hierarchically structured written-text provided by computer conferencing systems (Zumbach & Reimann, 1999). A threaded discussion usually shows the list of all the messages with subject headings, enabling a structuring of messages by topic. A common use of the threaded discussions in learning contexts involves a participant (i.e., instructor, student) specifying a topic for discussion in advance and others posting their response messages containing opinions, comments, or questions about the topic. The individual messages are thus organized by topics (Klemm & Snell, 1998) that emerge in the discussion.

One aspect of online learning that seems quite different from face-to-face learning involves class discussion. Online class discussion does not evolve sequentially through time, as classroom discussion does, but rather grows over time from multiple conceptual perspectives in many dimensions all at once (Condon & Čech, 1996; Davis & Brewer, 1997). The nature of the interactions assists in enabling the evolution of the discussion; however, the affordance of the technology also plays a role. According to Pea (1993), “affordance refers to the perceived and
actual properties of a thing, primarily those functional properties that determine just how the thing could possibly be used” (p. 51). Thus for example, in asynchronous discussion boards, the computer and Internet technology enables communication via the generation of discussion messages amongst participants.

**Social Dimension in Asynchronous Discussion**

From a social learning perspective, knowledge is socially constructed, and language is constructed and situated within a social context (Gee, 1997, 1999). “A primary function of human language is to scaffold the performance of social activities and to scaffold human affiliation within culture and social groups and institutions” (Gee, 1999, p. 1). Therefore, writing is used to construct and reconstruct knowledge by explaining our beliefs in community (Bruffee, 1999). Knowledge building and/or meaning making in learning is an integral part of a social context and culture when we explore the relationship among contents of text and the context where the meaning is created (Gee, 1997; Gill, 2000). If we are to support learning via discourse in online learning context, we need to establish the construction of knowledge as a social activity, with new ideas and information brought into the discourse of a community that shares goals for knowledge advancement and recognizes the contributions of multiple participants.

In order to examine a complex construct such as interaction, researchers benefit from carefully examining the context within which the interaction is taking place. An interesting aspect of asynchronous online learning is that interaction is mainly constructed in written form. It has been suggested that asynchronous online discourse is a new kind of language showing hybrid features of both spoken and written language (Davis & Brewer, 1997; Mann & Stewart, 2000; Yates, 1996). Language in online discourse is typed and therefore like writing and contains
exchanges, which are ‘often rapid and informal’ and therefore like talk. Thus, “it reads like and
to a certain extent acts like conversation” (Davis & Brewer, 1997, p. 2).

Language in asynchronous online discourse also differs from face-to-face communication in turn taking (Davis & Brewer, 1997; Garcia & Jacobs, 1999; Hutchby, 2001). Responses to messages may be delayed because of the asynchronous nature of the conversation. Time between the postings of messages among participants may range from several seconds to several days or longer depending on the length of time that the discussion forum or thread is available to its participants.

The nature of discourse is complex in any circumstance. In online contexts, the complexity is even more pronounced. It is important to consider many dimensions in the exploration of online discourse for learning. Two discussed here include the technological and social. It is also important to examine how knowledge is constructed, as well as the theories associated with learning, as we seek to extend our understanding. These principles were used to guide the study described in the next section.

Methodology

The Context

The focus of this study was to explore the nature of group discourse in asynchronous online discussion. The study was a case study, a process of inquiry about the case, including the logic of research design, data generation methods, and specific data analysis strategies, as well as the product of that inquiry (Yin, 2003). The purpose of case study research is “to cover contexture condition, believing that those conditions are highly pertinent to her phenomenon of study” (Yin, 2003, p. 13). This study proposed that the process of a social process of learning in
a WBLE is entwined with the context and the technology with which participants collaborate and interact, making case study an appropriate research design.

This qualitative case study was conducted in a Master’s level course supported by a Web-based learning system (i.e., WebCT®, http://webct.com). The selection of the context was purposeful (Patton, 2002) and was determined by case sampling (Goetz & LeCompte, 1984). Case sampling entails presenting a profile of attributes in an average case. In this study, three characteristics were used to select the case. First, the class was group-oriented; the primary focus revolved around group activities and projects. Second, the primary delivery of the course was through asynchronous computer conferencing. Third, participants entered the course with both similarities (i.e., most participants are school teachers in K-12 context) and differences (i.e., diverse web-based learning experience).

The implementation of the course took place in a research university in the South during a short session in the summer (four weeks). The participants consisted of the university instructor (n=1), doctoral students as facilitators (n=2), and K-12 teachers and school media library specialists as students (n=23). At the time of the study, most students (n=21) had experience (i.e., one or more courses) learning in an online environment. The participants were dominantly female (n=22) and Caucasian (n=21).

There were six different project groups (n=3-4), with two projects groups paired as a discussion group. Consequently, there were three different discussion groups (n = 6-8 participants) using the discussion boards throughout the implementation of the course. Each group was assigned in a specific discussion forum for their group with two discussion topics per week. A single discussion topic contained multiple discussion threads.
The first author of this paper was one of the facilitators and supported student participants to complete individual and group projects and assisted with the discussion. She also had primary responsibilities for data collection and analysis. The second author of this paper was the major instructor and was primarily responsible for course design and implementation.

The goal of the course, “Instructional Design,” was to provide an introduction to the instructional design process within a hands-on setting. The course offered sixteen class meetings within a blended technology enhanced learning environment. Students were expected to complete individual activities (i.e., ID reflection, reflection on course material readings), with a culminating group project (i.e., IDAs, Instructional Design Activities).11

During the course, participants experienced a variety of instructional methods, such as face-to-face workshops, synchronous online chat, and asynchronous discussion. Face-to-face workshops provided logistical support, a preview of course content, and opportunities to work on group tasks within a classroom and computer lab. Synchronous online chat sessions (i.e., virtual office hours) offered opportunities to ask questions and discuss the course content. Asynchronous discussions forums allowed participants to discuss multiple topics (i.e., learner analysis, instructional strategies, evaluation) throughout the course between face-to-face workshops. The asynchronous discussion board enabled a variety of interactions to assist students’ learning in several ways (e.g., sharing information, presenting and providing feedback on each others’ work, discussion course related topics, and reflection on the instructional design process).

**Data Generation and Analysis**

The primary data used for this study were the transcripts from the discourse captured from the asynchronous discussion board. There were 150 discussion topics, with a total of 621

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11 The complete syllabus is in APPENDIX C.
messages generated across all participants during the implementation of the course. The content of the messages ranged from course topics to technological support (e.g., how do I make the link in Web page?), to more socially focused messages (i.e., sharing stress tips). The transcripts of the discussions board were collected as a compiled text file at the end of the course for analysis.

The online learning tool controlled the structure of the threaded discussion. A generic feature of most discussion tools is that the discussion is displayed as a hierarchical and linear process. Figure 4.1 represents an example of threaded discussions in the WebCT® system. By providing threading capabilities, conference discussions remain relatively structured and coherent, and users can easily track the evolution of group discussions around specific topics.

One discussion group (n=8, combination of two project groups, Barney and Big Bird) was selected for in depth analysis of patterns and the nature of the learning process. This discussion group, comprised of two different project groups, was selected based in several factors. First, the personal background and current position of each participant varied, enabling multiple viewpoints and cultures to manifest during the discussion. Second, the group members had different experiences in online learning environments. The majority of the group members (n=6) had three or more either purely online learning or a mixture of face-to-face and online learning (i.e., hybrid) courses. One participant had two online/hybrid courses and one participant had no experience with online or hybrid courses. Third, this discussion group had a rich set of discussion in terms of number of messages posted in the forum. During the implementation of the course (i.e., four weeks), the group generated 170 messages directly related to the course content, an average of 21 per participant. The total number of messages was 16 % more than the
next closest group who generated 105 messages. Table 4.1 presents an overview of the participants.

Table 4.1

Data Analysis Procedure

Data analysis incorporated the 170 messages generated by the discussion group, including five discussion topics (i.e., needs assessment and learner analysis; objectives and assessment; strategies, activities and materials; implementation and evaluation; and instructional consultation) with 17 threads in the discussion topics. Detailed analysis was implemented in individual messages, yet fundamental unit of analysis was a thread of the discussion. Individual messages were analyzed within the context of the thread, and the threads were cross-examined during the analysis.

Preliminary analysis of the data started when the data was generated. In depth analysis was a complex and multi-layered and process took place over several months. Figure 4.2 presents an overview of the procedure. The process is described in more detail with a focus on two key components: mapping strategy and discourse analysis.

Figure 4.2

Mapping strategy. To examine the different patterns of interaction, a “mapping strategy” was employed and patterns in the messages were identified (see Han, 2002; Han & Hill, 2004). The following research question was used to guide this level of analysis: “how is group interaction depicted in online discourse?” The mapping strategy was used in this study to enable the researchers to visualize the relationship between the messages and participants. The “mapping strategy” enabled the researchers to draw nodes representing individual participants and then to create a different way of depicting the links and interaction between the messages (vs.
the linear order generated by the system) (see Figure 4.3 and Figure 4.4). This method enabled the researchers to better understand the interdependence of each message and therefore the network between participants' messages. The nodes in the maps are the individual messages in the thread while the links show relationships between the nodes.

**Discourse analysis.** Discourse analysis was a primary strategy used in analyzing social dimension of asynchronous discussion. Discourse in this study is defined as “a means of constituting cognition” (Resnick, Säljö, & Pontecorvo, 1997, p. 2). A fundamental assumption of discourse analysis is that language is a social consequence; and language scaffolds the social interaction within culture of community (Bruffee, 1999; Gee, 1999) from situative perspective. Discourse is situated in specific context, adapted to the technological and to social affordances of the context (Pea, 1993, 2004; Resnick et al., 1997). Knowledge construction and/or meaning making are not separate from the social context and culture in which the construction occurs. A primary purpose of discourse analysis is to explore the relationship among the content of the texts and context where in the meaning is situated (Gee, 1997, 1999; Gill, 2001).

Researchers have used diverse analytic methods in the research of electronic discourse generated by computer conferencing. For example, from the early exploration of interaction and collaboration in asynchronous discussion, content analysis was one of the methods has been taken (e.g., Gunawardena, Lowe, & Anderson, 1997; Henri, 1992) (see Bauer, 2001 for a review of content analysis). Content analysis of the transcript of discussion includes establishing theory based analysis protocols, coding the data, illustrating how each category applied to the data, and reporting the quantified results (i.e., how many message were generated in each category).

Discourse analysis used in this study is different from other methods that have been used in this area (e.g., content analysis) for several reasons. First, the focus of analysis was not just the
content presented in an individual message. Rather, the focus was the meaning situated in a context (i.e., threads, topics) and connections between individual messages. Moreover, we examined the threads of discussion in regard to how message(s) contributed to continuing the discussion. Second, this study excludes the quantification of the results. That is, we presented how individual message can be categorized; enumerating the numbers of each category was not essential. As other researchers suggested, in the early use of established analysis protocols, counting numbers would be useful to validate the code itself (Gunawardena et al., 1997). Yet, we believe the data is complex in nature; arbitrary calculation may not be supportive to understand the essence of the data. Third, the types identified in this study (see Table 4.2) are grounded in the data. Meaning interpretation was guided by and substantiated with the literature; however, we made an attempt to illustrate the types from the data as much as possible.

There are multiple views and foundations of discourse analysis (see review of discourse analysis as methodology MacLure, 2003 and Wood & Kroger, 2000). As described above, this study was guided by a situative perspective (e.g., Resnick et al., 1997). The authors found Gill (2000) and Wood & Kroger (2000)’s were useful to begin research in this area in terms of analytic strategies, which includes: forming a question, reading and interrogating the data for establish initial themes, choosing the text for more in depth analysis, reading and interrogating in detail, and data presentation and interpretation. The following research question was used to guide this level of analysis: “how does online discourse contribute to the learning process?”

The first step in the process involved reading and interrogating (i.e., cross examining the threads) all transcripts of the asynchronous discussion. Several steps were involved in the open coding process. By analyzing individual messages, the first rounds of analysis were directed at establishing initial themes. The nature of each message was coded (e.g., define goals, present
individual reflection) and the strategies used in writing the messages were identified (e.g., questioning, argument).

Next, we examined the connections between messages; that is, how one message was read and responded to by other participants. This enabled us to gain an initial understanding of how the learning process was presented in individual messages (e.g., idea initiation, meaning negotiation) and the result of the discussion (e.g., shared goals, shared accounts). Finally, several main categories from the data were eliminated or collapsed together as they were considered overlapping or repetitive.

Each category was considered as “code” for the next phases of analysis. The categories identified during initial data analysis were reapplied to the data set. We used three different strategies to check reliability: deviant case analysis, coherence, and peer examination (Gill, 2000). First, a detailed analysis of transcripts was performed to identify the ‘go against’ messages (what Gill refers to as "deviant cases analysis"). For example, use of discourse strategies (e.g., questioning) were not always categorized as same types of discourse; rather, the use of discourse was categorized by the nature of communication (see Table 4.1). Second, to check the coherence of the analysis, earlier studies similar to this study were reviewed (e.g., Cecez-Kecmanovic & Webb, 2000; Marra et al., 2004). This strategy is especially useful for establishing the types of the discourse. One message was often categorized as more than one type, since the discourse is complex in nature. In this case, we examined how the message contributed to and facilitated the core aspects of the discussion. Conflicts were resolved as we reexamined the data. Finally, peer examination was conducted to confirm the analysis methods and conclusions. Two peers examined the condensed transcripts of discussion board and reviewed the initial themes. Along with the second strategy (i.e., check the coherence), peer
examination was useful for categorizing the complex data as one specific type. The peer examination process enabled the discourse strategies and the result of discussion (see Table 4.2) identified by researchers to be refined and confirmed.

Data Presentation

In presenting the data, we begin with the technological dimensions of asynchronous discussion, specifically demonstrating how different layers of interaction are enabled, or hindered, through the use of the technology. Next, we explore how the social dimension of asynchronous discussion is characterized in terms of the nature and the function of online discourse in the learning process.

Technological Dimension in Asynchronous Discussion

The technological dimension in asynchronous discussion in this study specifically focused on the structural properties created as a result of the interactions among participants and technological affordances. In explaining the technological dimension, we will focus on specific techniques used during data analysis to guide the interpretation of the data. The emphasis in this stage of the analysis was not on the messages conveyed by the data; that is further discussed in the social dimensions section. Rather, the technological dimension is focused on the structure of the data, and how that impacted analysis and informed the results of the study. The system's ability to enable different interaction patterns is first explained. Next, we examine how the affordances of the technology can influence the learning process by identifying three different interaction patterns reflected in the discussion.

The technological affordances of the system used can influence the patterns of interaction. Turn-taking systems are used to organize social activities, such as interaction, in a specific context; it is beneficial to examine how the turns are distributed in a group context to
understand the structure and patterns of interaction (Sacks, Schegloff, & Jefferson, 1974). In face-to-face conversations, when a person asks a question, s/he expects an answer or non-answer given as a response. Depending on the speakers, the size and quality of the turns are changed and varied; however, the conversation typically moves in a linear path from beginning to end in terms of time.

The turn-taking system in asynchronous discussion does not consist of the rules and procedures participants commonly use to exchange turns in face-to-face discussion. Similar to turn taking in face-to-face conversation, turns in asynchronous discussion are either guided by the previous speaker or self-selected by next speakers (Sacks et al., 1974). However, in an asynchronous online discussion, compared to face-to-face conversation where one party talks at a time (Sacks et al., 1974), one message (i.e., response) can be used in more than one thread of a conversation. That is, one message may contribute to multiple conversations in various ways. While this can enable rich discussion, it can also contribute to confusion when an attempt is made to follow the resulting multi-faceted conversation.

While the turn-taking system in face-to-face interaction provides a consistent basis for speaker-change and its recurrence (Sacks et al., 1974), in asynchronous modes, the computer system makes its recurrence partially automatic. That is, options of allocation of turns are not provided by common rules of conversation; the turn-taking occurs as a result of pressing the reply button to the previous messages. Because of this, asynchronous discourse is often considered two-directional texts incorporating the activities of creating (writing) and posting (sending and receiving) the messages (Davis & Brewer, 1997). Without contextual and facial clues, in asynchronous discussion, a participant may not be able to control the exact placement of her message in the threaded discussion, as others may complete and post theirs first. Thus this
text-based context may result in a different communication environment than is found in face-to-face conversation.

Multiple lenses to view interaction were demonstrated in the data. Each view contributes to the richness of the interaction that can occur in a WBLE. The first lens illustrates the response sequences. The second lens illustrates the interaction that occurred amongst the participants. The third lens enabled the researchers to depict the concept map of messages.

Figure 4.3 presents a general depiction of the interaction patterns displayed by the computer system.

Figure 4.3

This expresses how the computer conferencing system organizes individual postings. The number indicates the actual sequence of the message as generated by the computer system. The lower number refers to the earlier posting in terms of time (i.e., number nine was posted before number 41). The arrow indicates a responding behavior occurred. That is a participant composed a message and clicked the reply button to a message previously posted.

Following the links between messages may not be readily discernible by a visual examination of the threaded discussion. The automatic display of the data by the online discussion board simply provides a hierarchical, linear representation of the conversation. A more detailed analysis of the transcripts of the discussion board enabled the researchers to further explore the actual relationships between messages.

Figure 4.4\textsuperscript{12} is an abbreviated version of the transcripts (i.e., first few lines of discussion) to illustrate how the interactions occurred.

Figure 4.4

\textsuperscript{12} See APPENDIX F for Full Transcripts of the Discussion
By examining the transcripts of the discussion, the researchers were able to demonstrate the response sequences.

Response Sequences

While the interaction is partially controlled by the system, generating a linear pattern, examining the participants’ linguistic behavior in the messages enables observation of more complex patterns. In Figure 4.5, the arrows are used to indicate connections between message and the dotted line indicates an actual interaction reflected within the text.

Figure 4.5

One element that enabled a more robust exploration of the messages was addressivity (i.e., who is named as the recipient in the text of the message). For example, Julie (498) responded to Annette (498), but she also responded to message created by Jamie (465) and Karin (472) at the same time by addressing their name in her messages. For another example, Jamie (503) responded to Julie (498), but she intended to respond to all participants in the thread (e.g., “to all” was in her message).

A number of properties of interaction in technology-mediated communication are the result of attempts to avoid ambiguity and discontinuity in structures of turn-taking, which in face-to-face conversation encounters would typically be negotiated by paralinguistic cues such as intonation, pauses, gesture and eye-gaze. As shown in the data (see Figure 4.4), the participants worked to organize the disparate elements of the discourse controlled by the system. For example, it has become more conventional for participants of online discussion to indicate the intended addressee by putting that person’s name at the start of a message (Hutchby, 2001; Werry, 1996).
Interaction amongst Participants

Asynchronous discussion is often described as a many-to-many communication tool that structures information exchanges and interactions between participants (e.g., Harasim, 1990). In asynchronous discussion, multiple participants engage at different times, therefore explicit interactions between two participants (i.e., one-on-one) are not always observed. In order to reveal the different layers of the discussion, the researchers found a new representation of the data was needed. Therefore, the messages in the thread were organized by the interaction amongst participants. Figure 4.6 indicates how the multilateral communications were demonstrated in this asynchronous discussion.

Figure 4.6

Figure 4.6 helps to illustrate how participants are connected to and interact with each other during the discussion by restructuring the messages by participants (as opposed to the linear display generated by the conferencing system). For example, Jamie asked a question (465), and Annette directly responded to Jamie (488). Jamie (465) and Annette (488)’s interaction comprised of question and answer. And Jamie did not responded to Annette’s answer (488). However, interaction between Jamie and Annette did not stop here. Jamie responded to other participants who answered her question (503) including Annette, by using addressivity (i.e., strategy; e.g., ‘to all’) and by responding to Julie’s post (498) (i.e., technological affordance; e.g., threaded by computer). Here, Jamie responded Annette (488) explicitly (address Annette’s name in Jamie’s message) as well as implicitly (through Julie’s message responded to Annette). This example indicates how Jamie, Julie, and Annette are connected in the threaded discussion.
For another example, Annette (547) responded to Jamie (534), and then Debb (555) responded to Annette (547), finally Alice (558) replied to Debb (555). Similar to the previous example, here, Alice also replied to Annette and Jamie by addressing their name in the text of the message (558). The interaction amongst participants is complex and multiple: four participants are connected through interaction between the messages (see Figure 4.6). As a result, it appears that all participants are linked in the discussion, not directly and/or explicitly, but each participant contribution enables the dialogue to connect together by responding to others’ messages.

Concept Map of Messages

Meaning from the context (i.e., the line of thought) in individual messages also allowed the researchers to observe different interaction patterns. The interaction appeared to be centered around the content of the messages; therefore, a concept map of the discussion was created (see Figure 4.7). Figure 4.7 includes interactions between Jamie, Julie, and Annette for further examination. The concept map is based on categories and themes that emerged in the messages generated by three participants.

Figure 4.7

The map proposes that interaction is also enabled by the relatedness of the content (e.g., concepts) of the messages posted by each participant. First, Jamie, Julie, and Annette’s messages are condensed as themes and these themes are categorized as shown in Figure 4.7. In this example, individual participants’ names or number of message are not specified, rather the focus is on describing the integration of content of the messages. By representing how participants shared the meanings, Figure 4.7 illustrates how participants cross-examined the concepts during the discussion. Investigation of the meaning from the text demonstrates the addressivity is not
the only indication that can explain how participants actually interacted. A sample of the transcripts of the discussion, including the first three messages of Jamie, Julie, and Annette, are provided in Figure 4.813.

Figure 4.8

In summary, the interaction enabled by the asynchronous discussion was depicted through three different lenses: response sequences, interaction amongst participants, and concept map of messages. These could only be discerned when the researchers moved beyond the linear presentation features enabled by the tool to the multilateral communication (i.e., many-to-many) capabilities taking place in the messages. Within this technological environment, participants’ linguistic behavior (e.g., addressivity) created unique interaction patterns. Further, concept mapping the discussion enabled the researchers to observe content connections between the messages. We now turn to the social dimensions in the asynchronous discussion, for insight into how this interaction is supported in terms of the use of different types of discourse.

Social Dimensions in Asynchronous Discussion

The social dimensions of the asynchronous online discussion in this study focused on the learners’ collaborative efforts. Specifically, we examined how different discourse types facilitated the discussion, and also helped enable collaborative learning. Five types of discourse were identified in this study: goal setting, reflection, connection, original reformulation and redirection. Table 4.2 provides a summary of the types of discourse, including the nature of communication, process of learning, discourse strategies, and the results of the discussion.

Table 4.2

13 See APPENDIX F for Full Transcripts of the Discussion
Goal Setting

The first type of discourse demonstrated in the data was “goal setting.” The nature of the communication during goal setting was to establish the goal(s) of discussion, thus framing the topic(s) of the discussion. In this context, the students were engaged in idea initiation using guiding questions from the instructor or other students during goal setting. Participation in the asynchronous discussion was a requirement of this class; consequently, one of the common goals in this context was engagement of discussion (i.e., reading and posting messages). Figure 4.9 displays one example of a “goal setting” message, in this instance one generated by the instructor.

Figure 4.9

The goal setting displayed in the text of Figure 4.9 includes the planning and defining of the goal, what Bereiter and Scardamalia (1987) refer to as “goal concretizing.” The instructor planned the discussion before the discussion began and provided a “guiding question” (e.g., “what are the benefits of inductive and deductive assessment?”) during the discussion to get the dialogue started (e.g., “why is it important to classify learning tasks?”). In the larger class structure, the global goal was framed (i.e., to discuss topics related to objectives and assessment in instructional design process), and then she concretized the goal (i.e., elaborate the classification of learners’ tasks) to initiate and facilitate the discussion.

During the goal concretizing process, the instructor used different strategies: summary, questioning, and monitoring. For example, she provided her view on what students have discussed in previous topics in the beginning of the messages (lines 6-8) and framed the questions for present discussion (lines 10-12). To present her perspective on this topic, she introduced the idea with related resources (line 11). The result of this type of discourse was “shared goals” as demonstrated in the discussion responding to this question.
In the example described above, the goal was shared and provided a common ground for the discussion. As the participants continued the discussion, the topic was elaborated with individual learner’s perspectives and extended to other topics. Figure 4.9 illustrates how the participants created and posted message based on shared goals (i.e., engagement of discussion and respond to the guiding question). Shared goals can be observed in a group of messages as the discussion evolves.

Reflection

A reflection message can be described as a reflection of an individual’s experience and knowledge. The nature of communication is to present an individual’s understanding of a given topic. A reflection message was often found in the beginning of the discussion thread. Participants either responded to the guiding question posted in the discussion board by facilitators or other students, or quoted the guiding question on the course website then created their individual understanding on the questions and topics. The following excerpt is an example of reflection (see Figure 4.10)

Figure 4.10

The first example shows how a student reflected her understanding of the given topic (i.e., different levels of writing objectives) and how she has found an idea about the topic (i.e., practical challenges in teachers practice). In composing message 284, Jamie translated the textbook into an authentic situation, and applied reality to the description of theory. In the example, Jamie has used different strategies, including citation (line 4), explanation (lines 4-6), and use of authentic examples (lines 7-8).

As shown in next example (message 76), Julie reports her personal experience as media specialist. She provided detailed information on the context (lines 13-14), stated the problem
(lines 14-18), described the solution (lines 18-20), and then concluded her statement with a recommendation (lines 21-22). In a given topic (i.e., learner analysis), she explained what challenges she faced and resolved the identified challenge. As the above examples indicate, individual reflective thinking occurred while using the discussion board. The reflection indicated in the messages may lead to enhanced knowledge during the composing the message (Levin, 1999).

Julie clearly demonstrated a focus on self-reflection and presentation. When creating a reflection message, it appears that the participant's reflective thinking process is more focused on the individual's situation and not others. As Bereiter and Scardamalia (1987) stated, from the notion of writing as a form of problem solving, “there is a great deal of soliloquy of the ‘where am I variety’, virtually no colloquy of the ‘where are you’ variety” (p. 301). However, when individual participants post their reflections in the discussion board, it is typically understood that the message will be read and responded to by others. Once it is shared among participants and other students present their reflective thinking on the message, the result of discussion becomes a shared account.

Connection

A connection message associates individual understanding within a collaborative context. This type of message attempted to converge different perspectives. Figure 4.11 shows an example of a thread of a discussion indicating how this type of discourse facilitates the discussion.

Figure 4.11

In the first example, Jane (message 346) stated her current understanding of concepts (i.e., distinction between goal and objective, lines 4-8) using an authentic example and asked for
other’s perspectives. In general, this type of message appears to have enabled the participants to move from simple agreement to confirmation of the idea, creating an opportunity to reach mutual agreement. The interaction between the messages is instant and succinct. As depicted in Figure 4.11, the responses review or summarize the major point of original message, except using direct/indirect quote strategies in message, the length of a connection message was shorter in length than other types of messages. The thread of discussion tends to close in a short period, once the confirmation or mutual agreement on the idea is achieved.

In the next message (350), Karin made a confirmation (line 13, line 15) and reflected Jane’s points in her experience (line 14). Debb also expressed similar viewpoint to Jane (line 20) and provide her distinction between goals and objectives. Mutual agreement based on confirmation from others is summarized as "unclarity between goals and objectives have to constantly be checked" in this discussion thread. With a connection message, each participant has the responsibility to demonstrate the meaning and to account for that meaning through continuing discussion.

Original Reformulation

The nature of an original reformulation message can be characterized as a type of discourse that challenges existing knowledge or leads to the creating of new knowledge. Employing this type of message, learners integrate different points of views, extending and expanding current understanding. The purpose of this type of message was to assess the existing thoughts or belief shared by the participants and/or their culture. Questioning, argument, and reviewing are common strategies used in this type of discourse. Two examples are illustrated in Figure 4.12.
In the first example (message 301), Alice provided her understanding of the topic (i.e., identify instructional objectives) from her context (i.e., from Media Specialist viewpoint). In this message, by providing a different perspective, Alice was trying to test the shared meaning in student participants group (i.e., role of media specialist) against her experience (lines 4-8). In the next example (message 465), Jamie framed a question to examine the concepts in practice (i.e., feasibility of moderate level analysis). Similar to the first example, this type of message generated discussion that tested the original message against personal experience. The nature of messages is alike, by assessing the original message from multiple perspectives; consequently, students may reach a general conclusion. On that account, the expected result of discussion is collective knowledge (i.e., integrated, expanded, and extended idea). Figure 4.13 provides an example of how collective knowledge was built during a discussion.

Figure 4.13

In this example (message 544), Alice explicitly employed the word “consensus” by summarizing previous discussions (line 4) (i.e., consider moderate level as negotiated meaning from Media Specialist’s angle). She substantiated her perspective with the textbook (line 13) as well as other student participant’s viewpoints by mentioning Annette’s message in a different thread of the discussion (lines 17-18), Alice’s message also illustrates how participants cross-referred the threaded discussion.

Re-direction

Re-direction can be described as a type of discourse that alters or modifies goals. Within the same discussion thread, participants, including instructors and students, can modify the goals of the discussion. A redirection may facilitate and lead to new discussion as it evolves over time. Summary, evaluation, monitoring, and questioning are strategies often used in this type of
discourse. This type of message tended to summarize and evaluate the previous discussion and we can expect result of discussion as emerging themes (i.e., goals), when the discussion can be continued. Figure 4.14 illustrates this type of discourse.

Figure 4.14

Jo, the university instructor, reviewed Julie’s message and summarized the main point from Julie’s message for further discussion. By asking a question, she opened the discussion to all participants and re-directed the topics of discussion (i.e., depth vs. breadth). As we described earlier in ‘description/re-description’ category, in terms of planning, Jo provided guiding questions on the topic (i.e., instructional strategies) with resources in the beginning of the discussion, and with continuing discussion, she tried to achieve different goals in terms of quality (i.e., in depth examination of different meaning).

She introduced the new topics and encouraged the students to move forward to a different level of discussion. This type of message is based on a previous discussion, and is typically created at the end of a discussion. Evidence of re-direction messages was not consistently represented in the data, therefore we cannot conclude that a discussion will always continue through the use of redirected goal(s). The limited use of re-direction in this study also implies that the students could already have moved to next discussion section or the time constraints of the class might have hindered further discussion.

Concluding Thoughts

With five different types of discourse, we explained how each message or a threaded message facilitated the discussion, in terms of collaborative efforts to achieve the goal(s). The nature of each type of discourse was illustrated with how different strategies were identified in the data and how different results of discussion were demonstrated in the data. The in depth
examination of types of discourse reinforce the understanding of the different patterns of interactions described in previous section.

Discussion and Implications

This study explored the nature of group interaction and discourse in a WBLE supported by computer conferencing. We offered findings from the study in terms of the technological and social dimensions of asynchronous discussion. The technological dimensions were presented in three categories: response sequences, interaction amongst participants, and concept map of messages. The social dimensions were categorized into five types of discourse: goal setting (i.e., establish goal), reflection (i.e., represent individual understanding), connection (i.e., associate individual understanding within a collaborative context), original reformulation (i.e., challenge existing knowledge and create new knowledge), and re-direction (i.e., alter/modify goal). The main themes in each area are further discussed in the following sections.

Exploration of Technological Dimensions of Asynchronous Discussion

Discussion participants, in the absence of vocal and nonverbal cues, employed a variety of strategies to organize the interaction (e.g., addressivity). Organizing strategies have been identified by other researchers who indicate that the use of verbal immediacy indicators (e.g., addressivity) also reduces the perceived psychological distance between participants. The research also indicates that students often perceive online discussions as highly interactive and social (Gunawardena & Zittle, 1997; Richardson & Swan, 2003).

The linear presentation of messages by the system challenged us in observing the interaction in the asynchronous discussion. Different mapping strategies allowed for a more thorough examination of various patterns of interaction in the asynchronous discussion, enabling the discovery of distinctive behaviors in the interactions. This calls attention to the need to
reexamine how interaction is determined in online environments. Most studies exploring interaction report the interaction in terms of density; that is, by the number of messages sent by participants (e.g., Beck, Fitzgerald, & Pauksztat, 2003). However, quantification of the rate of response may not provide sufficient insight in the interaction process, including the contextual factors that affect interaction (Strijbos, Kirschner, & Martens, 2004). Therefore, to understand how one message appears to be a strong contributor to, or more influential in, continuing the discussion, we should examine indications of unique linguistic behavior of participants within the system.

The use of a different mapping strategy also enabled the revelation that participants cross-referred the messages in different threads. As shown in Figure 4.5, Jamie (message 534) referred Sean’s message (522) from a different thread and made connection between two messages. In addition, the discussion of this thread was referred in different thread (e.g., see Figure 4.13 for the transcript). This phenomenon indicates that interactions can be viewed through multiple lenses if we look beyond the default structure created by the system (e.g., across-thread) (Levin, Kim, & Riel, 1990; Turoff, Hiltz, Bieber, Fjermestad, & Rana, 1999). Future study should further examine this phenomenon, how participants organize ideas across discussion threads (or topics), and how this might can be support to learning.

The visualization of response sequences also enabled the researchers to discover complex and dynamic interaction patterns amongst participants. As shown in the data, the many-to-many communication feature offered by the Web-based learning system does not always enable direct one-on-one interaction between two participants. Rather, in many instances, one message contributed to multiple threads in the stream of conversation. In these complex relationships, we
were able to observe that many individual messages are connected in the larger threaded discussion.

The interaction amongst participants has implications for the current conceptual frameworks on collaborative learning (e.g., Harasim, 2002; Laurillard, 2002). Current conceptual frameworks propose how participants make links between ideas. However, as indicated in the data from this study, the messages also bind each participant and consequently a group(s) of participants together. It appears that the contribution of one message may not only enable a response to one participant, but also connect many participants to each other (c.f., Romiszowski, 1997; Salomon, 1998).

The concept map of messages proposes that response sequences and interaction amongst participants can also be viewed between concepts within messages in an asynchronous discussion. On the surface, the messages posted by individuals are linked by the system in a linear fashion as they are posted. However, by exploring the specific content of and context in which the messages are posted, the data indicated that the interaction extends to collaborative conversation amongst participants. Ultimately, a conceptual network of interrelated ideas including multiple perspectives is built in asynchronous discussion (c.f., Romiszowski, 1997).

*Exploration of Social Dimensions of Asynchronous Discussion*

Five different types of online discourse were identified in this study. The types of discourse explain how learners defined the goals for the discussion, represented individual understanding, connected to collaborative efforts, tested shared meaning, and redirected the discussion. As described in the data presentation, dynamic interactions amongst participants can only be described and understood in association with the individual message in relation to others. Therefore, each message type is explained in relationship to the context of the discussion.
In this study, the goal setting message contributed to initiating and continuing the discussion, leading to shared goals. Without shared goals, a group of learners may not be able to proceed in their discussion (Bruffee, 1999; Palloff & Pratt, 1999). In this specific context, the pre-planned goals of the instructors were represented by the instructors as well as learner participants. The goal was shared in the ongoing discussion. The formal education context also contributed to participant contributions. One of the requirements for the course was participation in the online discussions. Engagement of the learners in the learning process was presumed to be a given, and, participation in the discussion was the responsibility of each learner.

The reflection message allowed participants to represent individual understanding. Understanding is matter of connecting information (Salomon, 1998). By representing individual understanding in a social context, participants were able to become members of a learning community that might be very different from the learning community with which they are most familiar (Bruffee, 1999). This type of message was often used to provide an answer to a guiding question. When a reflection message is posted, it is focused on how the individual understands the problem. However, the reflection messages generated by participants are shared. Consequently, participants have access to multiple perspectives on how others think. This may enable others to extend or even change their perceptions (Bell, 2002; Levin, 1999).

The connection message was observed when an individual reflection was situated within the collaborative context. Elaboration on each other’s perspective links individual ideas (Harasim, 2002), allowing learners to demonstrate their ability to see the essence of the problem (as reflected in the discussion topic) based on deep understanding of the context (Garrison, 1992). It is the responsibility of the individual to situate the meanings in the social context by integrating new ideas with previous knowledge and experience. Yet, the "control" of the
validation of meaning (i.e., mutual agreement) exists in the group, not the individuals (Garrison, 1992). Therefore, in the asynchronous discussion, individual accountability and participants’ interdependent relationships coexist.

The original reformulation message challenged existing knowledge during the discussion explored in this study. In an original reformulation message, participants integrated various perspectives, mutually extending and expanding current understanding. Collective knowledge is not always identified in one thread. However, discussed earlier, it is possible to observe how an individual participant’s message indicated the convergence (i.e., collective knowledge).

According to the literature, the crux of collaborative learning is the ongoing process of inquiry, not that participants inevitably create new knowledge (Scardamalia & Bereiter, 1993). One indicator of the ongoing process of inquiry is that participants perceive that some advance has been made in existing knowledge and that they believe they learned through the discussion (Scardamalia & Bereiter, 1993). This was demonstrated in this study.

The re-direction message indicated qualitative change in the discussion in this study. Re-direction messages were often found at the end of the discussion. This type of message contributed to the summarization and evaluation of the previous discussion. The re-direction messages were often identified in the data; however, the discussion was not always continued. As described, this type of message commonly occurred at the end of the discussion. Consequently, with given time framework of the formal education context, the discussion may not proceed (Davis & Brewer, 1997).

Methodological Considerations

Physical access to data for interaction analysis is relatively easy. Transcripts of online discussions are readily accessible since the written data is complied as text during and after the
discussion. However, given the rich and complex nature of the data, conceptual access may not be so easy. One single method of examining the data does not appear to be sufficient; rather multiple methods appear to be useful in gaining a richer understanding of the interactions that occur in online discussions.

Two strategies were used in this study to analyze the data: mapping strategy (Han, 2002; Han & Hill, 2004) and discourse analysis (Gill, 2001; Kroger & Wood, 2000). The mapping strategy focused on visualization of the data, and discourse analysis focused on examining the meaning situated in the specific context. Grounded in the data, the goal of using a variety of strategies was to visualize the interaction patterns to seek a different way of looking at the social process of learning.

Using a variety of strategies for analysis is not unique to this study. Other researchers have also used different strategies to demonstrate response sequence or relationships amongst participants (e.g., Fahy et. al, 2001; Garton, Haythornthwaite, & Wellman, 1999; Levin, Kim, & Riel, 1990). While we believe other researchers efforts have their own value and contribute to our understanding of interaction amongst participants, what we focused on in the data analysis was how interaction can be represented in a complex social context, such as the collaborative learning process. Initial use of the mapping strategy, in conjunction with discourse analysis, provided rich insights into the interactions in this study. However, the mapping strategy is new. It needs to be applied in multiple contexts by multiple researchers in order to refine the strategy.

Analyzing the transcripts of the asynchronous discussion board was truly a challenging task, perhaps the most challenging task in this study. The text analyzed was rich and complex, yet the analysis was limited in some ways. By examining the text as generated by the system, we were able to investigate how particular ideas and/or uses of strategies might be employed and
transformed by discussion participants over time. However, this strategy is not sufficient for capturing the evolution of ideas and building of understanding by participants (Sutton, 2001). If we want to explore the creation of knowledge through online discussions, there are many questions that need to be answered, including: what is the unit of analysis (i.e., individual messages, discussion threads)? What is the best configuration of the data for exploring knowledge creation? What other types of data might be needed (by one discussion archives) to explore knowledge creation? Further research is needed to help address these and related questions.

Another challenge comes from the nature of data. Due to the asynchronicity, it is not simple to analyze the activities that occurred during the reading, writing, and posting messages outside as well as within the discussion board. If we examine the evolution of a discussion over time, how might we conceptualize ‘distributed’ time – asynchronous participation – by the growth of discussion threads or particular themes? Or do we consider its evolution over time across participants? Future research is needed that will enable extensive data collection methods to substantiate the findings (e.g., in-depth recall interview, participant’s self-reflection during and after the session, post-group discussion).

**Implications for Future Research**

One area in need of further examination is the use of different strategies during a discussion. While multiple strategies were identified from the data, how each strategy contributed to the discussion was not fully explored. Future research needs to focus on how various strategies are employed in multiple contexts and how they might contribute to the discussion. For example, question (e.g., Ge & Land, 2004) and argument (e.g., Marttunen & Laurinen, 2001) message types are well described in recent research. We need to incorporate the
identified types of strategy into asynchronous discussion regarding to what supports learning process and how support are created. It would also extend the ideas how each strategy functioned in a different type of discourse.

Another area in need of further consideration relates to the participants' ability to recognize different layers in the discourse. As mentioned earlier in the paper, the turn-taking strategy in an asynchronous discussion does not incorporate the same procedures a participant uses to take turns in a face-to-face discussion (Sacks et al., 1974). Participants cannot control the exact placement of their messages in the threaded discussion systems as they currently are configured. This phenomenon is often described as a ‘conflict of discourse’ and as one of the challenges in WBLE (Kemery, 2000; Wegerif, 1998). Research questions related to the different layers of discourse (e.g., do the participants perceive complex interaction patterns, or do they simply see the linear pattern of the interaction as depicted by the system?) should be addressed in the future research.

Related to the multiple lenses to view interaction, identification of linguistic behaviors and how these are interrelated to technological affordances should be further examined. One of the indicators, addressivity, was identified and described in this study; other researchers have also identified different behaviors in online contexts (e.g., Erkens, Andriessen, & Peters, 2003). For instance, in the data, participants often replied to their own messages (e.g., “This feels a little silly, replying to my own post! But I want to say some things…about that long statement…”, Annette). When we examine this phenomenon, do we consider this as learning strategies or linguistic behaviors in online context? Other qualifiers that might contribute to the structure of the interaction should be thoroughly explored to enable researchers to investigate how we interpret size, centrality, and density of interaction from different perspectives.
Implications for Implementation and Practice

One area in need of further investigation related to the implementing the collaborative learning is the consideration of the impact of who is implementing the online course. It could be argued that through collaborative tasks, the creation of shared products, and the very nature of online discussion, many online experiences are actually implemented by the participants. The official facilitator (i.e., instructor) may or may not lead or guide the discussions. Instead, the interactions may be primarily guided and facilitated by the participants. This creates a change in the pedagogical process. Therefore, we need to carefully examine existing learning theories for “best fit” in online contexts while also exploring strategies for facilitating the processes in online learning so that new theories and practices can be established (c.f., Miller & Miller, 2000).

Another consideration for practice is assessment. One way to evaluate whether collaboration has occurred in a group is to assess the amount and nature of the interaction among participants. Interactions may occur when group members refer explicitly or implicitly to prior messages in a discussion, while staying on the topic. However, as indicated, the interaction does not always appear as a set of interdependent statements, direct/indirect comments for previous messages or answerers to questions. Several strategies could be employed to enable student to do self evaluation as individuals, self-evaluation as a group, and a comparison between students’ performance and the class objectives. How the students share the responsibility of collaborative work and peer evaluation on contribution to the discussion also needs to be addressed in the process of assessment (e.g., Johnson & Johnson, 2004). In that way, we may be able to evaluate participation in social process, which should not be measured by the total number and length of all the messages sent and received by all members of the group.
Another suggestion is training participants in how to communicate online. As the literature indicated, not all instructors and students are well prepared for implementation of collaborative learning (Brandon & Hollingshead, 1999; Kemery, 2000). Fostering learners’ capability to engage in online discussion may contribute to successful learning experience (Marjanovic, 1999). The strategies for fostering learners’ readiness for online collaborative learning should include such as, developing collaborative skills (e.g., Johnson & Johnson, 2004) as well as technology competency (e.g., Kemery, 2000). The facilitators are also responsible for the preparation of necessary online learning tools, materials, and resources.

The other area considered for implementation is the design of the system. For example, in this study, the concept map was used as an analysis tool. The strategy indicates interaction occurs around the messages created by multiple participants, consequently, what was shared between participants can be explained. The use of a concept map was originally intended to enable learners to generate and communicate ideas, to support learning by explicitly integrating new and old knowledge, and to assess understanding or diagnose misunderstanding (see Jonassen, Beissner, & Yacci, 1993; Lawson, 1994). We suggest incorporated concept mapping tools in current WBLE systems, (e.g., SenseMaker, Bell, 2001) so as to assist participants with understanding and monitoring their own cognitive development process in individual and collaborative learning contexts. This may also contribute to overcoming the conflicts of discourse in WBLE.

Concluding Remarks

One may observe that the "interaction" displayed by a computer network is merely a technological device used to link the messages. However, the examination of different layers in the interaction empowered the researchers in this study to view the connections amongst
participants into a collaborative conversational structure, where the messages are connected with ideas. Furthermore, the investigation of the meaning-making from the context enabled us to represent the conceptual structure of the interrelated ideas amongst participants.

Online discourse is situated in different layers of interaction: multilateral (i.e., many-to-many) communication, linear presentation of the asynchronous discussion, and a learner’s strategy to organize the interaction. In the unique and multi-faceted interaction created via asynchronous discussion, individual messages are intertwined and shared in a group. Both the process and result of the discussion are situated in the specific context. The individual’s effort is related to the group, and the group relies on individual effort. That is, the responsibility is distributed amongst participants, yet the control is shared in the community.

As the technology continues to evolve, and we become more skilled with communicating online, the exploration of a variety of methods for studying these environments will continue to increase. Further, we will likely need new teaching and learning strategies to fully engage the capabilities of the systems, both the human and technology. Continuing our exploration is vital if we are to realize the full potential of these learning contexts.

References

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Table 4.1

*Overview of participants*

<table>
<thead>
<tr>
<th>Name</th>
<th>Gender</th>
<th>Experience</th>
<th>Group</th>
<th>Current Job</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alice</td>
<td>Female</td>
<td>3rd online/hybrid class</td>
<td>Barney</td>
<td>Media specialist in elementary school</td>
</tr>
<tr>
<td>Annette</td>
<td>Female</td>
<td>4th online/hybrid class (The last class of the program)</td>
<td>Barney</td>
<td>Coordinator of information services at a K-12 private school</td>
</tr>
<tr>
<td>Debb</td>
<td>Female</td>
<td>3rd online/hybrid class</td>
<td></td>
<td>Elementary school teacher</td>
</tr>
<tr>
<td>Jamie</td>
<td>Female</td>
<td>3rd online/hybrid class</td>
<td>Barney</td>
<td>Media specialist in elementary school</td>
</tr>
<tr>
<td>Jane</td>
<td>Female</td>
<td>3rd online/hybrid class</td>
<td>Big Bird</td>
<td>Recruitment specialist in the county school district</td>
</tr>
<tr>
<td>Julie</td>
<td>Female</td>
<td>4th online/hybrid class</td>
<td>Barney</td>
<td>High school teacher</td>
</tr>
<tr>
<td>Karin</td>
<td>Female</td>
<td>1st class in the program</td>
<td>Big Bird</td>
<td>Media specialist in elementary school</td>
</tr>
<tr>
<td>Sean</td>
<td>Female</td>
<td>2nd online/hybrid class</td>
<td>Big Bird</td>
<td>Elementary school teacher</td>
</tr>
</tbody>
</table>
Table 4.2

Types of discourse

<table>
<thead>
<tr>
<th>Type of discourse</th>
<th>Nature of communication</th>
<th>Process of learning</th>
<th>Discourse Strategies</th>
<th>Results of discussion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal setting</td>
<td>- Establish goal(s)</td>
<td>- Idea initiation</td>
<td>- Questioning</td>
<td>- Shared goals</td>
</tr>
<tr>
<td></td>
<td>- Goal concretizing</td>
<td></td>
<td>- Summary</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Monitoring</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Quote/comments</td>
<td></td>
</tr>
<tr>
<td>Reflection</td>
<td>- Represent individual understanding</td>
<td>- Reflection</td>
<td>- Illustration</td>
<td>- Shared account</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Explanation</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Citation</td>
<td></td>
</tr>
<tr>
<td>Connection</td>
<td>- Associate individual understanding within a collaborative context</td>
<td>- Exploration</td>
<td>- Quote/comments</td>
<td>- Mutual agreement</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Sharing perspectives</td>
<td>- Questioning</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Agreement</td>
<td></td>
</tr>
<tr>
<td>Original Reformulation</td>
<td>- Challenge existing knowledge and create new knowledge</td>
<td>- Integration</td>
<td>- Questioning</td>
<td>- Collective knowledge</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Extension</td>
<td>- Argument</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Expand</td>
<td>- Reviewing</td>
<td></td>
</tr>
<tr>
<td>Re-direction</td>
<td>- Alter/modify goal(s)</td>
<td>- Conversion</td>
<td>- Quote/comments</td>
<td>- Emerging theme(s)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Summary</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Questioning</td>
<td></td>
</tr>
</tbody>
</table>
Figure 4.1 The structure of asynchronous discussion groups
Figure 4.2 Data analysis procedure
Msg. 465 (Jamie)
   📩 Msg. 469 (Mavis)
   📩 Msg. 472 (Karin)
   📩 Msg. 488 (Karin)
   📩 Msg. 498 (Julie)
   📩 Msg. 503 (Jamie)
   📩 Msg. 509 (Karin)
   📩 Msg. 524 (Debb)
   📩 Msg. 534 (Jamie)
   📩 Msg. 535 (Karin)
   📩 Msg. 545 (Annette)
   📩 Msg. 547 (Annette)
   📩 Msg. 555 (Debb)
   📩 Msg. 558 (Alice)

*Figure 4.3* Interaction pattern: A thread of discussion
Message no. 465
Posted by Jamie on Monday, May 26, 2003 11:33pm
Subject Is "Moderate" better?
Does anyone consider the fact that if ALL the teachers in a school thought that the Media
Specialist was a hot shot design consultant and the best thing since sliced bread and decided to use
this wonderful resource, that the SLMS would do nothing but consult? [the rest of the message
omitted]

Message no. 469[Branch from no. 465]
Posted by Mavis on Tuesday, May 27, 2003 3:50am
Subject Re: Is "Moderate" better?
Great question, Jamie. I also came up with this question while reading the chapters (even though
I'm not a SLMS). [the rest of the message omitted]

Message no. 472[Branch from no. 469]
Posted by Karin on Tuesday, May 27, 2003 8:36am
Subject Re: Is "Moderate" better?
As I read through the scenarios in each chapter, Jamie, I see myself in the moderate role.
[the rest of the message omitted]

Message no. 488[Branch from no. 465]
Posted by Annette on Tuesday, May 27, 2003 4:10pm
Subject Re: Is "Moderate" better?
You said it right on, Jamie! [the rest of the message omitted]

Message no. 498[Branch from no. 488]
Posted by Julie on Tuesday, May 27, 2003 7:13pm
Subject Re: Is "Moderate" better?
Jamie, Karin, and Annette, I am *so* glad to hear you say that it is more realistic to take on a
more moderate role. [the rest of the message omitted]

Message no. 503[Branch from no. 498]
Posted by Jamie on Tuesday, May 27, 2003 7:35pm
Subject Re: Is "Moderate" better?
And just as well say I! [the rest of the message omitted]

[the rest of the discussion thread omitted]

Figure 4.4 Examples of transcripts
Figure 4.5 Response sequences
Figure 4.6 Interaction amongst participant
Define as Consultant

Responsibilities include Instructional Design, Material selection, Book fair, Cataloging, Reading promotion.

Expect as Media Specialist

Perceive as Consultant

Regard as Collaborator

Consider as Teachers

Conflict between role descriptions

Challenge Conflict between responsibilities in reality

Moderate level of consulting Is realistic

In-depth level of consulting Is not readily applicable

\textit{Figure 4.7} Concept map of messages
Message no. 465
Posted by Jamie on Monday, May 26, 2003 11:33pm
Subject Is "Moderate" better?
Does anyone consider the fact that if ALL the teachers in a school thought that the Media Specialist was a hot shot design consultant and the best thing since sliced bread and decided to use this wonderful resource, that the SLMS would do nothing but consult? What would happen to reading promotion, and materials review and selection, and book fairs, and cataloging, and collaboration, and all the other things that we hardly have time for when the teachers DON'T want us as design consultants too? Maybe we don't want to reach the in-depth level, and the moderate level is better?

Message no. 488[Branch from no. 465]
Posted by Annette on Tuesday, May 27, 2003 4:10pm
Subject Re: Is "Moderate" better?
You said it right on, Jamie! Makes me think of what Turner said in on of the early chapters (I'm not going to stop and look up which one) about how the job of LMS was already defined by certain tasks before this one of instructional consultant was added to the description, and it's had a hard time finding footing because the other parts of the job are so entrenched. I think that for most of us, the moderate level of involvement is realistic. Now, my situation at school is a little different--I work on an 11-month contract, and teachers are encouraged to schedule design time with me in the summer. It's great, because we really have time to dig into things, and I'm working with them more at the intensive level and they love the support. But even with that great time built in, not everybody comes. I guess that no matter what you do or how much it's appreciated, some teachers will not want our help. But that just gives us that much more for the ones who *do* want it, right? And we can always hope that the others will come along.

Message no. 498[Branch from no. 488]
Posted by Julie on Tuesday, May 27, 2003 7:13pm
Subject Re: Is "Moderate" better?
Jamie, Karin, and Annette, I am *so* glad to hear you say that it is more realistic to take on a more moderate role. I am starting a new job as media specialist next year, and I'm a bit overwhelmed by the many different responsibilities. Throughout this class I've been wondering where one finds the time to help many teachers as instructional consultant. In reality, how many teachers view you as such? I know you have to start small, and work with teachers who are open to suggestions and help, so maybe it never becomes a huge problem. Teachers are often so used to planning alone or with their department that it might take time to "teach" them to see you in the role of instructional consultant.

[the rest of the discussion omitted]
Message no. 181
Posted by Jo on Monday, May 19, 2003 8:14am
Subject Classifying (?) a Learning Task
Greetings, all!

Here is something to help launch our discussion for the next day or so...

Based on some of the discussion and questions that have been posed, it seems that the idea of "classifying" a learning task may seem a bit "odd." (note: you may not think this is true -- just basing it on some comments that have been posed!). Yet, there are several taxonomies that are specifically designed just for this activity (e.g., Bloom, Gagne). Why is it important to classify learning tasks? And how might classification help you with the work you are doing now re: your objectives and assessment?

best- Jo

Message no. 212 [Branch from no. 181]
Posted by Julie on Monday, May 19, 2003 8:04pm
Subject Re: Classifying (?) a Learning Task
I guess it does seem a bit unnatural to officially classify a learning task, but I think that most teachers do it naturally. I think that the purpose is to make sure that your lessons are leading to higher order thinking and you aren't simply teaching the same general skills over and over again with different content. It is also important so you teach in a logical order...that a higher order skill is not taught before a lower one (does that make sense?).

Julie

Message no. 215 [Branch from no. 212]
Posted by Alice on Monday, May 19, 2003 8:12pm
Subject Re: Classifying (?) a Learning Task
I think of classifying a learning task when the teachers know the curriculum and do their lesson plans. They know what they will be doing: the tasks that have worked before, incorporate new ideas and adjusting to the group of kids they are directing it to. I agree with Julie that the teachers do this without the writing of the task down to the detail we are doing. I believe their bases would be the QCCs or AKS...knowing they have to teach certain curriculum units and if they preplan with others they have that much more experience to draw from.

Alice

[the rest of discussion thread omitted]

Figure 4.9 An example of goal setting message
Message no. 284 (4860-4872)
Posted by Jamie on Tuesday, May 20, 2003 8:18pm
Subject Writing objectives
The example Turner gives for moderate level consultation (p. 132-133) really made me think about how much gain there is in writing instructional objectives to too detailed a level. I suspect that many teachers (especially the more experienced ones) do the level of detail described, they just don't specify it that way. Requiring it may put unnecessary stress on already overworked teachers.

Message no. 76[Branch from no. 60]
Posted by Julie on Wednesday, May 14, 2003 11:16pm
Subject Re: Learner Analysis
I teach high school Language Arts in a very large school. This year my smallest class is 27 and my largest is 32. Unfortunately, I find that often the only way to survive the workload and the paper load is to try to teach to the "average". I try to design activities and assessments that target the greatest number of students, but I know that I don't do a good enough job of catering to those students outside of the average, but I do try. I often give several different options for projects, and try to vary the types of assessment throughout the year, but some of what I assign is dictated from higher up (i.e., certain number of practice essays per semester, etc.). I think that if the curriculum was more concerned with depth of knowledge rather than breadth, it would make it easier to tailor instruction to fit the individual learner.

Figure 4.10 An example of reflection message
1 Message no. 346
2 Posted by Jane on Thursday, May 22, 2003 8:12am
3 Subject Goals vs Objectives
4 Do you guys think that sometimes we blur the line between goals and objectives? 
5 For instance, I conducted a workshop for my women's organization called In Pursuit 
6 of Goals. In that workshop we looked at overall goals as a bumper sticker or where 
7 do you want to be, what do you want to achieve. Objectives were the steps to get 
8 you to where you want to be. But my questions is how do you make sure you have 
9 a distinction between goals and objectives or do you guys see them as the same 
thing?

10 Message no. 350[Branch from no. 346]
11 Posted by Karin on Thursday, May 22, 2003 9:51am
12 Subject Re: Goals vs Objectives
13 Certainly, I think it's a constant struggle to clarify your goals and objectives. Any 
14 group I have been involved with has had that same issue. Your have to continually 
15 check your thinking and make sure you don't stray.
16 K [initial]

17 Message no. 372[Branch from no. 346]
18 Posted by Debb on Thursday, May 22, 2003 7:20pm
19 Subject Re: Goals vs Objectives
20 Jane, the distinction between goals and objectives is sometimes (often) blurred for 
21 me. I think your idea is good, that goals are the big ideas. You have to keep that 
22 idea in the forefront of your mind. Debb

Figure 4.11 An example of connection message
1 Message no. 301[Branch from no. 287]
2 Posted by Alice on Wednesday, May 21, 2003 7:26am
3 Subject Re: Writing objectives
4 Just wondering… but as we will be (and some already are) Media Specialists, we
5 will be more in the position of helping teachers make instructional objectives. We
6 will not actually write them unless asked in the in-depth level. It sounds like we are
7 support people. Do you not find that a teacher would go to their grade level teachers
8 first before they would come to the MS?
9 Just wondering if I understand this. Oh and Karin...I'm not a teacher either...just an
10 assistant and learning all the time. Alice

11 Message no. 465
12 Posted by Jamie on Monday, May 26, 2003 11:33pm
13 Subject Is "Moderate" better?
14 Does anyone consider the fact that if ALL the teachers in a school thought that the
15 Media Specialist was a hotshot design consultant and the best thing since sliced
16 bread and decided to use this wonderful resource, that the SLMS would do
17 nothing but consult? What would happen to reading promotion, and materials
18 review and selection, and book fairs, and cataloging, and collaboration, and all the
19 other things that we hardly have time for when the teachers DON'T want us as
20 design consultants too? Maybe we don't want to reach the in-depth level, and the
21 moderate level is better?
22 Jamie

Figure 4.12 An example of original reformulation message
1 Message no. 544[Branch from no. 531]
2 Posted by Alice on Wednesday, May 28, 2003 2:51pm
3 Subject Re: Instructional Design
4 Well I guess I go with the consensus...moderate level of involvement is what I see
5 more of.
6 With all the other hats a Media Specialist wears, I can see how being an
7 instructional consultant would be a great task to achieve. I think that "no
8 involvement" should not even be on the ICAC chart...imagine not being involve in
9 the needs of the school...I can't. In the books we would review, order, and
10 catalog...should enhance the children's learning in some way or just have for the
11 love of reading. I know many Media Specialists do extensive in-service classes to
12 inform the teachers. I see myself, when I become a MS, doing the in-service
13 classes the most. I know Turner feels these are at the in-depth level, but I think
14 this is where we could reach our largest audiences. And if the teacher would like
15 extra help or information...so be it...I see time as our only restriction on what we
16 can do and accomplish. Our time and the teacher's time to collaborated on lessons,
17 ideas, and learning strategies is limited. I did like Annette's idea of the ID in the
18 summer...though I must say I do enjoy my summers off with my kids. I would feel
19 comfortable doing any of the activities at any level (except no involvement). If I
20 am able to do initial level work with some teachers, because that is all they desire,
21 well that is as good as it will get with them.
22 Others will want (or require) the moderate or in-depth level...which is also fine.
23 We are there to help the teachers and students find the resources they need...and
24 one resource is us. Alice

Figure 4.13 An example of convergence in original reformulation message
Message no. 366 [Branch from no. 356]
Posted by Julie on Thursday, May 22, 2003 6:29pm
Subject Re: What about those strategies?
Alice, you hit a sore spot with me when you mentioned how the county curriculum really pushes you to fit a certain amount of information in a limited time frame. It makes it even more difficult when your learners come to you with varying amounts of learning tools. I wish that some day public schools could concentrate more on depth of understanding instead of breadth. I think that we would have fewer students "skimming by" if we gave them opportunities to learn information in a multitude of ways. Sometimes you just need time to digest concept before the light bulb goes off. Gagne's model really helps to visualize how the steps of your lesson must build on one another to reach your goal. One of the real burdens on teachers today is to find ways to teach the required material in the allotted time without "losing" any of the learners.

Julie

[discussion between these two messages by others omitted]

1 Message no. 424 [Branch from no. 366]
2 Posted by Jo on Saturday, May 24, 2003 8:15am
3 Subject Re: What about those strategies?
4 Julie --

5 Your message made me wonder how we might do what you suggested -- go for depth vs. breadth? Do you think that it would work if we allowed kids to start focusing on particular interests earlier? Anyone have any thoughts on this?
6 Jo

Figure 4.14 An example of re-direction message
EPILOGUE

Synopsis

This study explored how collaborative learning was supported in an asynchronous Web-based environment. The two goals during the research were: (1) to examine the process of learning in an asynchronous discussion, and (2) to illustrate the use of new analysis methods for examining different patterns of interaction and diverse types of discourse generated in asynchronous discussion. A collection of articles resulted from the research.

The first paper, *Revisiting the meaning of collaboration, communication, and learning in virtual community*, appraises the meaning of collaboration, communication, and learning. The second paper, *Web-based learning as a social process: A critical examination of the research*, integrates the major points drawn from the research. The third paper, *Collaborate to learn, learn to collaborate: Examining the roles of context, community, and cognition in asynchronous discussion*, explores the roles of context, community, and cognition in asynchronous discussion. The fourth paper, *Language that is shared, situated, and distributed: Examining interaction patterns and types of discourse in asynchronous discussion*, depicts the different interaction patterns and discovers different types of discourse in asynchronous discussion.

The target audience for these articles includes researchers and practitioners who are engaged in studying, teaching, and designing and developing an interactive learning environment on the Web. As a whole, it is my hope that the dissertation research can enhance the understanding of online discourse and enable designers to develop strategies for facilitating collaborative learning in a Web-based environment.
Reflection on the Process

My previous research experience assisted me with building an understanding of the nature of the data in this study. However, I was confronted with challenges primarily created by the vast amount of the data and its complexity. The initial analysis task focused on organizing and managing the data. The research questions of each article were particularly useful for this process (Coffey & Atkinson, 1996). Moreover, the proposed questions were re-examined in relation to the nature of the data. In this regard, it was a quite interactive process and continued in this manner until the end of the study.

Even with the guidance of the research questions, the data analysis was a demanding task. Analysis does not simply mean "coding" the data; rather, it concerns the interpretation of the meaning of the data in its specific context (Coffey & Atkins, 1996; Wolcott, 1994). In the beginning of the analysis, reading and interrogating the data culminated with "colored" and "labeled" sets of text. I then asked myself, “what do all these different colors and labels mean?” and “what am I going to do with several hundreds pages of the ‘coded’ text?”

As laborious and time consuming a task coding itself was, the identification of themes and categorization of the multiple data was even more challenging. Each unit of the data has its own meaning, and the lack of clarity and conflicts between themes and categories were often found during the process. Moreover, while the rich set of data enabled me to capture salient themes, it also contributed to divert the focus of the research. "Focus" was the key issue for working with divergent data. Again, working with the research questions was one of the best strategies for dealing with this challenge.

Another strategy useful for the data analysis process was assessment of my work, my own assessment as well as that of others. I believed that the primary responsibility for
dissertation research could not be shared with anyone else. However, I now realize that sharing the process is very useful for completing the research. Several opportunities enabled me to share the process, including the presentations of preliminary findings at professional conferences, discussions with colleagues, and co-authoring the chapters. Presenting the initial findings and discussions with colleagues, in particular, challenged my understanding of the data and the findings. Different questions asked in various contexts contributed to the development of my knowledge and skills in the entire process, especially the representation of the data.

In the representation of the data, "control" and "rich description" were the key themes (Kvale, 1996). Audiences and readers of these articles would not have access to the natural data; thus, my responsibilities included providing them with valid data presentation. While I was focusing on "reporting the results," audience and colleagues inquired about the details from the study. Consequently, I made an effort to explicate the procedure as much as possible and illustrated the data through the use of different data and voices from multiple participants while writing the chapters.

Writing was closely related to the representation of the data. I found "writing up" the dissertation the most challenging task yet also the most beneficial in the entire process. I assumed that I should be fully armed with all the knowledge and the findings from the data before writing. After several rounds of data analysis, I thought that the rest of the process was a matter of writing as a mechanical procedure. On the first day of actual writing, however, I realized that was not true. The reality confounded me and then writing appeared to be something I could not do at all.

I believe writing is a discovery process, to learn what I’m doing and thinking (Wolcott, 2001). I was stimulated to examine the data and reassess the preliminary findings while writing.
Compared to the eagerness of collecting the data, analysis and representation of the data was somewhat "getting rid of the data" (Wolcott, 2001). Selection of the data set for in-depth analysis and representation in the paper was not a simple task. It included decision making and problem solving processes. Along with other strategies stated in research articles, writing itself enabled me to work with something manageable and feasible.

Working with the manuscript format dissertation provided me with several opportunities and challenges as well. Doing a dissertation and preparing four manuscripts at the same time should be a great opportunity for the professional development in academia. However, even though I conducted one research study, I often felt as if I were involved in several research projects. Working with different research questions and analysis methods, and combining four pieces systematically was a truly challenging task. In addition, there were logistical issues, such as conforming to the requirements and scope of different publications.

The completion of the dissertation was an intensive learning experience. I realize the ultimate goal of the dissertation is not only providing a set of answers to the particular research questions, but to some extent, it is also uncovering what has not been asked. Hence, I believe doing research is an ongoing process within a broad context.

Continuing with the Process

As mentioned, I had opportunities to share the research ideas for the dissertation while framing and conducting the study at the professional conferences. I was challenged by questions, such as “how analyses of interaction can tell us something about learning,” “what is collaborative learning, interaction, and co construction of knowledge and how are these notions related,” “how we can deal with the discourse generated via asynchronous discussion as a
researcher.” The questions from the colleagues and audiences accompanied me throughout the process.

This dissertation aspires to answer those questions. The completion of the work, however, does not stop here. The research continues, expanding and extending the ideas through investigation of and application to multiple contexts. Further, the findings from the study and the questions shared above will be incorporated in my future research agenda.

References


APPENDICES
APPENDIX A

COPYRIGHT PERMISSION
Dear Seungyeon,

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Good luck with your dissertation.

Sincerely,

Jan Travers
Managing Director
Idea Group Inc. (Since 1988)
APPENDIX B

TERMS AND DEFINITION FOR CHAPTER 1
Asynchronous communication: The sharing of messages with delayed feedback.

Collaboration: Sharing responsibility in tasks with common goal(s).

Collaborative learning: A social process of learning that takes place in the context of communities of inquiry (Bruffee, 1999; Islas, 2004).

Communication: Human interactions to present, share, and build information and knowledge.

Communities of inquiry: Where participants pursue open, dialogic, facilitated communication and interaction while learning (Islas, 2004).

Computer-mediated communication: The convergence of telecommunication technologies with computers to create a new set of tools to support human communication and learning (Berge & Collins, 1995; Romizowski & Mason, 1996, Ryan et al., 2000).

Electronic discourse: Text-based conversation and discussion generated by computer-mediated communication asynchronously and synchronously.

Learning: The process of knowledge building and supporting each other to know in community of inquiry.

Mediated communication: Human interaction supported by any form of technology, such as telephone, mass media, or Internet networking.

Synchronous communication: Real time exchange of messages.

Quasi-synchronous communication: As in co-present verbal interaction, a notion that there is a temporal gap between a turn’s production and its reception in computer-mediated communication (Hutchby, 2001; Garcia & Jacobs, 1999).

Virtual community: groups that emerge when enough people interact and form webs of personal relationship in cyberspace (Woods & Smith, 2001)
APPENDIX C

COURSE SYLLABUS
Course Syllabus

Course Overview

To provide an anchor for the design concepts and practices studied, learners acquire hands-on experience in the design, development and evaluation of instruction, on a micro (lesson/session) level. Emphasis is placed on the design of learning resources most appropriate for the goals of the instruction being created. Instruction developed in the course is stand-alone instruction that can be replicated and distributed within a real-world context.

Concepts, practices and hands-on experience are discussed and applied within a framework of major design components, including analysis, design, development, implementation, and evaluation (ADDIE). The philosophical foundation of the course is not that there is one procedure for design, but rather an approach that works best for a particular context, audience, and activity. The course is also founded on the idea that the design process is influenced by the learning beliefs and instructional frameworks of those involved in the work (e.g., media specialist, teacher, learner). As such, part of what we will do in the course is explore various philosophies, procedures, and techniques for designing instruction.

The design process will be discussed in the larger context of problem solving, with the learner acquiring the information and skills necessary to use and apply the process in an instructional setting. The goal is not to become an expert designer, but to become more of a reflective practitioner of design, assisting people in the activities of teaching and learning. Knowledge of the design process, working in concert with tools and skills determined necessary in a given a context/audience/activity framework, will enable you to accomplish this goal.

Course Requirements

- Participation and idea sharing throughout the course, in a variety of formats: face-to-face interactions, virtual office hours, and postings to the course bulletin boards
- The completion of several Instructional Design Activities (IDAs) related to components of the design process (completed individually)
- The creation of ID Reflections
- Provision of Feedback to ID Buddies
- The completion of Design Team activities during the Saturday workshops
- The completion of a team-based Instructional Design (ID) Portfolio, that will include the following:
  1. Instructional Design Activities (compiled and revised from the individual IDAs)
  2. Lessons Learned Report
  3. Instruments and materials developed for the project
- Final presentation of ID Portfolio in a face-to-face Design Presentation
### Course Grading

<table>
<thead>
<tr>
<th>Element</th>
<th>Points</th>
<th>Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class Participation (e.g., face-to-face workshops, Discussion Boards, Buddy Feedback)</td>
<td>20</td>
<td>throughout course</td>
</tr>
<tr>
<td>Instructional Design Activities (IDAs)</td>
<td>20</td>
<td>throughout course</td>
</tr>
<tr>
<td>ID Reflections (for chapters in the text)</td>
<td>10</td>
<td>throughout course</td>
</tr>
<tr>
<td>Instructional Design Portfolio</td>
<td>40</td>
<td>4 June</td>
</tr>
</tbody>
</table>

**Note:** Final deadline is **Noon**!

| Design Presentation                                                   | 10     | 29 May            |

**Total Points =** 100

### Course Procedures and Activities

By the second session, you will be asked to complete a "skills" and "interest" inventory to see how much design background various class members already possess. This is the "Getting to Know You" activity. The goal is to determine where emphasis should be placed and where to begin instruction re: the design process. This initial assessment will help us better plan for both the group and individual needs of class members.

You will also be creating (or linking up, if you have one) a Web page by the second session of the course. This Web page will be used to further introduce yourself to your classmates and to post assignments for the course as they are completed (individual and group). Here are a couple of samples: Sample One, Sample Two.

You will be asked to identify an instructional "problem" for the instruction you will be creating with your team during the first session of class. The problem, described in narrative form, will be used for the completion of the Instructional Design Activities (IDAs). In addition to the identification of a problem, the goal of the instruction should also be generated. Guidelines for defining the problem and selecting an instructional goal can be accessed from the Guides section of the Web site.

The Instructional Design Activities, assigned throughout the semester, will initially be completed individually (another set will be generated for the ID Portfolio). However, feedback will be provided by your teammates and Design Buddies (selected in the first session of the class).
work for these mini-projects will be completed via e-mail, chat sessions, face-to-face interactions, etc. -- in other words, whatever form(s) of communication work best for you, your team mates and your buddies. These tasks will be related to the topic being discussed in class in any particular session or week, revolving around the overall goal of your team instructional problem.

You will be creating ID Reflections documents as a part of the course. The documents, entitled *My View of the Design Process (1-15)*, are designed to address three fundamental questions: *what are the big ideas? how can I apply this to my project? and what questions do I have?* The Reflections will be created using a "15/5" framework; that is, they should take you no longer than 15 minutes to write and us no longer than 5 minutes to read. The ID Reflections documents will be posted on your Web page throughout the semester.

Work on the Instructional Design Portfolio, a team project, will start at the very beginning of the course. You will work with three (3) to four (4) colleagues to create various documents related to your instructional project. The documents will consist of the IDAs, a *Lessons Learned* Report, and materials for the implementation of the instruction. You and your teammates will be asked to decide on an instructional problem/goal at the first session of the course. The work for the Instructional Design Portfolio will be completed via e-mail, chat sessions, face-to-face interactions, etc. -- in other words, whatever form(s) of communication work best for you and your teammates.

Finally, you will participate in a face-to-face Design Presentation at the end of the term. The presentation session will provide our community with an opportunity to showcase group design projects and to share success stories with each other.

**Required textbook**


**Course Expectations**

Upon completing the course, each learner will be able to...

- demonstrate an understanding of the design process, including the importance of learning beliefs and learning theory to the process
- identify, describe, and apply the major processes typically included in the design process, including analysis, design, development, implementation, and evaluation
- function independently and cooperatively in Design Team activities
- demonstrate competency in the team-based design process through the completion of an ID Portfolio
Immediate Responsibilities

Note: The Immediate Responsibilities listed below apply to the first few days of the course. Refer to bi-weekly CSM (could, should, must) messages for guidance with "Immediate Responsibilities" throughout the course.

- Go to the bookstore (physical or virtual) and purchase your books (UGA (off Lumpkin), FTX or Follett (both on Baxter street in Athens), or virtually at Barnes & Noble or Amazon.com). The first reading discussion will occur during the first class session.
- Play around with the course Web site and get to know the various components. It is **strongly** suggested that you complete the site quiz to help you get familiar with the course Web site.
- Create your individual Web page (if you need one).
- Think about the instructional problem you would like to tackle for your Instructional Design Activities (IDAs) with your Design Team. We will talk about this in our first face-to-face session.

Configuring your System

This site has been tested using Netscape Navigator 4.7. While it may work with other browsers, the designers and developers can only attest to the site working when viewed with Navigator 4.7 or higher. If you do not have a copy of the software, you can visit the Netscape Website to download the latest version of Netscape. Download Instructions are available from the Netscape Web site.

Furthermore, some files on this site are PDF format. Thus, You will need Adobe Acrobat Reader to view and print these files. If your computer does not have the software, you can download a free version at the following website: http://www.adobe.com/prodindex/acrobat/readstep.html
### Participation Checklist/Rubric

<table>
<thead>
<tr>
<th>Element</th>
<th>Criteria</th>
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</thead>
</table>
| Face-to-face participation (10) | - Prepared to engage in discussion and activities  
- Makes comments/asks questions during face-to-face discussions  
- Meets with Design Buddies/Teams, as needed face-to-face participation |
| Distance participation (10) | - General class/Discussion Cluster Interaction  
- Design Buddy/Design Team discussions  
- Individual Participation |
| | - Contributes to general class discussion and discussion cluster interactions when appropriate  
- Contributes to design buddy/design team interactions when needed  
- Seeks out interactions with content, other learners, instructors, and/or technology to aid learning and understanding  
- Contributions are substantial and add value to the dialogue/activity |
| **Total = 20 points** |

### IDA Checklist/Rubric

**Note:** This rubric will be used for all IDAs (total of 20 points).

<table>
<thead>
<tr>
<th>Element</th>
<th>Criteria</th>
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<tbody>
<tr>
<td>Answers to questions for IDA - Individual (5)</td>
<td>Bulleted answers to questions based on a complete analysis of the problem under consideration.</td>
</tr>
<tr>
<td>Answers to questions for IDA - Team (10)</td>
<td>Descriptive and detailed answers to questions based on a complete analysis of the problem under consideration.</td>
</tr>
<tr>
<td>Comments on Design Buddies’ IDAs (5)</td>
<td>Substantial and formative feedback provided to Design Buddies.</td>
</tr>
<tr>
<td><strong>Total = 20 points</strong></td>
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</tbody>
</table>

### ID Reflection Rubric

**Note:** This rubric will be used for all Reflection submissions (total of 10 points)

<table>
<thead>
<tr>
<th>Element</th>
<th>Criteria</th>
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</thead>
<tbody>
<tr>
<td>Personal explanation of the key points from each chapter (8)</td>
<td>Through response to the question: what are the big ideas? How can I apply this to my project? And what questions do I have?</td>
</tr>
<tr>
<td>Substantiation of view with citations from the literature (2)</td>
<td>Use of the text (or other readings) to substantiate and justify your perspectives</td>
</tr>
<tr>
<td><strong>Total = 10 points</strong></td>
<td></td>
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</tbody>
</table>

### Poster presentation

<table>
<thead>
<tr>
<th>Element</th>
<th>Criteria</th>
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<tbody>
<tr>
<td>Presentation created using appropriate media (5)</td>
<td>Highlights of project presented on multiple slides in PowerPoint or other productivity tool</td>
</tr>
<tr>
<td>Presentation is clear, concise and well-presented (5)</td>
<td>Presentation includes enough information so that others can quickly get a basic idea of what you were doing for your project. Information is presented in a professional manner</td>
</tr>
<tr>
<td><strong>Total (10 points)</strong></td>
<td></td>
</tr>
<tr>
<td>Element</td>
<td>Criteria</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------</td>
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</tbody>
</table>
| **Refinement of IDAs 1-7 (5 points)**        | Accurately and thoroughly completed for one lesson, including:  
|                                              |   ▪ Thoroughly describes instructional needs (what is vs. what should be).  
|                                              |   ▪ Accurately and thoroughly describes problem.  
|                                              |   ▪ Thoroughly describes goal.  
|                                              |   ▪ Describes where and how product will be used and how it well be sustained.  
|                                              |   ▪ Accurately and thoroughly describes target population.  
|                                              |   ▪ Thoroughly describes task.  
|                                              |   ▪ Thoroughly describes tools.  
|                                              |   ▪ Identifies major steps in task.  
|                                              |   ▪ Accurately represents micro level.  
|                                              |   ▪ Thoroughly describes lesson, including objectives and strategy.  
|                                              |   ▪ Thoroughly describes assessment tools and procedures.  
|                                              |   ▪ Identifies process used to develop instructional materials.  
|                                              |   ▪ Thoroughly describes evaluation tools.  |
| **Lessons Learned Report (10 points)**       | Thoroughly describes where and how implementation took place (environment, time, etc.) as well as who actually participated. |
| Implementation Description                  |                                                                                                                                         |
| Results of Implementation                    | Thorough description of experience and what was learned, including recommendations for revisions.                                        |
| References (5)                               | All resources included and listed in APA format                                                                                          |
| Appendixes (15)                              | All tools created for analysis, implementation, and evaluation are included and labeled appropriately. All materials used for instruction |
| Organization and Presentation of Overall Portfolio (5) | Information was easy to find and followed guidelines for each section of the portfolio. Used table of contents with page numbers and/or tabs for major sections (as appropriate). |
| **Total Points = 40**                        |                                                                                                                                         |
| **TOTAL POINTS = 100**                       |                                                                                                                                         |
APPENDIX D
INTERVIEW PROTOCOLS
Interview Protocol

Interview Time: 1 hour
Prerequisite: Participant has signed consent forms for research participation.

For Student

1. I want to understand the meaning of your experience in EDIT 6170 so far this semester.
2. Do you remember particular activities related to this course? What happened and how did it happen?
3. What is the major difference between a face-to-face and web-course?
4. Do you think your understanding or knowledge has changed as a result of interactions with peers via web technologies?
5. Do you think you created new personal constructions of knowledge as a result of discussions/interactions within the group?
6. What concerns do you have about web-based learning?

For Instructor

1. When did you decide to use web technology in your teaching? Why are you using web-based technology in your teaching?
2. Could you describe in as much detail as possible a situation in which you feel learning occurred in EDIT 6170 course?
3. How do the students respond to web-based learning? Can you explain their response?
4. How do you monitor student’s work, homework and/or progress?
5. How do you do assessments? How to you know that students are learning and really "getting" it?
6. What kinds of success have you experienced with the EDIT 6170 course?
7. Are you experiencing any difficulties in class?
8. Did individual participants change their understanding or create new personal constructions of knowledge as a result of interactions within the group?
9. Do you believe that web-based learning will fundamentally change learning? Please explain.
10. What concerns do you have about web-based learning?
APPENDIX E

MID-TERM THOUGHTS/REFLECTIONS/OPINIONS
This evaluation is to determine the following:

(1) your perceptions on how things are going,

(2) the usefulness of activities, and

(3) your recommendations for the rest of the semester.

Please find respond to the following questions to help guide me in making things better for the next four weeks! Thanks!

1. The thing/s I like most about the course is/are:

2. The thing/s I like least about the course is/are:

3. Here are some things I would like to see happen before the end of the course…
APPENDIX F

TRANSCRIPTS OF DISCUSSION FOR CHAPTER 4
Message no. 465
Posted by Jamie on Monday, May 26, 2003 11:33pm
Subject Is "Moderate" better?
Does anyone consider the fact that if ALL the teachers in a school thought that the Media Specialist was a hot shot design consultant and the best thing since sliced bread and decided to use this wonderful resource, that the SLMS would do nothing but consult? What would happen to reading promotion, and materials review and selection, and book fairs, and cataloging, and collaboration, and all the other things that we hardly have time for when the teachers DON'T want us as design consultants too? Maybe we don't want to reach the in-depth level, and the moderate level is better?
Jamie

--------------------------------------------

Message no. 469[Branch from no. 465]
Posted by Mavis on Tuesday, May 27, 2003 3:50am
Subject Re: Is "Moderate" better?
Great question, Jamie.  I also came up with this question while reading the chapters (even though I'm not a SLMS). Your message also reminded me of the first class. And here's my question "What is your vision for the school library media program, especially where it concerns the improvement of teaching and learning?" On reflecting your visions that you stated at the first session, which level would work for you better? And what are you doing right now as a SLMS and/or a consultant?
Mavis

--------------------------------------------

Message no. 472[Branch from no. 469]
Posted by Karin on Tuesday, May 27, 2003 8:36am
Subject Re: Is "Moderate" better?
As I read through the scenarios in each chapter, Jamie, I see myself in the moderate role. And for precisely the reasons you mention. We have so many demands on our time, these little "hit and run" consultations can help teachers without taking too much away from our other responsibilities. Our primary function as I see it is to serve as literacy consultant rather than design consultant.
Karin

-----------------------------------------------
Message no. 488[Branch from no. 465]
Posted by Annette on Tuesday, May 27, 2003 4:10pm
Subject Re: Is "Moderate" better?
You said it right on, Jamie! Makes me think of what Turner said in on of the early chapters (I'm not going to stop and look up which one) about how the job of LMS was already defined by certain tasks before this one of instructional consultant was added to the description, and it's had a hard time finding footing because the other parts of the job are so entrenched. I think that for most of us, the moderate level of involvement is realistic. Now, my situation at school is a little different--I work on an 11-month contract, and teachers are encouraged to schedule design time with me in the summer. It's great, because we really have time to dig into things, and I'm working with them more at the intensive level and they love the support. But even with that great time built in, not everybody comes. I guess that no matter what you do or how much it's appreciated, some teachers will not want our help. But that just gives us that much more for the ones who *do* want it, right? And we can always hope that the others will come along. Annette

-----------------------------------------------
Message no. 498[Branch from no. 488]
Posted by Julie on Tuesday, May 27, 2003 7:13pm
Subject Re: Is "Moderate" better?
Jamie, Karin, and Annette, I am *so* glad to hear you say that it is more realistic to take on a more moderate role. I am starting a new job as media specialist next year, and I'm a bit overwhelmed by the many different responsibilities. Throughout this class I've been wondering where one finds the time to help many teachers as instructional consultant. In reality, how many teachers view you as such? I know you have to start small, and work with teachers who are open to suggestions and help, so maybe it never becomes a huge problem. Teachers are often so used to planning alone or with their department that it might take time to "teach" them to see you in the role of instructional consultant.
Julie

-----------------------------------------------
Message no. 503[Branch from no. 498]
And just as well say I! Imagine if they all wanted our help! I really feel that the SLMS role is NOT to be a design consultant, but to have a little knowledge (a dangerous thing no doubt!) and be able to steer them gently in the right direction. If we were to do all the ID, what would the teachers do, besides teach that is!

Speaking of which, my principal has asked me to consider teaching the 7th grade LA and reading next year! Is that scary or what?

Jamie

------------------------------------------------------------

Message no. 545 [Branch from no. 503]
Posted by Annette on Wednesday, May 28, 2003 3:43pm
Subject Re: Is "Moderate" better?
Is the teaching in addition to your LMS job? Wow, Jamie, that would be a load! I read weekly to 2 classes of 5th-graders, and even that small regular assignment sometimes causes me a crunch: I think that life in the media center is so much moment to moment that the planned, scheduled things are almost impossible. But you'd be great at it, of course--and think of the respect you'd garner from your teacher colleagues! Annette

------------------------------------------------------------

Message no. 509 [Branch from no. 498]
Posted by Karin on Tuesday, May 27, 2003 9:06pm
Subject Re: Is "Moderate" better?
Julie, Don't get overwhelmed. Most teachers won't immediately view you as an instructional consultant. Take it in small chunks. My theory is if you can help one teacher in each grade level this year, you will get another next year. The logical result of that is that eventually they may ALL be beating a path to your door!
But by that time, I'll have a few other classes under my belt and maybe I'll know what to do about it. (cringe)
I can tell you, be very careful in the selection of your media clerk, if you have the luxury of hiring one. She (or he) can make all the difference in the world in your ability to do your job!
Karin

Message no. 524[Branch from no. 509]
Posted by Debb on Wednesday, May 28, 2003 7:18am
Subject Re: Is "Moderate" better?
I'm so glad to hear all of you thinking mostly in the moderate range. Like Julie, I'm feeling overwhelmed with all there is to do and know. Unlike Julie, I don't have a new job waiting on me! I would think that as time goes on, there will be some areas where you stretch and become involved at the in-depth level, but most areas would remain in the initial or moderate. I also think this depends greatly on what has gone on before you came aboard, especially at first. It's not humanly possible to work in-depth at too many levels--you'd have to pick and choose. I'm worried that my "vision" is very blurry. Is everyone else's crisp and sharp? Debb

Message no. 534[Branch from no. 524]
Posted by Jamie on Wednesday, May 28, 2003 9:16am
Subject Re: Is "Moderate" better?
Absolutely not crisp and clear! Even coming to the end of my 2nd year in the Media Center I still am unsure about many areas. Although Anne says she doesn't like cataloging and inventory, those at least are areas I feel on solid ground and sort of know what I'm doing!
Maybe because those are traditionally Media Specialist tasks with little or no collaboration involved!
Jamie

Message no. 535[Branch from no. 534]
Posted by Karin on Wednesday, May 28, 2003 9:48am
Subject Re: Is "Moderate" better?
As you said, Jamie, it's more comfortable sometimes to stick with cataloging and inventory - "traditional" roles. The problem is that no one sees end results or "what's the payoff for me?"
In these days of shrinking budgets and greater accountability system wide, we must make ourselves indispensable to our clients. I think Turner talked about that in the first chapter - the nebulous role of the MS. Teachers and administrators must see results of our work that means something to them in theirs. (Does that make sense? My brain is running faster than I can type and I'm on a sugar high!)

Karin

Message no. 547[Branch from no. 534]
Posted by Annette on Wednesday, May 28, 2003 3:54pm
Subject Re: Is "Moderate" better?
You and I are on the same wave length, Jamie--I've actually been looking forward to inventory this spring because at least I know what to do with that! I think my vision of self as LMS is so circumscribed by the job as it exists for me: actually, I do have a lot of leeway that many others don't, because my job description includes lots of instructional planning with teachers, lots of staff development, and opportunities to participate in some school wide initiatives that really can expand the perspective. But I don't have this wonderful independently-held-and-strived-for vision of my position--I try to do the job well as it is described for me, making adjustments and changes when I see the need and can get the support. Annette

Message no. 555[Branch from no. 547]
Posted by Debb on Wednesday, May 28, 2003 8:45pm
Subject Re: Is "Moderate" better?
Annette, thank you for your comments on your vision. I guess that's what I had in mind--I intend to do what's expected of me, but vision? Debb

Message no. 558[Branch from no. 547]
Posted by Alice on Wednesday, May 28, 2003 10:42pm
Subject Re: Is "Moderate" better?
Annette and Jamie...yes I also agree with you about doing the best job you can do with what is expected of you. I like the idea of refining it as you go along...we all do that in anything we do. Debb, I have always had problems stating my goals and visions...I feel if I am doing the best I
can (and I do expect a lot from myself) that is expected of me as a professional, I am doing well. I know we are supposed to have a vision of what we would like the Media Specialist to be, but sometimes the day to day activities might get us off course. In the end if one is happy, doing their job competently, and teaching children and teachers...well I say that it's all in a days work.

Alice

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APPENDIX G

SAMPLE DATA ANALYSIS: INTERVIEW TRANSCRIPTS
Jane: Yeah, *it helped me understand where people were coming from and it reinforced what I was reading*. Where as I might not have gotten it. Somebody else might say something, I'm like "oh yeah that's what they were trying to say. So *I think that helped me to really digest what we were learning*. I just really felt like I learned so much…

Jane: Sometimes I felt like I couldn't jump into the conversation like the last couple ones I didn't really comment cause I didn't feel like I could jump into it for some reason. *Everybody seemed to cover what I wanted to say* before I could get to it and I didn't want to beat a dead horse. I was like Ok well *we've commented on that enough* and I read them but there was some that I didn't jump in and I, I felt comfortable not doing that…*I just really soaked in what everybody else was saying* and I felt that that was what that discussion board was for, you know.

Jane: Oh the discussion boards. That was *real life learning for me* in the discussion boards because *a lot of people would ask a question and they would answer it from their perspective*. That's how our discussion boards went really they would answer it from… I would answer it *from the perspective of coming from a non-educational background* and then somebody *would comment from the educational background* and then it would seem that somebody would then take comments from both and link it in together, it was so neat how that would come together sometimes.

Or they would say, *"well yeah I think that's a great point that this person made" and make the folks who were not really in education feel like they could contribute to the discussion*. It's kind of hard sometimes to fit in when you don't come from and educational background. *When you get involved in the discussion boards you feel like you fit in, because the groups welcome your comments and respond to your comments and I think that really helps to integrate all walks and different paths that people have come to, to come to this class.*

Chloe: Probably posting ideas and having people *write back to you what they thought* or you being able to *post what you thought about what they mention* because a lot of things that people would say hadn’t even crossed my mind yet. And it was a good way to *share information or ideas*.
| Chloé: Yes. I tried to read all of them [other groups’ discussion forum]. I would read ours first and then I would try to go in and read the other ones because I thought that they would also bring up things that our group hadn’t thought about. It was kind of nice to read some different points of view. [But] I never responded, I was just a silent observer. |
|---|---|---|
| Chloe: I think so, I think it [discussion board] helped broaden, and I don’t come from a media center background so getting to hear a lot of the comments from people who have been in the program longer or who have been media specialists that was, you know, a good experience for me to come hear some of the things that they find, you know, that are problems. And being a classroom teacher at other grade levels because I’m high school a lot of them are elementary school. So the way that they would use instructional design would be totally different from the way I would |
| Chloé: I think people when required to go in and have a discussion online over those topics I think you get a lot more people being honest and not afraid to talk out. You know some people are shy in class. Like I don’t normally speak during class but through the bulletin board I felt more comfortable giving my opinions and ideas and things like that. |
| Rachel: Hmm I like WebCT because all the information is there so when I need to or if I’m inclined to, I can go and read what other people have said so in that respect I like knowing that that is there. But I do like WebCT. It kind of gives you a little bit of a crutch, at least there's more information then just, I mean if, if our class were all online for one thing it would have been more then just a few Saturday’s. I think it was a good balance; yeah I'm glad we didn't have to meet more often. |
| Karin: It’s [discussion board] an important component into making us feel like a community. Even when we’re…I’m isolated and at home, everyone is all around us geographic region and yet when I go on there and I see a part of a conversation, it has a way of, pulling us in and letting us still be in one community. It’s a big community building. It’s very much of a community building tool when we’re all suffering. |
APPENDIX H

SAMPLE DATA ANALYSIS: DISCUSSION TRANSCRIPTS
Initiates the discussion

Message no. 465 Application
Posted by Jamie on Monday, May 26, 2003 11:33pm
Subject Is "Moderate" better?

Does anyone consider the fact that if [ALL the teachers in a school thought that the Media Specialist was [a hot shot design consultant] and the best thing since sliced bread and decided to use this wonderful resource, that the SLMS would do nothing but consult?] What would happen [to reading promotion, and materials review and selection, and book fairs, and cataloging, and collaboration, and all the other things that we hardly have time for] [when the teachers DON'T want us as design consultants too]? Maybe we don't want to reach the in-depth level, and the moderate level is better? Jamie

Challenges/tests the shared meaning (i.e., textbook)

Message no. 469 Branch from no. 465
Posted by Mavis on Tuesday, May 27, 2003 3:50am
Subject Re: Is "Moderate" better?

Great question, Jamie. I also came up with this question while reading the chapters (even though I'm not a SLMS). Your message also reminded me of the first class. And here's my question "What is your vision for the school library media program, especially where it concerns the improvement of teaching and learning?". On reflecting your visions that you stated at the first session, which level would work for you better? And what are you doing right now as a SLMS and/or a consultant? Mavis

Re-description of guiding question

Message no. 472 Branch from no. 469
Posted by Karin on Tuesday, May 27, 2003 8:36am
Subject Re: Is "Moderate" better?

As I read through the scenarios in each chapter, Jamie, I see myself in the moderate role. And for precisely the reasons you mention. We have [so many demands on our time, [these little "hit and run" consultations] can help teachers without taking too much away from our other responsibilities]. Our primary function as I see it is to serve as literacy consultant rather than design consultant. Karin

Reinforces Jamie’s question

Message no. 488 Branch from no. 465
You said it right on, Jamie! Makes me think of what Turner said in on of the early chapters (I'm not going to stop and look up which one) about how the job of LMS was already defined by certain tasks before this one of instructional consultant was added to the description, and it's had a hard time finding footing because [the other parts of the job are so entrenched]. I think that for most of us, the moderate level of involvement is realistic. Now, my situation at school is a little different--I work on an 11-month contract, and teachers are encouraged to schedule design time with me in the summer. [It's great, because we really have time to dig into things, and I'm working with them more at the intensive level and they love the support]. But even with that great time built in, [not everybody comes]. I guess that [no matter what you do or how much it's appreciated, some teachers will not want our help]. [But that just gives us that much more for the ones who *do* want it, right? And we can always hope that the others will come along.]

Annette

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Message no. 498[Branch from no. 488]

Jamie, Karin, and Annette, I am *so* glad to hear you say that it is more realistic to take on a more moderate role. I am starting a new job as media specialist next year, and I'm a bit overwhelmed by [the many different responsibilities]. Throughout this class I've been wondering [where one finds the time] [to help many teachers as instructional consultant]. [In reality, how many teachers view you as such?] I know you have to start small, and work with teachers who are open to suggestions and help, so maybe it never becomes a huge problem. [Teachers are often so used to planning alone or with their department that it might take time to "teach" them to see you in the role of instructional consultant].

Julie
APPENDIX I

DESCRIPTION OF ACCEPTED/TARGETED PUBLICATION
Encyclopedia of Virtual Communities and Technologies
Subhasish Dasgupta, Editor, George Washington University

The Encyclopedia of virtual communities and technologies provides an inclusive coverage of the concepts and realities in the field of virtual communities and technologies. The hundreds of entries included in this encyclopedia have been authored by leading international researchers, presenting an in-depth analysis of conceptual, technical, and the impacts of virtual environments in our global village. In addition, included entries provide coverage of different types of virtual communities, their social status and impact, and individual and group behavior in these communities. This encyclopedia also offers coverage of upcoming and emerging technologies for virtual communities human-computer interfaces, new networking, mobile computing, web services, and synchronous and asynchronous environments. (Downloaded from http://www.idea-group.com/encyclopedia/details.asp?ID=4459)

Distance Education
Som Naidu, Editor, University of Melbourne, Australia

Distance Education is the official journal of the Open and Distance Learning Association of Australia Inc. (ODLAA). The journal has an international focus and publishes peer-reviewed articles which aim to engender and disseminate research and scholarship in open, flexible, distance education and training. Distance Education is one of the first journals published to focus exclusively on this area of educational practice and it continues to be seen as a primary source of original and scholarly work in the field by practitioners, teachers and students. (Downloaded from http://www.tandf.co.uk/journals/titles/01587919.asp)
Journal of Computing in Higher Education

Carol B. MacKnight, Executive Editor, University of Massachusetts

JCHE was founded in 1989 by the New England Regional Computing Program, Inc., a consortium of 60 colleges and universities, as an important way of extending the influence of leaders around the world who are actively engaged in integrating computing into the curriculum. In 2002, JCHE became associated with the National Institute for Community Innovations, an organization dedicated to developing and promoting educational innovations.

The Journal contains essays, book and product reviews, reports, and research articles that contribute to our understanding of the issues, problems, and research associated with instructional technologies and the integration of technology into the learning and teaching process. (Downloaded from http://www.jchesite.org/about.html)

Journal of Asynchronous Learning Networks

John R. Bourne, Editor, Sloan Center for OnLine Education

The aim of the Journal of Asynchronous Learning Networks is to describe original work in asynchronous learning networks (ALN), including experimental results. Our mission is to provide practitioners in online education with knowledge about the very best research in online learning. Papers emphasizing results, backed by data are the norm. Occasionally, papers reviewing broad areas are published, including critical reviews of thematic areas. Entire issues are published from time-to-time around single topic or disciplinary areas. The Journal adheres to traditional standards of review and authors are encouraged to provide quantitative data. The original objective of the Journal was to establish ALN as a field by publishing articles from authoritative and reliable sources. The Journal is now a major resource for knowledge about online learning. (Downloaded from http://www.aln.org/publications/jaln/index.asp)