

AN INVESTIGATION OF THE FORMATION OF LEARNING COMMUNITY
IN WEB-BASED DISTANCE EDUCATION

by

Lisa Johnston O'Hara

B.S. Ed., Indiana University of PA, 1986

M.Ed., Indiana University of PA, 1995

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This dissertation was presented

By

Lisa Johnston O'Hara

It was defended on

March 28, 2008

and approved by

Diane J. Davis, Ph.D., Director, Center for Instructional Development and Distance Education

Richard J. Donato, Ph.D., Associate Professor, Department of Instruction and Learning

Louis H. Pingel, Ph.D., Associate Dean, School of Education, Associate Professor,
Department of Psychology in Education

Louis H. Berry, Ph.D., Dissertation Director, Associate Professor,
Department of Instruction and Learning

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Lisa Johnston O'Hara, Ed.D.

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This study examined the interactions that occurred in an on-line university course. The study used the verbal interaction categories identified in the Flanders Interaction Analysis Protocol (1970) and the Criteria for a Learning Community by Palloff and Pratt (1999). A qualitative research design was selected in order to analyze the content of the individual student posts, as well as to identify the strengths and weaknesses of the instruments used to measure interaction and community.

The NVivo7™ research software was used to categorize and analyze the content of student interaction in threaded discussions for four individual cases. The results showed that students did form community to varying degrees and that the degree of community formed differed based on developmental factors and previous classroom experience. From the Flanders protocol, Lecturing-Citing Opinions and Agreement-Building on the Ideas of Others were the most common types of interactions. The study also identified several types of interactions that the Flanders instrument did not classify, such as Relating Personal Experience, Reflective Comments, Use of Flames/Emoticons/Text Message Language, and Expressions of Courtesy.

The discussion text met many of the criteria identified by Palloff and Pratt (1999) for a learning community. The cases involving graduate students were more likely to meet the criteria for collaborative learning and socialization than the cases comprised of undergraduate students.

None of the cases identified any instances of offers to evaluate the work of others, a Palloff and Pratt (1999) criteria.

Recommendations were made for improving the design on on-line courses to be more intuitive and to allow for visual reinforcement of interaction types. Additionally, training for faculty utilizing on-line courses that identifies strategies to encourage and develop different types of interactions in the on-line classroom was recommended. Other recommendations included development of a series of Indicators that signify the development of community in the on-line classroom.

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CHAPTER ONE

INTRODUCTION TO THE PROBLEM

INTRODUCTION

Distance education, particularly on-line or Web-based instruction, is fast becoming a major revenue stream for universities within the United States. An on-line search of “on-line degrees” netted 132 million results in just one quarter of a second. A search of “on-line universities” produced 418 million results in much the same time (Google, 2007). The appeal of distance education is obvious; with individuals facing mounting career, personal, and family responsibilities, learning at a distance provides a viable option for garnering a university degree.

Beller & Or (1998) underscore the importance of flexibility in learning situations for students, and adult learners in particular, given their need to obtain an education without being committed to a specific time and place. Current research also supports this trend with the Babson Survey Group reporting 3.2 million students involved in on-line classes in during the 2005 academic year (Catalano, 2007). Students are also now electing to pursue on-line degrees, or to supplement their face-to-face courses with additional on-line courses (Carnevale & Olson, 2003).

While distance learning can be traced back to 1840, when Issac Pitman began offering shorthand lessons through correspondence, the concept of utilizing emerging technologies to enroll students for credit-based courses began in the 1920s when university-owned and operated radio stations went on the air. Offering limited abilities for universities to organize curricula

around this technology, there was enough success to encourage the formation of the American Association for Adult Education (AAAE) in 1926. Because the most prominent method of instruction at the time was lecture, with little interaction between the learner and instructor, the radio delivery format required little adaptation of an instructor's presentation.

As television was being developed commercially in the mid-1940s, the AAAE evolved into the Fund for Adult Education. By 1976, there were 253 public television stations operating in 47 states and the use of television for college-credit courses had expanded to include public television, as well as dedicated, closed-loop systems, which operated over satellite, microwave, or cable networks. (Holmberg, 1977). The evolution of this technology into Interactive Television (ITV) soon allowed for expansion to two-way communications between learners and the instructor, allowing for interaction to take place in the classroom.

As technology continued to emerge, computer-based formats for distance learning began to evolve. Computer tutorials offered a single learner the opportunity to interact with the materials, but provided no interaction with an instructor unless it took place outside of the tutorial program. When combined with e-mail, a computer-based learning program offered the ability to communicate with the instructor, but did not offer communications with peers. The advent of the Internet offered the most potential for distance learning; using the Web as a platform, learners would be able to interact with the instructional materials, their peers, and their instructor.

Instruction utilizing an on-line platform can be easily accessed from any location providing an efficient means of attending to course information and assignments both synchronously and asynchronously. While many Web-based courses are designed for an

asynchronous format, in Web-based paradigm for learning the interaction between the learner, his or her peers, the course materials, and the instructor is crucial for the learning process to be successful (Palloff & Pratt, 1999).

In discussing the interaction among and between learners in a Web-based course, the term “virtual learning community” or “virtual community” is often used to describe the context in which communication occurs. Although not a physical place, community in a virtual environment, refers to the invisible, yet perceptible, boundaries set by a group in which individuals come together around a shared interest, purpose, or goal (Koh, Kim, Butler & Bock, 2007).

Shrage (1991) developed a model for a learning community that focuses on the “shared experience” of the learning task. The shared experience that is central to Shrage’s model is one of participation. The learner, Shrage theorized, collaborates with others to create shared meaning about a concept. The collaboration need not take place in face-to-face discussions, it could also occur electronically—through telephone lines, e-mail, chat rooms, or threaded discussions. The medium for communications under Shrage’s model does not define the quality of the experience, the collaboration with others does.

Thirteen considerations for instructional designers are identified in Shrage’s model of collaboration within a learning community. These elements could be used in several different distance education formats, but have particular relevance to the Web-based distance learning course:

1. Competence, which refers to a very basic level of knowledge, a basic goal, or a basic skill, that is shared among all in the course and serves as the foundation for a “communal brain.” (Shrage, 1991, p. 37).
2. A shared and understood goal that is common among all of the participants in the course.
3. Mutual respect and tolerance for others.
4. The ability to create and manipulate shared spaces.
5. Multiple formats for information representation on which discussion and interaction can be based.
6. The ability to test and manipulate representations.
7. Continuous, rather than continual, communication to maintain a collaborative environment.
8. Both formal and informal environments that provide the structure to keep the class on task and the space to maintain discussions.
9. Defined lines of responsibility without restrictive boundaries.
10. Individual, rather than consensus, decisions.
11. No requirement for physical presence. The lack of a brick and mortar classroom does not impede the ability to communicate or to learn from one another. Social presence, the sense of being engaged in a social encounter with another who is at a distance, can be achieved in a virtual setting.
12. Inclusion of selected outsiders to enrich the learning experience through insights and information.
13. The end of collaboration.

The availability of electronic communication tools, in particular, to support collaboration among learners in Web-based education is essential. The Web offers an instructional environment based on continuous, though not necessarily continual, communication that is achieved through synchronous and asynchronous methods. Palloff & Pratt (1999) build on Shrage's model of collaboration to identify five criteria that indicate an on-line community is forming. These criteria move beyond indicators of basic collaboration and focus on those behaviors that indicate sharing and support of the instructional tasks taking place between learners.

The five criteria identified by Palloff & Pratt include:

1. Active interaction with course content and personal communication. Learners actively use the course content and communications tools available to aid in their learning. This indicates that students are actively involved in their own learning.
2. Collaborative learning as evidenced by comments directed primarily student-to-student. Learners actively collaborate within their peer group, directing comments and discussion to other learners.
3. Socially constructed meaning evidenced by agreement or questioning in open discussion areas. As collaborative learning increases, the learners begin questioning their peers or indicating agreement to topics in open discussion areas.
4. Sharing of resources among students. To aid in their own learning, and to assist in the learning of their peers, students begin suggesting research sources or sharing other resources within their peer group.

5. Expressions of support and encouragement exchanged between students, as well as the willingness to evaluate the work of others. Learners begin showing support for other students by including expressions of support and encouragement for the work of others. Additionally, learners may also offer to evaluate the work of their peers and to provide suggestions based on those evaluations.

The California Distance Learning Project (1997) identified a number of key elements as necessary for effective distance learning. The separation of learner and instructor, both in time and space, for the majority of the instruction is the hallmark of distance learning. To support this reality, and to increase the efficiency of the learning experience, the utilization of educational media to house course content and allow for communications between the learner and instructor should be deliberate. The inclusion of two-way communications in the distance classroom is crucial; interaction among all class participants is a requirement. Finally, it is suggested that the effective learning experience in the distance classroom requires that the instruction is learner controlled, rather than instructor controlled.

The need for collaboration in distance learning is cited as major concern among educators. In a traditional classroom setting, collaboration is recognized as an essential element for effective learning. Without the ability to collaborate with other students, the instructor may have difficulty supervising the learning process overall (Tebeaux, 1995). In on-line learning, the interactions among and within the learners in the class, between learners and instructor, and collaboration among both groups serves as the impetus for the formation of a learning community—a virtual space through which knowledge is imparted and meaning is co-created, thus achieving learning outcomes (Palloff & Pratt, 1999).

Most educators agree that technologies such as Web-based education create a different learning environment to which both the instructor and students must adapt. Lack of face-to-face contact creates a transactional distance that must be overcome by the learners (Moore & Kearsley, 1996). The lack of physical presence in a Web-based class has been cited as problematic for effective learning. Without immediacy behaviors, classroom discussion or interaction, the learner in an on-line course has little feedback from the instructor or other from learners.

To counter this perceived shortcoming, most Web-based instructional platforms include tools to encourage learner interaction. Biography posting sites, where instructors and learners can post photographs and biographical information, are used to build familiarity between the individuals in the group. Group projects are possible in Web-based learning; many software platforms have created specific areas where groups can form and work together. Threaded discussions where learners can post messages asynchronously are another common tool to encourage interaction. Finally, many Web-based instructional platforms also include chat tools for both synchronous and asynchronous interaction.

Flanders's Interaction Analysis (Flanders, 1970) was widely used during the 1960s and 1970s for studying verbal interactions between the instructor and students in the classroom. Using pre-determined protocols, the observer identifies and records the nature of each interaction as it occurs between the instructor and students and among and within the students during class. In the on-line classroom, the instructor takes the role of facilitator of instruction; learners play a more active role in their learning and the learning of their peers (Sherry & Wilson, 1997).

With its focus on pedagogical style and the events taking place in the classroom, the Flanders protocol can be adapted for use in other classroom types, including the Web-based classroom (Stake, 1995).

Using Flanders as the initial meter of classroom interaction, in this instance focusing on the interaction events taking place--rather than on who performs them--the evolution of classroom interaction can begin to be analyzed. The criteria identified by Palloff & Pratt (1999), which focus on a classroom type that has evolved over 30 years later, focus on many of the same types of communication interaction events; the difference being that the learners now perform many of the learning interaction tasks for themselves and their peers.

The incorporation of technology into instruction is not new and the research has much to offer in this area. As a medium for communication in the classroom; however, unique aspects of the communications process in on-line instruction are now being identified as areas for further investigation. "Wide scale adoption of on-line education is just beginning and almost all of the research needed in this area has yet to be defined or conducted" (Kearsley, 2000, p. 59).

Goodfellow (2005) notes the importance of examining "activities and events in both physical and virtual contexts in comparable form (p. 125). Studies often cite the formation of the virtual learning community as a supporting factor in the instructional effectiveness of Web-based learning, but the degree to which this community forms remains a question.

Although the literature indicates that mediated instruction at a distance is equivalent to the traditional classroom experience, more research is needed to describe the properties that are similar and those that are clearly different so that effective instructional designs can be made. Questions for future research in on-line learning will focus on what happens to effect learning. What kinds of interactions occur in on-line learning? How do learners participate? Are the

communications interactions taking place in the on-line classroom moving from an instructor-to-learner based model to a classroom dynamic where learners contribute to their own learning, as well as that of their peers?

PURPOSE OF THE STUDY

The purpose of this study was to analyze the content of the communication in an on-line class to test the criteria for the formation of a learning community. Using Palloff & Pratt's (1999) guidelines for the formation of a learning community and Flander's Interaction Analysis Protocol (1970), the contents of the discussions taking place in an on-line classroom were evaluated against two sets of measurements. Palloff & Pratt identified if a "virtual community" is being formed based on the types of interactions; Flander's protocol tested the amount of interaction taking place based on a reliable set of guidelines. The findings of the study will be used to identify possible criteria that could be used for future research in the development of an on-line community, to inform the practice of instructional designers working in Web-based media and ultimately, to create the most effective instructional environment for on-line learners.

Research Questions

The questions that this study is designed to investigate are:

1. What are the levels and types of participation demonstrated by learners in the classroom as identified in an adapted Flanders Interaction Analysis Protocol (1970)?
2. How and to what degree do learners meet the communication criteria identified by Palloff & Pratt (1999) for the formation of a community?

3. What are the strengths and weaknesses of current assessments--Flanders (1970) and Palloff and Pratt (1999)--for use in development of criteria for measuring development of learning community.

ASSUMPTIONS

1. Participants have basic computer skills. Basic skills are defined as being able to launch an application, run a browser, key information via a keyboard, go to a particular location or Web address, and point and click using a mouse.
2. Participants have access to the Internet at their homes, at work, or at a university-provided computer laboratory.

LIMITATIONS

1. Participants will be limited to students enrolled in classes at a State System of Higher Education (SSHE) university and the results may not necessarily be generalized to other populations.
2. The data analyzed will be collected using the Web CT™ Web-based instruction portal. The extent to which the results may be generalized to other distance learning platforms is unknown.

DELIMITATIONS

1. The study will be delimited to written comments made using the available Web CT™ communications tools over the period of one semester.

2. The documentation of comments recorded on Web CT™ could be affected by system glitches or failures that prevent data from being recorded completely.

DEFINITION OF TERMS

Asynchronous Communications: Communication that does not occur at the same time; communication in which only one person communicates at a given time (Jonassen, 1996).

Bulletin Board: A system that provides computer users with access to files for downloading and areas for posting messages (Hansen, 1997).

Chat Room: Real time, synchronous exchanges among individuals located in a virtual location (Jonassen, 1999)

Computer-mediated Communications: Organized interaction between individuals that utilizes computers or computer networks as the communication medium (Romiszkowski, 1997).

Discussion Group: A group that discusses a specific topic through electronic communications such as e-mail, chat room, or bulletin board (Ackerman & Hartman, 1998).

E-mail (Electronic Mail): A system for transmitting messages or information digitally through a communications network (Hansen, 1997).

FTP (File Transfer Protocol): A means of transferring or sharing files across the Internet from one computer to another (Ackerman & Hartman, 1998).

Hyperlink: Clickable words, phrases, images, or portions of an image that represent another Web site or Web-based resource; sites or resources that are activated when clicked (Ackerman & Hartman, 1998).

Hypertext: A means of viewing or working with text that permits the user to follow cross-references to other Web resources by clicking on the highlighted link (Ackerman & Hartman, 1998).

Independent Message: A message that does not refer to any other message based on content or discussion topic.

Interactive Message: A message that is threaded, or linked, to another based on content of the message or the discussion topic.

Learning Community: A group in which individuals come together around a shared interest, purpose, or goal (Koh, Kim, Butler & Bock, 2007).

Listserv: A type of discussion group, interest group, or mailing list that is focused on a particular topic (Ackerman & Hartman, 1998).

Multimedia: A synthesis of digital media types, such as graphics, photographic images, audio, animation, video, or virtual reality (Hansen, 1997).

On-line Instruction: The application of a repertoire of cognitively oriented instructional strategies implemented within a constructivist and collaborative learning environment and presented through a Web-based learning portal. May be used interchangeably with Web-based instruction.

Synchronous Communications: Real time communication; occurs when two or more people are communicating with each other at the same time (Jonassen, 1996).

Threaded Discussion: Mechanism that allows learners to search and review messages; an extended bulletin board system using a hierarchical tree structure to store the messages and the message reply structure (Eisenstadt & Vincent, 1998).

Web CT™: Web-based instructional product, used in both industry and academia, that provides a format and means for communication and presentation of instructional materials.

Web-Based Instruction: The application of a repertoire of cognitively oriented instructional strategies implemented within a constructivist and collaborative learning environment, presented through a Web-based learning portal. (Allen et al., 2002). May be also refer to on-line instruction and be used interchangeably with that term.

CHAPTER TWO

REVIEW OF THE LITERATURE

INTRODUCTION

The review of the literature that is relevant for this research will focus on four areas: the explosion of on-line learning, Web-based learning solutions, communication patterns and learner interaction, and virtual communities. The purpose of this literature review is to draw on the literature to explore the growth of on-line learning in the university environment, to identify relevant considerations in the development of on-line learning environments; to build a theoretical foundation for the development of a learning community; and to identify the communication and interaction patterns of learners in on-line courses. Both theoretical and empirical studies are considered within each section of the literature review. The chapter concludes with a short summary of the literature reviewed.

THE EXPLOSION OF ON-LINE LEARNING

The annual strategic planning meeting at many universities likely includes a new question: How does on-line learning fit into our larger institutional mission? (Gallagher, 2003). For students, distance learning provides the opportunity to obtain advanced degrees, career certifications, and personal or job enrichment studies that fits with career and family responsibilities. Universities, responding to the needs of learners for more convenient and flexible study schedules, view distance learning competitively—a means

for growing their revenue stream while at the same time meeting the needs of students for increased autonomy. Higher education is now held to the same standards as any other income producing entity and, as a result, must also answer to the many stakeholders with vested interests.

Taking courses at a distance for college credit has boomed over the years. As early as 1988, before the advent of on-line learning programs, the International Council for Distance Education estimated that over ten million people studied at a distance (Kaye, 1988) through correspondence and video-based courses. With the introduction of Web-based courses, by 2003 nearly 5 percent of all university students, representing an estimated \$2.4 billion in tuition dollars, were involved in degree programs that were presented entirely on-line (Gallagher, 2003). Research by the Sloan Consortium also identifies marked increase in on-line enrollment, posting a 60% increase in learners between 2003 and 2005 (Catalano, 2007). Carnevale and Olson (2003) report that many traditional university students are also taking on-line courses in addition to their face-to-face courses. Further, in a survey of 2,200 universities conducted by the Babson Survey Research group for the 2005 academic year, 3.2 million students were reported to be enrolled in on-line classes during the fall semester (Catalano, 2007).

Preference for Distance Learning

The reasons given over one hundred years ago for preferring distance education are actually quite similar to the rationale used by students today. Limitations of geography, travel, and financial resources have prohibited students from attending a university. Add to this the increased burdens of career and family responsibilities that

often plague today's professional person and the result is an individual in urgent need of more flexibility in his or her life.

Technology now touches every aspect of one's career, bringing with it changes in process and content. To remain current in nearly any field in today's employment market requires a commitment to lifelong learning. The Internet provides a natural outgrowth for the lifelong learning trend as its technology is found in nearly every workplace from industry to education. Teachers in Pennsylvania, for example, are required to obtain a specific number of educational credits each year to maintain their state certification. Without a university nearby, individuals seeking to maintain their professional credential were, in the past, forced to travel distances or incur great expense by taking up residence at a university for a portion of the summer.

Surveys of learners in earlier distance education programs reveal that most participate because of convenience, flexibility of time, cost savings, travel requirements, and ability to combine studies with family responsibilities (Hyatt, 1992; Liveratos & Frank, 1992). Clark and Jones (2001) examined the reasoning used by learners when selecting a format for a class: either an on-line course or face-to-face course. Among the on-line learners, the overriding motivation for selecting an on-line course was flexible use of time. The face-to-face learners had many motives for selecting the traditional classroom; however, no one reason stronger than the others. With regard to communication apprehension and learning outcomes, no significant difference was noted between the two formats.

At the University of Pittsburgh, convenience is the factor cited most often by students for choosing an on-line format (Catalano, 2007). What could be more

convenient than a medium for learning that does not require one to leave home or the workplace to take classes or complete assignments?

In the 1980s, the Corporation for Public Broadcasting developed a general profile of the “typical” distance learning student identifying the individual as over 26 years of age, highly-motivated, goal oriented, and unable to participate in the traditional classroom setting (Brey & Gigsby, 1988). Today, the “typical” student in an on-line course may be an adult or a younger individual, including those who consider an on-line degree to be a third career—after their job and family responsibilities (Catalano, 2007). The availability of distance education, through the use of technology, answers the needs of individuals from all situations and circumstances that wish to obtain course credits or a degree, but are unable to physically attend classes.

The challenges posed by the methodologies of distance education for meeting the needs of learners are numerous. For instructors, the distance learning course may require a change in course planning and organization. While the content of the course will remain the same, new strategies for presenting the information will likely be required. Willis (1992) and McHenry and Bozik (1995) identify guidelines to be used in the planning process for distance learning:

1. The instructor should have a firm grasp of distance learning and its related research to begin the planning process.
2. Analyze the strengths or weaknesses of delivery approaches from the point of view of the learner; coordinate these with the available forms of instructional technology to be used.

3. Provide training prior to the beginning of the distance learning experience to acquaint learners with the delivery technology to be used. Learners must understand how to use the technology and the instructor be responsible for assuring that all learners use technology appropriately.
4. Plan for all printed course materials and supplements to arrive prior to the start of class.
5. Use strategies that personalize the classroom setting and encourage communications, such as introductions among class members, beginning each class with discussion between the groups and encouraging communication among and within the group.
6. Both students and instructors must understand the strengths and weaknesses of the instructional delivery systems that are used for the course.

The use of technology to achieve these objectives has evolved to make course planning and delivery uncomplicated for both learners and instructors. From the initial use of instructional Web pages to today's learning portals, the Internet will continue to drive the availability and format of distance learning.

The Internet and World-Wide Web

Microcomputers have been used for the dissemination of distance learning information for a number of years. Beginning with the transmission of text and basic e-mail information, computer-based distance education grew to incorporate multimedia elements as well. The introduction of the Internet and World Wide Web also influenced the amount and types of information available for learners. Through the use of hypertext

and hypermedia, individual learners could create computer-mediated groups, or communities, of learners (Jonassen, 1996).

Computer-mediated communications (CMC) refers to any form of organized interaction between individuals that utilizes computers or computer networks as the communications medium (Romiszowski, 1997). Walther (1992) and Walther and Parks (2002) point to a definition of CMC directly related to distance learning by specifying that it is communications facilitated by technology in an on-line classroom. The interactive aspect of the communications technology can include both text and multimedia elements that are easily exchanged using the Hypertext Transfer Protocol (http) on the Web. In its most basic form, computer-mediated communications supports both synchronous and asynchronous communications, allowing individual learners and instructors to engage in a chat or discussion group; to phone one another; to post a message; to exchange e-mail; or to review posted lectures and supplemental materials on bulletin boards.

As early as 1996 learners were identified as participating in interactive tutorials in the World Wide Web, utilizing intranets and informatics such as on-line databases, library catalogs, Gopher and Web sites, in addition to using information posted on the Internet or World Wide Web (Wulf, 1996). Only a few years later, Kearsley (2000) writes that “it is difficult to estimate what percentage of courses in higher education are currently in on-line form...however, there is a clear trend for more and more college courses to be offered completely in on-line form, with no on-campus component” (p. 17-18).

Features and Benefits of On-line Instruction

An early researcher in the field of on-line, or Web-based, instruction, Khan (1997) identified a number of features and benefits to the Web that promote immersion in the subject matter. Among these are interactivity, multimedia environments, open systems, collaborative learning environments, and authentic learning experiences. Individually, each of these elements has many positive implications for learners; however, it is when these elements are combined that the potential benefit for learners increases dramatically.

The interactivity afforded by on-line environments includes learners interacting with each other, their instructors, and their resources. Learners may use synchronous or asynchronous communications to effect communications between their peers and the instructor. Providing feedback to learners, whether through e-mail or on-line comments, was identified as an integral part of the distance learning experience. Following up on a distance education course in Technical Writing, Durmont (1996) identified that prompt feedback, regardless of form, contributed to a learner's overall satisfaction with the Web-based learning experience and also contributed to a sense of community among the learners.

The sense of community experienced by students can be expanded through the use of collaborative assignments. Students participating in a Web-based learning experience are able to utilize groupware to complete activities requiring small group participation. Interactive communication with peers and instructors can fill the need for discussion and sharing of ideas among individuals, much the same as a class discussion with other learners present.

The Web-based learner also has the opportunity to interact with the learning resources and technology used. Because Web-based instruction promotes an open system—providing learners the opportunity to move outside their current resources for information—the potential for increased learning is real. Further, the availability of multimedia elements on the Web creates a rich environment in which learners can experience information in a variety of forms.

Aside from addressing the differing learning styles of students, many multimedia formats encourage interactivity between the learner and the instruction (Brown, Collins & Duguid, 1989). Instruction on the Web offers several dimensions of interactivity for learners (Reeves & Reeves, 1997). Often designed following constructivist pedagogy, the Web provides a learning environment that stresses the importance of the context in which the information is learned by utilizing collaborative learning, authentic tasks, dialogue, and reflection (Mayes, 2001 & Allen, 2005). As the facilitator of information in a Web-based course, the instructor guides student learning and provides opportunities for collaboration among participants. Additionally, to assist in the transfer of knowledge, the instructor may use inductive strategies to encourage students to use available technology as a tool to guide their individual learning.

The hypertext and hypermedia links used in Web-based education also facilitate interactivity between the learner and his or her resources. Faced with a realistic problem to solve, the learner uses his or her existing knowledge, as well as the links available on the Web, to seek out information and integrate new knowledge with old, creating representations of knowledge that are meaningful to him or her. The true power of hypertext and hypermedia links used in Web-based instruction lies in their ability to

convey conceptual interrelatedness of ideas. Cognitive flexibility theory, which can be applied to the hypertexts used in Web-based instruction, emphasizes a case-based approach to learning in which multiple perspectives are used to teach. Given authentic learning situations, students must construct their own interpretation of the information by analyzing, synthesizing and evaluating the various information sources available through the Web and then constructing their own knowledge representations (Jonassen, Peters & Loughner, 1997).

Motivation and Distance Education

The role that motivation plays in the experience of the distance learner is critical to his or her success. Without the extrinsic motivation of being in a traditional classroom, physically surrounded a peer group and an instructor, the learner must rely more heavily on intrinsic sources to be motivated to course completion. Placing the role of intrinsic motivation in perspective, one must consider that up to 50% of all students enrolled in a distance education course drop out prior to completion of the course (Cornell & Martin, 1997; Moore & Kearsley, 1996).

Keller's (1983) ARCS (Attention, Relevance, Confidence, and Satisfaction) model has been used to identify those factors that can increase the motivation of the learner in Web-based education (Duchastel, 1997; Cornell & Martin, 1997). Attention in Web-based instruction is often a function of the multimedia elements incorporated into the instruction. Relevance can be attributed to the constructivist orientation of many Web-based lessons. Providing the opportunity to learn new information in a context familiar to the student will increase the relevance of the new knowledge.

The use of hypertext and hypermedia links, such as when following a threaded discussion, assists the learner in understanding and comprehending the instructional communications and thus improving his or her confidence with the new knowledge. Satisfaction may take one of several forms in the Web-based learning experience. Learners may feel satisfaction when sharing completed work or contributing to a discussion with other students in the course, when receiving feedback from the instructor, or when transfer of the new knowledge occurs.

Malone's framework for intrinsically motivating instruction utilizes challenge, fantasy, and curiosity to create intrinsically motivating lessons (1981). Instruction that is challenging incorporates personally meaningful goals into the instruction. Web-based instruction can encourage learners to become interactive with the instructional materials through on-line discussions and message posting, as well as through investigation of hypertext and hypermedia elements. This interaction between the class participants offers the opportunity for challenging interactions within the peer group and builds intrinsic motivation for learning.

Fantasy, immersing the learner in a rich environment that includes some form of interactivity, makes use of the basic environment provided by the Web. Aided by multimedia elements that create a realistic setting, the learner is able to experience the content being learned, through interaction with the learning materials and subsequent discussion or comments with the instructor and with his or her peers, to increase personal motivation. Curiosity also speaks to the Web-based learner in encouraging exploration of ideas with others in the classroom. Special discussion groups can be formed that permit learners with similar interests to explore specific topics in a small group setting.

The Design of On-line Instruction

Some researchers claim that Web-based distance education sites are distinct from other educational settings and require specific instructional strategies (Willis, 1998; McIssac & Gunawardena, 1988; Moore, 1996). Others identify that a theoretical base for instructional design in the distance setting is essential and emphasizing the need for instructional design strategies. Citing Michael Moore's description of distance teaching, Hanson et al. (1996) describe the need to develop instructional methods that support teaching behaviors that are separate from learning behaviors, thus underscoring the importance of effective communications tools between the instructor and learner. Moore and Thompson (1997) clarify this with the statement: "It must be understood that distance education is much more than simply adding a new communications technology to an existing educational organization. Major pedagogical, instructional, and philosophical implications result from the learner or learners being more or less permanently separated from the teacher" (p. 2).

As technology evolves, there have been a number of advances in information systems, communications, alternative delivery systems, and in learning theory. These changes, it should be noted, have influenced the tools used to effect learning rather than subject matter. Content and learning objectives are still designed to fill the learner's needs; they are simply structured to meet the characteristics of the delivery systems and the learners. Gustafson and Branch (1997) reinforce the importance of utilizing instructional design principles in the development of distance-based instruction by indicating that "the unifying variables contained in most of the original ID (instructional

design) models remain valid, namely, that the process involves analysis, design, development, formative and summative evaluation, and perhaps dissemination” (p 86).

Web-based course design runs the gamut of a variety of technologies and levels of sophistication. The features provided may differ depending on the skills of the software developer, the course developer, or the commercial solution selected.

Commercial Solutions. There are a number of commercial software packages available for educational template creation. Most of these are based on Flash, DreamWeaver, AuthorWare, HTML or similar open authoring languages. These solutions offer an attractive ease of use for instructional staff employed at business organizations or institutions of higher education. As a one stop shop answer to Web based learning, portals such as Blackboard™, Click2Learn™, and Web CT™ are now widely used by industry and education alike.

The most apparent advantage of portals is a consistent, system-wide, platform for Web-based learning. The majority of commercial solutions offer communications tools, including threaded discussions and chat features; the capability to post lecture notes, to test learners in an on-line format, to post announcements or reminders, and to view graphic presentations. Many of these solutions also offer registration, management, record keeping, tuition and fee payment, course development, and course hosting.

Development Guidelines. Although still an expanding field, the literature does provide guidance for effective development of instruction. Some researchers believe that teaching on-line can improve the manner in which even the traditional course is taught (Ko & Rossen, 2001). In the design of Web-based instruction, many of the basic criteria that are applied to computer-based instruction (CBI) also apply to the on-line course

(Dringus, 1995). Falk (1997) stresses the importance of following an established instructional design model when developing an on-line course. The developer of an on-line course needs to pay particular attention to the forms of information presentation provided to learners, as well as to methods of assessing performance and providing feedback.

The importance of chunking text, breaking material down to the smallest, most meaningful pieces, is a basic principle in the design of Web-based instruction (Porter, 1997). The information must be attractive to the learner, meaning that it is easy to read as well as easy to use. Ritchie and Hoffman (1997) propose a design model for Web-based instruction, based on an instructional design model, which encompasses seven basic elements:

1. Motivating the learner,
2. Specifying what is to be learned,
3. Prompting the learner to recall and apply previous knowledge,
4. Providing new information,
5. Offering guidance and feedback,
6. Testing comprehension, and
7. Supplying enrichment or remediation.

Ritchie and Hoffman (1997) further caution that, while the Web offers nearly unlimited potential for teaching and learning, the mere publication of a Web page with multimedia elements does not constitute instruction. Instead, thoughtful application of instructional design principles, combined with the power and potential of the Web, will be most effective at developing the learning medium.

In a survey of over one hundred Web sites offering graduate or undergraduate instruction, Bell and Meyer (1998) identified that the best courses were those “courses which best took advantage of the medium...those associated with the most interactivity, meaning they provided the greatest opportunity for communication among class participants and between student and instructor” (p. 3). The interactive, learner-centered format of Web-based instruction is a benefit to participants because the Web supports different types of media, providing an effective platform for thinking and learning activities, both for individuals and for groups of learners (Bonk & Reynolds, 1997).

COMMUNICATION PATTERNS AND INTERACTION

Interaction is a basic component of instruction and is an essential element to student learning and the overall success of distance learning (Yildiz & Chang, 2003; Hammer, 2001; Kearsley, 2000; Moore, 1993; Moore, 1989; Gilbert & Moore, 1998). For Moore (1989), interaction is “a defining characteristic of education” (p. 2). Shale and Garrison (1990) consider interaction to be integral to the educational process, an essential link between learner, instructor, and subject matter. Hillman, Willis, and Gunawardena (1994) describe interaction among and within students, and between instructor and students, as an “educational transaction” (p. 1). Finally, Berge (1999) describes interaction from the context of Web-based interaction as two-way communication among two or more individuals who are oriented to either task/instructional completion or social relationship that includes a means for the teacher and the learner to receive feedback thereby creating or adjusting knowledge representations based on the information and activities of the class.

Research has indicated that patterns of communication in distance education differ from those of face-to-face instruction because of the separation of learners, the mediation of communication through technology, and the lack of nonverbal cues (Zvacek, 1991). Yet the most basic differences between the two modes of communication is that the on-line classroom utilizes electronic technology to send and receive messages, whereas the face-to-face classroom uses light and air to achieve the same end (Lievrouw & Finn, 1990).

To date, much of the research has used face-to-face communication as the optimal benchmark for assessing CMC (Burgoon et al., 2002). Saba (1999) cautions researchers in simply comparing face-to-face interaction with distance interaction, indicating the real question is not one versus the other, but if there is enough interaction for the learner to develop new knowledge in either form.

In an article on practical pedagogy in the communications classroom, Lane and Shelton (2001) state “communication is obviously an inherent part of computer-mediated communication. In fact, there is a centrality to the role of communication in CMC” (p. 242). CMC may provide the means for communication, but the technology is equally as important as it provides the tool for the learner’s responses and actions.

Burgoon et al. (2002) and Walther (1996) identify that CMC can be better suited for some interactions than face-to-face communication opening up many research possibilities for instructional designers. Kennedy and Duffy (2004) postulate that for on-line learning to be successful, three criteria should be met: (1) students must be prepared for it by the providers of the course; (2) instructors must be proficient in managing

collaborative learning in an on-line format, and; (3) the university must support the use of on-line learning, including provisions for technical support.

Within the communications literature, it has been reported that social communications do occur in on-line task groups (Walther, 1996). Kiesler, Siegel and McGuire (1984) sought to explore the effects of computer-mediated communications on group interaction. Comparing computer-mediated and face-to-face groups, they found that the computer-mediated groups took longer to reach a decision, but that the groups were equally as task oriented as their face-to-face counterparts.

The incorrect belief that social interaction will take place automatically often leads to failure of the group to reach its potential from a social/collaborative perspective. Kreijns, Kirschner, and Jochems (2003) identify pitfalls for social interaction given “the tendency to restrict social interaction to educational interventions aimed at cognitive processes while social (psychological) interventions aimed at socio-emotional processes are ignored” (p. 349). The researchers recommend that greater emphasis be placed on social and psychological aspects of collaborative learning and attention paid to developing these areas.

Swan (2001), in a study of asynchronous on-line courses, finds three factors affecting student satisfaction with and perceived learning from on-line courses: clear and consistent structure, instructors who frequently and constructively interact with students and valuable discussion with others. These factors, each of which influences the amount and complexity of communications, also contribute to the development of on-line communities of inquiry.

Interaction

Interaction can be defined as a mutual or reciprocal action or influence. Within any classroom, interaction serves to stimulate and motivate students; it provides the feedback that is crucial to the development of community and critical thinking. Learning is believed by some to be an inherently a social process (Duffey & Cunningham, 1995). Through interaction, a body of knowledge is defined and reconstructed. Interaction is the process that develops the body of knowledge within the learner.

The National Institute of Education (NIE) Report *Involvement in Learning* highlighted the importance of interactive teaching and noted interaction with faculty as the key factor responsible for student learning and satisfaction with college (NIE, 1984). Participation in classroom activities is viewed as inherent to achieving the outcomes of the learning experience. Knowles (1980) is very specific about classroom participation and in the guidelines he provides for managing learning experiences, he advises, “Given a choice between two techniques, choose the one involving the students in the most active participation” (p. 240).

Hammond and Collins (1991) adapted the self-directed learning theory of Knowles and suggest development of learner-centered instruction by building a cooperative learning climate; analyzing the situation, identifying learner needs, and evaluating and validating learning throughout the process. Each of these steps requires interaction between the learner and the instructor.

Cranton (1989) further elaborates on the importance of interactive methods of instruction citing “In general, learning is usually facilitated by active participation, and interaction or discussion can be an effective means of ensuring involvement in the

learning process” (p. 83). To further emphasize this point, Cranton states “Regardless of the instructional methods and materials selected, it is important to incorporate active learner involvement into the teaching and learning process. Individuals who listen passively to a lecture without answering or asking questions, discussing issues, or applying skills after the session are less likely to retain the information” (p. 133). Bogda (2005) concurs citing a study of on-line students who agreed in a self-report that interaction was a crucial part of their learning.

Characteristics of the Learning Environment.

In all learning environments, interaction is tantamount to achieving effective learning. The distance learning environment; however, can pose special challenges. In a classroom environment learners are able to listen to classroom interaction even if they are not currently participating in a discussion. The ability to gain knowledge based on the discussion of others, and then to participate at another point in the interaction, allows for a richer learning experience.

Kolb, Rubin and Osland (1995) identify characteristics of the learning environment that are best suited for adult learners. These characteristics can also be applied to distance learning in that they shift the spotlight away from the instructor and instead focus on the student as the creator and developer of learning. Reciprocity, the concept that learning involves giving as well as receiving, is the most salient characteristic of effective Web-based learning. Kolb, Rubin and Osland further state “in adult learning both giving and learning are critical” (p. 48). Rather than relying only on the instructor, students contact each other and take the initiative to find information for themselves by asking questions, engaging in discussion, or searching for information on-

line. Research confirms that students understand their role in an on-line classroom is changing and that they must take a lead in classroom interaction (Bogda, 2005).

Another characteristic of an effective learning environment is experience-based learning, of which Kolb, Rubin and Osland (1995) write “Experience shows adults what they need to learn, but their experience also allows them to contribute to the learning of others” (p. 48). In a Web-based course, particularly one that encourages communications between learners, discussions can occur which facilitate problem solving and personal application of knowledge.

Lave and Wenger (1991), in studies of involving practice communities, state that all learning is situated, meaning that it is positioned in a social system, in a specific context of practice. Rather than viewing learning as gaining a discrete body of knowledge, they contend that learning is an attribute of social practice. Learning, they assert, takes place in the process of the interactions between and among members of a community. Shin (2002) reaches beyond interaction within the group to identify “transactional presence” (p.121), the “degree to which a distance student perceives the availability of, and connectedness with, teachers, peer students, and institution while interaction is viewed as an activity which may result in and from a high perception of Transactional Presence (p. 132).

The perception of distance learning as a solitary process is a common stereotype (Eastmond, 1995). The amount and availability of interaction in distance learning is actually inherent with the design of the instructional experience. On-line courses can include team projects and class discussion, as well as many other activities that form the basis of instruction in a traditional, face-to-face classroom. The Web-based experience

simply requires that new communications protocols be established for the virtual classroom (Kerka, 1996). Kelly (2004) in a review of research on on-line learning concedes that high levels of interpersonal interaction lead to increased motivation, higher achievement, more positive attitudes toward learning, higher satisfaction with instruction, enhanced critical thinking and problem solving, higher cognitive processing, and the development of personal confidence.

Roblyer and Wiencke (2004) have also identified five elements they deem essential for interaction in on-line courses:

1. Social and rapport-building designs;
2. Instructional design for interaction;
3. Interactive capabilities of course technology;
4. Evidence of learner engagement; and
5. Evidence of instructor engagement. (p.2).

Moore (1989; 1993) contributed to the theoretical framework of interaction by proposing that there is a transactional distance in the distance learning environment as instructors do not interact in the same physical and temporal space. Moore and Kearsley (2005) specifically define the concept of transactional distance as “the gap of understanding and communication between the teachers and learners caused by geographic distance that must be bridged through distinctive procedures in instructional design and the facilitation of interaction” (p. 223). The “transaction” that Moore and Kearsley speak of is “the interplay between people who are teachers and learners, in environments that have the special characteristic of being separate from one another” (p. 224).

Because of transactional distance, learners and instructors may misinterpret one another's behaviors, thus negatively affecting the quality of the learning. Moore classified three the types of interaction essential for learning in distance education as:

1. Learner-content interaction: The process of interacting intellectually with content that results in changes in the cognitive structures of the learner's mind.
2. Learner-instructor interaction: The communication between the instructor and student, through a program of curriculum, instructional presentations, and evaluations of learning, with the student providing feedback on the teaching procedures.
3. Learner-learner interaction: The communication that occurs among and within individual learners, within groups of learners, and with or without the real-time presence of an instructor.

Kelsey (2000) utilized Moore's interaction framework in a study of a distance learning classroom to determine the extent to which learners actually used opportunities for interaction and then queried learners about their perceptions regarding barriers to interaction. Among his findings, Kelsey reported that social concerns, technology failures, time limitations, content understanding, the role of the facilitator, and limited time for cognitive processing were identified as barriers to interaction.

Tracking the effectiveness of a Web-based course over four semesters, Cooper (2000) also identifies three learner-centric types of communication as necessary for the development of community in on-line instruction:

1. Instructor/Student Communication: The instructor maintains regular communication to keep the learners informed about class activities and to provide supplemental information or resources.
2. Student/Instructor Communication: The learner communicates with the instructor on specific questions to assure comprehension. This communication also encourages relationship development between the instructor and student.
3. Student/Student Communication: The learners communicate with their peers in the group. This communication serves to eliminate isolation among class participants and also provides a forum for learners to share information and resources, to provide critical analysis for other participants, and to respond to questions or comments from other class participants.

Social Presence.

Much of the research in on-line learning over the past two decades has minimized the importance of the physical setting of learning and, instead, emphasized the social significance of “remote presence” (Goodfellow, 2005, p. 114). Communications taking place in an on-line format are at times perceived to be impersonal or task oriented given the lack of non-verbal communications. Despite the lack of non-verbals, research has shown that relational communications occurs nonetheless (Parks & Floyd, 1996; Walther, 1995). Among the theories best known for evaluating communication interactions is Social Presence (Short, Williams & Christie, 1976), which focuses on an individual’s perceptions related to the communications medium.

Social presence is the degree to which a medium is perceived as conveying the presence of the communicating participants and is inclusive of the words conveyed during the communication, as well as the verbal and non-verbal cues and the communication context (Short, et al., 1976). The researchers assert that social presence is an attribute of a particular communications medium and hypothesize that the delivery systems used to disseminate the communications vary in the degree of social presence afforded to learners. The focus of social presence has remained the medium in over thirty years of research and evaluation. Using face-to-face communications as the ideal, each medium is ranked on the degree of social presence it affords.

Gunawardena (1995) relates social presence in distance education to the psychological concepts of intimacy and immediacy, indicating that it influences the degree to which an individual is perceived as a real person in mediated communications. Noting that social presence is a critical factor for effective communications, the need to support community members in developing a sense of social presence within their text-based exchanges is imperative (Koh, Kim, Butler & Bock, 2007).

In a traditional classroom situation, social presence impacts the level of intimacy within the classroom through factors such as physical distance, eye contact, voice quality, facial expressions, body language, or conversation. In a Web-based learning environment, learners interaction may lack certain immediacy behaviors that close the perceived proximity between their peers and that encourage genuine communications among the group.

In a study involving graduate students, McLellan (1997) found that a lack of physical presence did not create a barrier for class interaction, and in some cases, proved

more effective for communications among some learners. Using Web-based tools that included class biography pages, e-mail, and listservs, learners were able to communicate effectively with one another and the instructor. Students who were admittedly hesitant to comment in a regular classroom situation found communicating with others an easier task when the interaction was computer-mediated.

Factors related to social presence have been studied in relation to their influence on student learning. In a traditional classroom situation, social presence contributes to the level of intimacy within the classroom. Kearney & Plax (1985) examined immediacy behaviors in the traditional classroom as a potential indicator of student learning. The results of their research indicated that immediacy was a good predictor of student learning and identified that immediacy behaviors, such as eye contact, voice quality, or facial expression, by the instructor were effective for diverse student populations.

Social presence is extended to virtual interactions through the context of the communications (Biocca, 1995). Building on social presence theory, Gunawardena (1995) examined the social factors that impact communications and learning in a distance education program. Noting that the research indicates that participants in computer-mediated communications exercises, lacking any other source of information about the participants in their learning group, develop impressions of others based upon accumulated messages and other text-based interactions, Gunawardena notes that social presence can be cultivated in either a traditional or distance education classroom.

One of the most basic tools used by learners as a substitute for immediacy behaviors includes the use of emotional icons or “emoticons” as part of the textual remarks made in computer-mediated communications (Gunawardena, 1995). Additional

tools available today for conveying immediacy include photo posting and avatars to provide visual cues to the other learners. Wenger (1998) concurs with the need to cultivate social presence and identified empathy as a key design issue in his research on learning communities. Members of on-line classrooms have a unique challenge in that they must be able to express and receive empathy from other community members through their interactions. Because they are not able to physically reach out to one another, they must communicate and receive empathy through the medium of their interaction.

Measuring Classroom Interaction

Quality instructional conversation is interesting and engaging. It retains its focus throughout the conversation. There is a high level of participation among and within the group and learning is cultivated through discussion. Classrooms are transformed into a community of learners when the distance is reduced between learners and their peers by constructing lessons from common understanding of each other's experiences and ideas, making teaching and learning a collaborative activity (Dalton, 1989).

Interaction in the classroom through the use of instructional conversations is supported by social learning theory. Social relationships build a foundation for a community of learners. Whether part of a classroom that is face-to-face or on-line, learning is enhanced by informal conversation, humor, the opportunity to share goals, and interaction among the participants. Learners construct their new knowledge and understanding in context by making meaningful connections between previous knowledge and experience and the new concepts presented. If learners feel connected

and part of a group, they are more likely to feel motivated to participate and to be successful in their learning.

Instructional conversation should be interesting and engaging; it should have meaning and relevance for the learner. There should be a high level of participation without one individual, instructor or student, dominating the discussions. Ideally, students will engage in extended discussions among themselves, as well as with their instructor (Goldenberg & Pathey-Chavez, 1991). In a study comparing face-to-face instruction alone with face-to-face instruction complemented with on-line discussion groups, Althaus (1997) found that supplementing face-to-face instruction provided a learning environment that was superior to the traditional classroom. In a study of interaction patterns in face-to-face and on-line classes Hillman (1999) further identified that the interaction patterns in on-line courses resembled discussion. In his analysis, the interaction patterns in face-to-face courses looked more like classroom recitation. Hillman based his research on courses that provided the same information in both face-to-face and on-line formats, but with different instructors.

Flanders Interaction Analysis Protocol. Changes in thinking about the role of the teacher were raised during the 1960s that addressed the interactions that occurred in the classroom. It was thought that if instructors could learn to control and enhance specific types of interactions that occurred, more effective and efficient learning could take place (Armstrong, 1979; Pagliaro, 1979). The Flanders Interaction Analysis Protocol (FIAP) was developed during this period to measure initiation and reaction

patterns among students and instructors, along with specific information regarding their interactions. Identified as one of the best known and most validated observation instruments (Acheson, 1987), the Flanders system consists of ten mutually exclusive categories for the classification of verbal events.

As background for the development of the interaction analysis protocol, Flanders (1967) reviewed observational techniques to categorize the behavior of classroom instructors. Developing a standardized system of categories allowed for the systematic observation of specific interactions in the classroom. Flanders goal was to understand the nature of classroom interaction and to identify the conditions that would produce maximum learning – helping instructors to learn to develop and control their teaching behavior. The verbal interactions of the classroom teacher were analyzed as to the type of influence they exerted on learners – direct or indirect.

Direct influence is exerted when the instructor states his or her own opinions, gives directions intended to influence learner behavior, criticizes, or makes statements that demonstrate his or her authority. Indirect influence occurs when the instructor clarifies or accepts the feelings of learners, solicits and uses the ideas and opinions of learners, and praises or encourages students. The Flanders Interaction Analysis Protocol (1970), identifying the direct and indirect categories, is identified in Table 1. Flanders maintained that from the ten categories identified in his instrument, an observer could obtain 111 bits of information. In order to explain how a particular interaction was precipitated, one need only look at its precursor—the preceding verbal event.

Flanders (1967) recognized that verbal interaction was essential in the acquisition

of knowledge, citing evidence that the majority of teaching functions are implemented through verbal communications. As part of his process, a trained coder would observe, or listen, to the dialogue exchanges in a classroom for a specified amount of time. The result was a list of codes that could reveal patterns representing a series of events or reactions during verbal exchanges between teachers and students. Analysis of the interactions allowed conclusions to be drawn about classroom behaviors such as the amount of reinforcement and support that were provided during classroom interaction, whether the teacher or students suggested the ideas that are discussed, and the balance of initiation of initiation and response on the part of both the teacher and the learner.

Through the analysis of classroom interaction Flanders (1970) hoped to initiate a change in the role of the teacher so that instruction and interaction would include “less emphasis on teacher initiation combined with pupil responses and more emphasis on interaction patterns in which the teacher responds to pupil initiations” (p. vii). While the system was developed primarily for analyzing teaching behaviors, Flanders believed that the system of verbal analysis could be adapted to other verbal nuances when one individual is assumed to have a dominant role in a conversation.

Interaction analysis did serve as a useful tool for providing instructors with feedback about their observed classroom behaviors (Sugai & Lewis, 1989; Schwanke, 1981). It was determined that superior achievement could be found among classrooms in which the instructor attained complete compliance from his or her learners. Further, these high achieving classrooms could be identified by their environment—one in which the instructor supported and encouraged learner initiatives (Flanders, 1967).

Using an interaction analysis approach to evaluate classroom communication offers a measurement of the significance the process might have for the educational system (Jones & Sherman, 1980). It has been demonstrated that the patterns of interaction among and within groups is often determined by the level of consensus observed with those groups (DeStephen, 1983). Flanders (1976) identified that the behavior of one individual influences the behavior of others in either a positive or negative manner.

The Flanders system supplies researchers with an abundance of data through various combinations of analyses. For example, in an early study, Amidon and Flanders (1963) divided an interaction matrix into several general areas to help demonstrate visually what types of verbal interactions predominated during the observation. Combination and re-purposing of analyses are possible and offer a rich variety of feedback to instructors and researchers; the convenience of a computer-based data collection and analysis tool is an added benefit.

A variety of categorical systems designed to analyze student-teacher interaction, and based on Flanders's initial research, have been developed by Amidon and Hunter (1967), Anderson (1967), Flanders (1970), Hough (1967), and Withall (1967). The FIAC with its primary interest on the verbal influence of teachers on students has prevailed as one of the most widely used and valid instruments to provide descriptive data of classroom verbal events. Blumberg (1974) adapted the FIAC for use with teachers and supervisors, developing more categories for the supervisor, given the amount of influence and control that a supervisory role conveys. Blank (1996) further adapted the FIAC for

use with a software program, ADCAS, to evaluate the percentage of teacher initiated, versus student initiated, talk. The FIAC has also seen adaptations used in evaluating newer media, such as videoconferencing, when used to deliver instruction (Peacock, 2005), with music teacher interaction (Kassner, 1998), and in sports training (Schempp, McCullick, St. Pierre, Woorons, You & Clark, 2004).

In the literature, there is a strong critique about interaction in distance learning. Cyr (1997) states “interactivity is frequently noted as the missing ingredient when comparing distance learning experiences with traditional face to face learning experiences” (p. 19). He goes on to argue “For proponents of distance learning, interactivity offers the evidence on which to build a case that a distance learning experience is just as good, if not better than, traditional face-to-face learning experiences” (p. 19). Whether perceived by participants as a positive or negative condition of instruction, interaction and interactivity are the keystones of effective distance delivery.

THE LEARNING COMMUNITY

The World Wide Web provides the ability to network students to the vast resources found on the Internet and provides a more flexible and sophisticated environment, thus extending the educational potential of the medium beyond text dependent capabilities. The Web allows for hypertext and hypermedia environments that connect learners quickly and easily to a large network of resources. The amount and variety of resources available to learners via the Internet is phenomenal; learners can

identify research sites, read documents on-line, or consult directly with individual experts. This linkage between learners and the resources available on the Internet has been termed “knowledge networking,” the purpose being to facilitate information acquisition and knowledge building (Harasim, Hiltz, Teles, & Turoff, 1995).

The Web also provides flexibility for navigation within the instruction itself. The ability to navigate freely among sites and information affords learners a sense of control and self-directed learning (Lowyck, 1995). Learners are free to investigate authentic materials related to a topic, such as reviewing government documents related to a student’s interest or communicating with experts in a subject matter. The Web makes locating materials and people easy, thus expanding the virtual classroom for learners.

Building a Community of Learners

An on-line community could be described as a network of interactions (Haythornthwaite, 2002) that focuses on sharing of information. However, community goes much deeper than that, including shared stories, jargon and shortcuts to communication that are used by members to negotiate meaning, to exercise social control, and also to signify group membership (Goodfellow, 2005).

In a discussion of on-line learning in the United Kingdom, Allen (2005) postulates a different approach to learning. Talk 2 Learn uses a community-based system to group learners around a common purpose; members share perspectives through discussion and debate, rather than follow a set program of learning outcomes. Allen credits the Vygotskian (1981) arguments on social interaction in human behavior for his approach. Additionally influencing the Talk 2 Learn methodology is a focus on learning

that takes place outside of the traditional school setting, rather than in it (Wenger, 1998).

The community of Talk 2 Learn learns collectively, rather than individually, providing ideas, support and discussion along the way.

Kaye (1992) points out that an on-line network can provide raw materials – the necessary communications partners, or a group of partners, for argument, debate, brainstorming, or discussion—each of these being critical to the personal, meaningful construction of knowledge. As technology continues to improve and enhance communication possibilities, this network will continue to change the face of the classroom and the construction of knowledge.

Technology and the Learning Community.

In using technology as a resource and as the platform for building a community of learners, students are encouraged to explore their own interests and to solve authentic problems within their community of learners (Lave & Wenger, 1991), which is a basic construct of situated learning. Chiou (1992) indicates that hypermedia-based platforms, such as the Web, are an effective means for building learning environments that support situated learning. He indicates that learning is left to the learner, as it occurs during interaction among students, mostly in socially-based activity such as learner communications.

A virtual classroom supports two types of interaction: asynchronous and synchronous. Asynchronous tools include List Servs, e-mail, Web boards, threaded discussions, chat rooms, and conferencing systems. In an asynchronous learning

environment, learners do not have time restrictions for participation, so they may participate when they choose. There is time for reflection and review and also for opportunities to research problems. Synchronous interaction occurs in real time. It requires faster problem solving and decision-making, but also provides the opportunity for immediate feedback. Learners can submit their thoughts or other work to their peers and receive an immediate critique.

In the creation of on-line learning communities, the communications technology provided by the Web can serve as an agent for:

1. Socialization (Allen, 2005),
2. Collaboration (Allen, 2005);
3. Increased interaction among learners and the instructor (Mayes 2001; Allen 2005);
4. Community (Goodfellow, 2005).

The on-line network serves as the tool with which to create an active community of dialogue-based learning: Ideas are exchanged, multiple perspectives are presented, and interaction occurs among the participants who share common experiences and goals (Goodfellow, 2005). Brown, et al. (1993) noted early in the research on Web-based instruction that on-line networks could create an effective learning environment through participation in communities of practice. Through the possibility of mere access to other learners, increased interaction and communication could occur. Ruopp, Gal, Drayton and Pfister (1993) first indicated that building a sense of community in on-line learning situations is critical to the success of the community. This social aspect of learning is

important as learners at a distance could develop feelings of isolation. Indeed, Allen (2005) confirms this with the Talk 2 Learn program's findings that not only did community exist, but that sub-communities also began to develop outside of the learning-based groups.

The literature supports the concept of the on-line learning community and emphasizes its potential for creating an interactive learning environment, but direction on how to form a successful, productive on-line learning community is only beginning to emerge. Much of the research to date offers a great deal of theory and focuses on computer-mediated communications, the precursor to the hypermedia platforms available today.

Web as a Tool for Community. Maslow (1971) was the first to identify the need for social belonging—or community—when he developed his hierarchy of needs. The paradigm of a community as a place where individuals can support others, and have their needs supported, to reach self-actualization and to form an identity can be supported by the on-line classroom (Allen, 2005). The merging of computer conferencing and the Web initially contributed to the development of virtual classrooms (Hiltz, 1994). The capacity of technology to serve as an educational tool is in its ability to support human communications and interaction, as well as group-based interactivity (Collis, Andernach & Van Diepen, 1997).

Connectivity provided through computer networks, connecting learners with their peers through a communications dialogue, can provide a viable and productive atmosphere for educational purposes (Mayes, 2001; Allen, 2002; Allen, 2005). On-line

participants use dialogue with their peers to collaborate, reflect, debate, critique, share, provide feedback, and engage in other social communications behavior. The feeling of connectedness that encourages the sense of community among learners is vital. By responding to comments, participating in a debate, or otherwise engaging in dialogue with their peers, learners feel that their remarks are being listened to; that they are being heard. The feeling that one has been heard is an important factor in any form of communications, indicating that interactivity among peers in a Web-based course is imperative (Eisenstadt & Vincent, 1998).

Feeling of Community Among Learners. Wiesenberg and Hutton (1995) identified the critical nature of the feeling of community to the success of the virtual classroom. Dede (1996, p. 199) concurred indicating that “to succeed, distributed learning must balance virtual and direct interaction in sustaining communion among people.” Indeed, a common stereotype of the distance learner, regardless of the form, is that of an isolated individual. Learning at a distance, particularly with the technology afforded in a Web-based environment, offers a different type of connectedness than that of the traditional classroom, but does provide the opportunity for interaction on an individual or group basis.

In a study involving 200 students at a state university in Georgia, Cooper (2000) underscores the need for learner interaction among their peer group, citing that the discussion is helpful in enabling learners to assist one another with assignments and to improve their understanding of the course materials. As the methods and technology

used to facilitate distance learning continuing to evolve, the expectations for learning and developing a well-rounded knowledge base will become more global (Porter, 1997).

Sharing of Knowledge and Experiences. At the graduate level in particular, the community developed through the sharing of knowledge among virtual classmates has particular relevance. As more universities offer MBA programs via the Web to meet the needs of the distance learning participant, they also have begun to attract learners from around the world who bring unique work experiences and industry-specific knowledge to the class discussions. Through the use of on-line class discussions and study groups, information is shared in terms of “how real-world business is affected by various news events and economic realities.” (Berger, 1999, p. 686).

The collaborative learning experiences that result for these individuals, linked virtually through a Web-based course, makes for a powerful learning opportunity that incorporates the professional expertise and experiences of a national or world-wide audience. Berger also notes that in addition to sharing professional knowledge to enhance class discussion, the communications used as part of the Web-based course also presents an opportunity to provide feedback on business writing proficiency, to discuss ethical issues regarding written communications placed in view of others, and to explain proper protocols for communications tools.

Porter (1997), in a discussion of community in the Web-based learning environment, notes that to develop an effective classroom—whether traditional or Web-based—learners and educators must come together to create a community of sharing. Further, she notes that the sense of community is enhanced as communications tools for

participants are increased. Communication tools augment the ability of the learner to communicate readily, as part of a current discussion of a particular topic; they also provide for reflection and perhaps more meaningful discussion at a later time. The ability to re-visit prior discussion topics, or to continue with more in-depth analysis over a period of time, builds the feeling of community among the learners.

Criteria for a Learning Community

In discussing the interaction between learners in a Web-based course, the term “virtual learning community” is often used to describe the context in which communication occurs within a particular course. A learning community in a virtual sense is postulated as a shared environment, with emphasis on the back and forth nature of interaction within it.

Shared Experience. Shrage (1991) developed a model for a learning community that focuses on the “shared experience” of the learning task. The shared experience that is central to this model is one of participation; the learner collaborates with others to create shared meaning about a concept or topic. Collaboration need not take place in face-to-face discussions, but could occur electronically such as through telephone lines, e-mail, chat rooms, or threaded discussions. The medium for communication under Shrage’s model does not define the quality of the experience, the collaboration with others does.

Thirteen considerations for instructional designers are identified in Shrage’s model of collaboration within a learning community. These elements could be used in

many different distance learning formats, but have particular relevance to the Web-based course:

1. Competence, which refers to a very basic level of knowledge, a basic goal, or a basic skill, that is shared among all in the course and serves as the foundation for a “communal brain.” (Shrage, 1991, p. 37). From this basic competence, integration of ideas will occur.
2. A shared and understood goal that is common among all of the participants in the course. The goal is typically the terminal learning objective for the course and encompasses a shared approach to problem solving, discovery, and creating value.
3. Mutual respect and tolerance for other learners. The collaborative premise of the virtual learning community requires that participants show respect for others in their group.
4. The ability to create and manipulate shared spaces. Specifically, the creation and the manipulation of shared spaces that learners can use collaboratively when interacting on-line. These shared spaces may be for synchronous or asynchronous communications or for identifying other relevant sites.
5. Multiple formats for information representation, expressing the instructional message through different communication channels to provide the learner with multiple sources of information on which to base collaborative discussion and other interaction.
6. The ability to test and manipulate representations. By manipulating the

representations, learners are able to find the most meaningful activities for creating their own knowledge. The multiple forms of the representations, coupled with ensuing collaborative discussion, provides learners with the experience of shifting between differing points of view

7. Continuous, rather than continual, communication. Learners need the ability to communicate among with within their group, both asynchronously and synchronously, to maintain verbal interaction throughout the course. Although learners could participate only through asynchronous discussion, Shrage's model emphasizes that the synchronous channel is important to keep all participants on task with instructional activities, and thus keep discussion in the collaborative environment current.
8. Both formal and informal environments that provide the structure to keep the class on task and the space to maintain discussions. For most Web-based courses, the course pages implemented by the instructor provide the formal environment that guides the course activities. The discussion and message areas provide the informal environment, or community, where greater interaction among learners can occur.
9. Defined lines of responsibility without restrictive boundaries. Clear lines of responsibility, without restrictive boundaries, signify the framework of the course syllabus and the implementation of activities for the course. The syllabus identifies the requirements, learners then use the resources made available by the instructor and other learners for exploring and creating

knowledge.

10. Individual, rather than consensus, decisions. Decisions do not have to be made by consensus – in a traditional classroom the instructor generally makes the decisions for the course. In a virtual community, learners take more of a role in class leadership, offering encouragement and support, suggesting resources, or providing feedback to their peers.
11. No requirement for physical presence. For learners, the lack of a brick and mortar classroom does not impede the ability to communicate and to learn from one another. Social presence, the sense of being engaged in a social encounter with another who is at a distance, can be achieved so that it is possible for learners to feel present with one another, despite being at different physical locations. Regular communications allow learners to develop social relationships with their peers. Additionally, the on-line format of the communications encourages learners, who might be rather timid in a traditional classroom, to speak more comfortably and contribute more to discussions.
12. Inclusion of selected outsiders to enrich the learning experience through insights and information. Information from outsiders can come from many sources: textbooks, journal readings, the Internet, “guest” participants, discussion groups outside of the course chat, or Listservs. The outsiders provide information as a supplement to the course materials, encouraging increased discussion and broadening the views of the class participants.

13. The end of collaboration. Although the scheduled collaboration will cease at the end of the course, many participants may continue to communicate with one another outside of the virtual community. Students may elect to participate in Listservs, other discussion groups, or simply to maintain casual contact from time-to-time.

Sharing and Support. The availability of electronic communications tools, in particular, to support collaboration among learners in Web-based education is critical. Because Web offers an instructional environment based on continuous, but not continual, communication, tools must be available that allow the learner to be heard within the group at the time that he or she chooses to log on. Additionally, while communication tools are critical to promoting collaboration and a shared environment, the mere act of communicating collaboratively does not indicate that community has formed.

Palloff and Pratt (1999) expand on Shrage's model of collaboration to identify five criteria that indicate an on-line community is forming. These criteria move beyond indicators of basic collaboration and focus on those behaviors that indicate sharing and support of the instructional task between learners.

The criteria identified include:

1. Active interaction with course content and personal communication.
Learners actively use the course content and communications tools available to aid in their learning. This indicates that students are actively involved in their own learning.

2. Collaborative learning as evidenced by comments directed primarily student-to-student. In addition to using the course content and communications tools, learners actively collaborate within their peer group, directing comments and discussion to other learners.
3. Socially constructed meaning evidenced by agreement or questioning in open discussion areas. As collaborative learning increases, the learners begin questioning their peers or indicating agreement to topics in open discussion areas.
4. Sharing of resources among students. To aid in their own learning, and to assist in the learning of their peers, students begin suggesting research sources or sharing other resources within their peer group.
5. Expressions of support and encouragement exchanged between students, as well as the willingness to evaluate the work of others. Learners begin showing support for others by including expressions of support and encouragement. Learners may also offer to evaluate the work of their peers and to provide suggestions based on those evaluations.

Paloff and Pratt (1999) propose that, in Web-based learning, the interaction among the learners and their peers, between the learners and the instructor, and the collaboration that ensues among both groups serves as the impetus for the formation of a learning community – a virtual space through which knowledge is imparted and meaning is co-created, thus achieving learning outcomes. In the context of the traditional classroom, instructors have often used community to motivate individual learning; the

on-line classroom seeks to do the same through sociability and group cohesion (Garrison & Anderson, 2003).

The learner-learner and learner-student interactions are also supported by Moore's (1989, 1993) research on transactional distance and identify the importance of measuring what happens in the on-line discussions. Reviewing the contents of the communication in an on-line class, comments can be grouped and analyzed for adherence to the criteria for the formation of a learning community. Goodfellow (2005) further notes the importance of the subjective experience of on-line learning in the formation of community as identified by "patterns of practice of participants in on-line interaction"(p.117).

ORIENTATION TO THE PRESENT STUDY

There is a multitude of research on distance learning, examining the different delivery systems and gauging their effectiveness, but the majority of this research is specific to the print and video media. Within the literature, studies of communications involved tend to focus on the affective domain and learning expectations—like versus dislike—rather than the context of the communications (Goodfellow, 2005). Web-based distance learning, as a continually-emerging technology, provides a different view of both the communication and the interactions that take place during the course and the learner's role within those interactions.

Among the benefits of on-line instruction, interacting with the content and interacting with other individuals are often identified as two of the most important

elements that contribute to a successful learning environment. Technology offers the tools to create the distance learning environment; however, effective design and development of Web-based learning environments is essential to ensure that learning is successful (Khan, 2005; Ritchie & Hoffman, 1997; Falk, 1997; Gustafson & Branch, 1997; Moore & Thompson, 1997; Hanson, et al., 1996; Dringus, 1995).

In an on-line learning environment, the learner assumes greater responsibility not only for his or her own learning, but for supporting the learning of others in the group as well. The interaction in the Web-based classroom becomes more learner-centered, providing active discussion, collaboration with other learners, and support for others in the group. Through the interactions taking place, learners in a Web-based course perform many of the “instructional” tasks that are attributed to an instructor or teacher in a traditional classroom (Sherry & Wilson, 1997). It is this interaction among learners, the sense of community, through which knowledge is imparted and meaning is created (Palloff & Pratt, 1999).

Within the literature it is agreed that a sense of community enhances learning in the traditional setting and that belief is often extrapolated to the on-line classroom—in most instances without any research to identify if community, in the virtual sense, exists as we think it does (Hargis, 2005). Nonetheless, the sense of community that is possible among learners has been identified as essential in Web-based classrooms (Allen, 2005; Mayes 2001; Eisenstadt & Vincent, 1998; Dede, 1996).

Indicators of whether or not a community is forming have been proposed, based on the definition of a learning community provided by Shrage (1991) and further adapted

for use specifically in the Web-based classroom by Palloff and Pratt (1999). These criteria offer a benchmark against which on-line classroom interaction can be measured for the building blocks of community formation in a Web-based context. Initially, some eager educators hoping take advantage of the technological promise of the Web believed that simply taking hardcopy materials and transferring them to an electronic format to be available at all times would increase learning (Hargis, 2005). Stuit (2002) perhaps makes the most relevant observation with regard to on-line learning when indicating that placing information on-line is the easy part; creating the experience within on-line learning is hard.

Research is needed to examine the interactions taking place among and within learners in the Web-based classroom. Goodfellow (2005) notes the importance of examining “activities and events in both physical and virtual contexts in comparable form” (p. 125). Studies often cite the formation of a learning community, in a virtual state, as a supporting factor in the instructional effectiveness of Web-based learning, but the degree to which this community forms remains a question. This study will use the theoretical base provided by the research to explore and describe the nature of the communications that occur in a naturalistic setting among Web-based learners. The results of the research may prompt future design considerations for the development of effective Web-based instructional environments that encourage communications interactions as part of an effective learning experience.

CHAPTER THREE

RESEARCH METHODOLOGY

INTRODUCTION

This chapter defines the researcher's role, the research design, the background and setting, a sampling description, and data collection procedures. The methodology of this research is based in a qualitative, theory-driven approach. The threaded discussions of an on-line course are comprised of messages that can be quantified based on message type. Additionally, instructor and student data contained in the comments recorded as part of the threaded discussions of the course provide insight into the nature of the interactions in the course.

Researcher's Role

The primary role of the researcher in this study was that of an observer, interpreter, and evaluator. The researcher's background includes positions as an instructor in a higher-education setting in the fields of human resources and communications; a trainer and program evaluator in industry; and an executive officer of organizational learning in the financial services industry. No attempt was made by the researcher to become involved in the instructional process or classroom activities. The researcher maintained a neutral perspective toward distance learning and technology in an attempt to objectively describe the events as they occurred.

Design

Qualitative research methods are best suited for those instances in which a detailed understanding of a process or experience is desired, and when the information available is in a text or visual form (Bakeley, 2007). Within this field, case studies attempt to present a holistic understanding of the complexities and interrelationships of the factors in a system, whether the system is a course, a program, an institution, an event, or a person (Merriam, 1988; Stake, 1988). Suited more for generating hypotheses than testing them, case study methods involve a systematic, in-depth examination of an event through the processes of data collection, analysis, and reporting of results that provide a clearer understanding of what happened within the study, as well as what might be important to investigate in future research (Davey, 1991). For studies involving learning communities, Paccaganella (1997) emphasizes the importance of the use of an interpretative methodology for exploring this phenomenon.

In this research, an exploratory case study design was used to analyze the communications that take place in the formation of a learning community. The method is inductive and was open to change of direction in the analysis of the data. Additionally, in this case, a specific theory-driven approach was used in order to describe the phenomenon in terms of theoretical principles and to identify the purpose of the case (Yin, 1994). From the literature review, two models were identified to guide the research: Flanders's Interaction Analysis Protocol (1970) and Palloff & Pratt's (1999) Criteria for the Virtual Learning Community. These models provided the factors that served as the basis for categorizing and analyzing the data. Levin, Kim & Riel's (1990) technique of intermessage reference analysis was used to analyze the frequency with which messages are referenced by other messages.

This exploratory study investigated multiple cases of Web-based courses that utilize the threaded discussions for computer-mediated communications. The research was bound temporally (one semester long) and physically (only the text contained in the threaded discussions). The study included coding and categorizing, as well as developing descriptive displays to analyze and organize the data. While the main approach to the study was exploratory—to explore and describe the interactions taking place among learners in a natural setting—there also was also a confirmatory stance to this study, where evidence that validates the criteria identified for the formation of a learning community was sought.

Non-probabilistic, or purposeful, sampling was used in the study. Purposeful sampling assumes that the researcher wants to understand a particular phenomenon and selects a sample that will provide the most information from which to learn (Merriam 1998). To select a sample for study, a list of attributes needed in the case that will also fulfill the purpose of the study is developed. The researcher then locates a case that matches the attributes identified on the list (Merriam, 1998). In this study, the criteria for selection included:

- Previous experience using Web CT™ (or some other Web-based course tool)
- Use of the threaded discussion area as part of the class activities
- The instructor makes assignments that could be completed using the communications tools provided by Web CT™.

Background and Setting

The university from which the data were obtained is in Western Pennsylvania. The main campus is recognized as a doctoral granting, research university with approximately 15,000 students on campus, of which nearly 3,000 are graduate and professional students. The University offers graduate programs in five professional colleges.

Four different cases will be analyzed; the courses included in the study are: (1) an undergraduate liberal studies (general education) required course, (2) an undergraduate communications course, (3) a graduate training and development course, and (4) an undergraduate networking course. The population for the study was estimated at 80, as each course had an average enrollment of 20 students. The total number of messages analyzed among all of the cases was estimated at 200.

The university adopted Web CT™ as its platform for providing Web-based instruction to both undergraduate and graduate students. By providing a User ID and password, Web CT™ is accessible to the students from their homes, apartments, work areas, or the computer laboratory. The Web CT™ program allows for several forms of communication, including threaded discussions, chatroom, and e-mail. For the purpose of this research, the threaded discussions, the contents of which are maintained by the software, will be reviewed.

Data Collection Procedures

Because the phenomenon being studied could be altered through the act of observation, the use of naturalistic analysis procedures was used to collect the data used in the study. The data collected included the text of messages posted to discussion threads, both individually and as part of specific project-related groups, if available, and quantitative data regarding levels of participation.

As noted in the literature, field research conducted with unobtrusive techniques can give rise to some ethical problems. Although scholars in the field of electronic communications generally do not yet agree on common guidelines, all are concerned with the privacy of individual users and take precautions such as changing names, pseudonyms, or addresses from any communications logs used (Paccagnella, 1997). For the purposes of this study, all names or

references to e-mail addresses were redacted to maintain the privacy of the study participants; subjects were identified only by the word “student” followed by a number, which was randomly assigned by the instructor of the course.

The main instrument for data collection in this study was the Web CT™ program that supports Web-based instruction at the University. All data collection was performed on-line; the server to which the learners are logged on captured the written interaction. With the data archived on computer, there was no interaction between the learners and the researcher. From the data captured as part of threaded discussions, archives of the communications among and between course participants were reviewed and analyzed.

Measures of Participation

Web CT™, the platform used for the study, maintains a record of all messages posted to a thread during a course. This information provided the data necessary to analyze the following patterns in frequency and quantity of student participation:

1. The mean and median number of messages by all students during the course.
2. The total number of messages posted by each student during the course.

Level of participation. The total number of messages posted and the mean and median number of messages posted provided an indication of the level of participation of the group and of individual students and also supported the Palloff & Pratt criteria referencing active interaction with personal communications. An analysis of message flows has shown a correlation between individual totals of messages and the length of messages ($r=.94$) (Harasim, 1993); this study used the number of messages as the measure of the volume of writing.

Interactive and Independent Messages. The degree to which messages were threaded

to one another was described using Levin, Kim & Riel's (1990) technique of intermessage reference analysis. Each message posted was analyzed to determine whether it refers to any other message. Henri (1992) identified two types of participation that can be applied to electronic communications: independent and interactive. In an independent message, the author of the message makes no reference to other messages; an interactive message contains references to other's messages and builds on the contents. The degree of interactive participation is described with the following statistics:

1. The total number of independent messages posted by students;
2. The total number of interactive messages posted by students;
3. The mean and median number of independent and interactive messages posted by students;
4. The percentage of independent and interactive messages posted by all students.

Hillman, Willis & Gunawardena (1994) expanded on an interaction model first described by Moore (1989) grouping textual data in learner interaction into one of four categories: (1) Learner-content, (2) Learner-instructor, (3) Learner-learner, or (4) Learner-interface. In the first type of interaction, which Moore & Kearsley (1996) described as the "defining characteristic of education," the instructor must bring about the interaction between the learner and the subject matter. The learner-instructor interaction provides meaning to the content; the instructor provides support and encouragement for the learner as he or she interacts with the content.

Learner-learner interactions provide opportunities for individual students to encourage their peers, to test their own knowledge, to tutor other learners as part of the interaction, and to provide evaluation of the work of other learners. To be successful in this experience, the learner

must also be confident of his or her interactions with the educational interface—the software or other platform through which instructional experiences are accessed.

In this study, evaluations of learner interactions that support Palloff & Pratt's (1999) criteria were described to indicate the types of interactions taking place between learners and the quality of those interactions. In a learning community, the student peer group is theorized to perform tasks that are supportive of learning and to assist in the overall learning that occurs within the group—tasks that are generally performed by an instructor in the traditional classroom.

The quality of the interaction is key to the formation of community; without the appropriate environment, learning will be a solitary experience and could be less effective than in the traditional classroom.

Use of Flanders's Interaction Analysis Protocol. The Flanders's Interaction Analysis Protocol (Flanders, 1970) was widely used during the 1960s and 1970s for studying verbal interactions between an instructor and the learners in a classroom. With its sensitivity to pedagogical styles, rather than curricular content, the protocol can be adapted to other types of classroom interaction. Flanders's protocol relies mainly on two basic classifications, becoming more specific within these groups by describing the specific types of interaction events taking place. Figure 1 on page 65 identifies the classifications of interactions in the Flanders protocol, providing examples of interaction behaviors that can be attributed to each.

Within the instructor classifications, interactions are described that are supportive, that influence learner participation or action, or that critique and evaluate learner activities. Within the student classification, interaction is classified by who initiates the interaction and what type of conversation ensues. Finally, an "other" classification exists for silence or periods of confusion in which communication cannot be understood.

Flanders's original protocol was used to record primarily instructor and learner behavior in the classroom, situations in which the instructor had primary responsibility for the dissemination of knowledge. The classroom behavior of the instructor was categorized as indirect praise or acceptance of feelings, influence to clarify or solicit a response from the learner, or providing lecture, directions, or criticism. Students, using Flanders's protocol, initiated conversation with the instructor or responded to discussion initiated by either the instructor or their peers. The FIAP has also been widely adapted to allow for changes in instructional methods and technology since its initial development in 1967. Recent adaptations have been made for music classrooms, athletic training, computer software, and videoconferencing (Kassner, 1998; Schempp, McCullick, St. Pierre, Woorons, You, & Clark, 2004; Blanks, 1996; and Peacock, 2005). With the evolution of learning from the instructor-centered classroom to the learner-centered Web-based classroom, Flanders's protocol is still useful for observing instructional interactions; the difference being that learners are expected to provide many of the interactions previously attributed to the instructor. This study will use an adapted version of the FIAP to analyze on-line classroom interaction.

Instructor(Indirect)

- (1) Accepts Feeling: Accepts and clarifies the students feelings in a non-threatening manner. Feelings may be positive or negative. Predicting or recalling feelings are included.
- (2) Praises or Encourages: Praises or encourages student action or behavior, jokes that release tension, not at the expense of another individual, nodding head or saying “um hm” or go on are included.

(Influence)

- (3) Acceptance of Ideas of Student: Clarifying, building on or developing ideas suggested by others. Extension of ideas of others.
- (4) Asks Questions: Asking a question about content or procedure with the intent that a student answers.

(Direct)

- (5) Lecturing: Giving facts or opinions about content or procedure; expressing own opinions or ideas, giving explanations, citing other authorities.
- (6) Giving Directions: Directions, commands, or orders to which a student is expected to comply. May include statements intended to guide a student’s thought or research.
- (7) Criticizing or Justifying Authority: Statements intended to change student behavior from non-acceptance to acceptance pattern, bawling someone out, stating why the instructor is doing what he is doing; extreme self-reference.

Student

- (1) Responsive Student Talk: Student response to instructor. Instructor initiates the contact or solicits student response. Freedom to express own ideas is limited.
- (2) Initiative Talk of Student: Talk by students that they initiate—initiating own topic; freedom to develop opinions and line of thought, asking thoughtful questions, going beyond existing structure.
- (3) Responsive Student Talk: Student response to another student.
- (4) Initiative Talk of Student: Talk by students which they initiate to another student.

Other

Silence or Confusion: Pauses, short periods of silence, and periods of confusion in which communication cannot be understood by the observer.

Figure 1. Flanders’s Interaction Analysis Protocol (1970)

Criteria for the Creation of a Learning Community. Palloff & Pratt's (1999) model for the development of a learning community uses many of the same criteria as Flanders's protocol for analyzing interactions. In the Palloff & Pratt model; however, the interactions taking place are not classified as learner-instructor or learner-learner; rather the interactions are described by the nature of the interaction and the types of comments made. The interactions described in Palloff & Pratt's criteria are outlined in Figure 2.

Criteria	Evidenced By
Active interaction with course content and personal communication	Learners actively use the course content and communications tools available.
Collaborative learning	Comments directed primarily learner-to – learner. Learners actively collaborate with their peers, directing comments and discussion to other learners.
Socially constructed meaning	Agreement or questioning in open discussion areas.
Sharing of resources among students	Learners begin suggesting research sources or sharing other resources with their peer group.
Expressions of support and encouragement	Learners show support for other students by expressing support and encouragement for the work of others. Learners offer to evaluate the work of their peers and to provide suggestions for improvement.

Figure 2. Criteria for a Learning Community (Palloff & Pratt, 1999)

Both Palloff & Pratt and Flanders have similarities between the types of interactions they capture. Each identifies comparable interactions that support learning; the difference is in who participates in the interactions and how they participate. Traditionally, in the Flanders protocol,

the instructor performed the interactions. In the Web-based classroom, in which the learners take more responsibility for learning, common types of interactions are taking place. The similarities between the two are identified in Figure 3.

Criteria	Evidenced of in Flanders's Interaction Analysis Protocol	Evidenced of in Palloff & Pratt's Criteria for the Formation of a Learning Community
Active interaction with course content and personal communication	Responsive student talk, initiative student talk.	Learners actively use course content and communications tools.
Collaborative learning	Acceptance of ideas of students, lecturing, responsive student talk, initiative student talk.	Comments directed primarily learner-to-learners. Learners actively collaborate with their peers, directing comments and discussion to other learners.
Socially constructed meaning	Asking questions, accepts feelings, responsive student talk.	Agreement or questioning in open discussion areas.
Sharing of resources among students	Accepts or uses ideas of students; lecturing, initiative student talk; giving directions to other students.	Learners begin suggesting research sources or sharing other resources with their peer group.
Expressions of support and encouragement	Praises or encourages, criticizing or justifying authority.	Learners show support for other students by expressing support and encouragement for the work of others. Learners offer to evaluate the work of their peers and to provide suggestions for improvement.

Figure 3. Similarities in Classroom Interactions of Flanders Interaction Analysis Protocol (1970) and Palloff & Pratt (1999) Criteria for a Learning Community

Cyrs (1997) noted that studies of interaction were the missing link when evaluating the effectiveness of distance learning with traditional, face-to-face instruction. The interactions

described in the Flanders Interaction Analysis Protocol have been validated over a number of years as indicators of classroom interaction and learning. Indeed, the Flanders instrument has been widely used since its inception in the 1960s, often having been re-fitted or re-purposed to fit a particular classroom dynamic. As it focuses on the events taking place in the classroom, the Flanders instrument can again be re-purposed for on-line instruction to evaluate whether or not the same types of interaction that are seen in the face to face classroom are also occurring in the on-line course. This study used Flanders as the initial meter for classroom interaction, providing a method by which the evolution of classroom interaction was monitored and analyzed.

Palloff & Pratt include among their criteria many of the same types of interactions identified in the Flanders instrument, without focusing on who performs the classroom interaction. The on-line classroom, one in which learners perform many instructional tasks for themselves, in addition to their classmates, requires little distinction with regard to who encourages interaction or performs instructional tasks. The focus is on the learning community—the group that has formed around the shared purpose or goal—of completing specific instructional tasks and completing a course.

Within the Palloff & Pratt criteria for the virtual learning community, parallels can be seen between the interactions observed. The interactions are the same; the difference is in who performs them for whom. Within Flanders, the instructor is expected to encourage many of the interactions within the classroom. Palloff & Pratt identify that the same types of interactions are occurring; however, within their on-line classroom, all members of the learning community play instructional roles and contribute to their own learning, as well as that of their classmates.

The parallels between Flanders and Palloff & Pratt had particular importance for the validation of the Palloff & Pratt standards and this study. By linking the Flanders indicators to the Palloff & Pratt criteria, data supporting the value of Palloff & Pratt's model of the learning community was obtained. Data supporting the formation of the learning community, based on a widely-accepted measurement of classroom interaction, will have further importance for designers of Web-based instruction who seek a valid assessment tool for the evaluation of on-line learning.

DATA ANALYSIS

The data analysis process was conducted using NVivo 7TM, the newest release of qualitative data analysis software from QSR International. This software supports the interpretation of unstructured or semi-structured data for exploration, description, comparison, pattern analysis, theory testing, theory building, and evaluation (Bazeley, 2007). The use of QSR software with qualitative data has been documented as an efficient means for analysis as it helps the researcher to structurally organize data so that it can be retrieved and organized conceptually into hierarchical categories (Richards & Richards, 1991). The NVivo software program helps the researcher to search for and to identify theoretical ideas through a process of discovery. The categories, or nodes as they are also referred to in NVivo, used in this study for the analysis of the threaded discussions were based on two sets of factors: the interaction events identified by Flanders (1970) in his protocol and the criteria for a virtual learning community as defined by Palloff & Pratt (1999).

Nodes that are developed as part of the analysis of the data will form a hierarchical structure known as an index tree. The index tree is similar to an outline and can be refined

during the data coding and analysis process, allowing new meaning and patterns to emerge. Coding was performed by reading the threaded discussion text and assigning codes to the communications based on the index tree. The coding was used to aid in the retrieval, analysis, and synthesis of reoccurring themes or comments. With the index tree structure complete, each node was defined to make clear the phenomenon being described or represented. After the coding was completed for the interaction events identified by Flanders (1970), the process was repeated using the criteria for the virtual community identified by Palloff & Pratt (1999).

Analysis of the Combined Criteria. The study was performed by analyzing the text of the threaded discussions, first using the Flanders protocol, applying the protocol to all threaded discussion text and categorizing the types of interaction events that take place. As part of this analysis, the data were organized conceptually into categories based on the factors, or types of interaction events, identified by Flanders. Because the focus of Web-based instruction is on the learner, each of the communication interactions was analyzed from Flanders's protocol for both the "Instructor" and "Student" perspectives. This analysis explored whether or not learners are performing an instructional role for their peers in the Web-based classroom, based on a long existing standard of classroom interaction.

Palloff & Pratt's criteria, which represent the instructional functions that learners ideally perform for their peers in the Web-based classroom were then used to analyze the same threaded discussion text. This analysis explored whether or not learners performed the instructional tasks found in Web-based classrooms in which a virtual learning community is forming, meeting the criteria identified by Palloff & Pratt. The results of the two analyses were then compared. Evidence of learners having performed an instructional role serves as the determinant of the degree to which the virtual community, as defined by Palloff & Pratt (1999), was developing.

The results of the coding and analysis process were used to identify the threaded discussion text that meets the criteria identified by both Flanders and Palloff & Pratt in their respective models.

From these results, a comparison was made between the two and conclusions were drawn regarding the formation of a virtual learning community as defined by Palloff & Pratt.

Data collection via computer provides an efficient means for capturing the interaction between learners in a naturalistic environment. The archived transcripts of the threaded discussions provided a means for capturing the learners' thinking in a written format. Because the data were recorded independent of the study, the context of the phenomenon was studied as it naturally occurred with no control or manipulation of variables. This system adhered to the qualitative paradigm of data analysis that typically uses no control or manipulation and uses inductive logic to allow categories, themes, and patterns to emerge within the data (Bogdan & Biklen, 1992).

EXTERNAL VALIDITY

In that this study's methods operated within a qualitative framework, where the researcher is considered the main instrument, there could be a question of the accuracy and validity of the information gathered and its interpretation (Glesne & Peshkin, 1992). Although the case study does not provide a basis for grand generalization of the results, "petite generalizations" that occur throughout a particular case may be possible (Stake, 1995). Qualitative research seeks to provide an understanding for the reader, through multiple descriptions of phenomenon, to convey the realities of the situation to the reader. The exploratory case study, specifically, is best for identifying questions, selecting measurement constructs, and developing measures that will be used in a larger scale investigation (Davey, 1991).

To establish the quality of case study research, Yin (1994) identifies several tests. The first test is to create construct validity by including multiple sources of evidence. This study satisfied this requirement by gathering information on the content of the messages, the frequency with which the course participants communicate, and the intermessage reference analysis.

Yin (1994) also suggests that multiple case studies be performed to maximize external validity to strengthen the generalizability of the findings. Although generalizability is often a requirement of traditional research, in qualitative research, with its focus on understanding and description, the results are not necessarily generalizable, or the “petite generalizations” identified by Stake (1995) may instead occur. In this study, multiple cases were analyzed, two sets of factors were used for the analysis, and intermessage reference analysis was also employed to strengthen the validity of the observations.

The final test identified is based on the reliability of the study so that the findings can be replicated in the future (Yin, 1994). The study met this requirement by keeping thorough documentation of the techniques used to collect, manage, and analyze the data. This documentation will make it possible to duplicate the study, procedurally, again.

Through the descriptions and experiential understandings provided as a result of this study, generalization of the information provided in the case study ultimately becomes the responsibility of the reader. The expectation of this researcher was to provide a meaningful understanding, through both qualitative and quantitative information, of the formation of the learning community on which future research can be based and the practice of instructional systems design can be informed.

CHAPTER FOUR

ANALYSIS OF THE DATA

INTRODUCTION

This study was conducted to investigate the types and frequencies of interactions in online discussions and to describe those in relation to the development of a learning community. In this chapter, each of the three research questions identified in Chapter One will be reviewed within the context of the data analyzed. A description of the interactions that occurred within each of the cases will also be presented.

Description of the Message Data

The study included four separate cases, each a course involving threaded discussions as part of the class activities. Two of the cases were undergraduate courses; two were graduate courses. Each of the courses analyzed was taught by the same professor and had an on-line discussion in which students were expected to participate. No requirements were made as to how often a student was required to post, or how much a student was expected to contribute with regard to the amount of text written. The instructor made only a nominal number of posts to start the initial discussion and to manage any disagreements that occurred within the threads.

The data were obtained from archived discussion text directly from the Web CT™ program; no interference or interaction occurred between the researcher and the students engaged in the discussions. The data were imported directly to QSR's NVivo 7™ as individual sources. Given the naturalistic process for data collection, the compiled data included many symbolic

references, such as emoticons and punctuation used for emphasis, misspellings, grammatical errors, and abbreviations of words, such as those used when sending text messages. The students clearly wrote for self-expression and to participate in the class, not for graded review. These text characteristics occurred across all cases and were not limited to any specific group or individual. Table 1 identifies the total number of message posts by students in each of the cases and the corresponding mean and median of the posts.

Table 1: Number of Student Message Posts by Case

Case Number	Total Student Message Posts	Mean	Median
1	61	5.08	5.00
2	63	5.25	5.00
3	104	4.00	4.00
4	47	4.27	4.00
Total	275	4.51	4.00

Case 1 was an undergraduate, technology-based course, for sophomore and junior business majors. During the semester, students posted 61 messages to the threaded discussion; the mean number of message posts for this group was 5.08. Case 2 was a graduate level course for education and business M.Ed. degree students. This group logged a total of 63 message posts during the course of the semester. The mean number of message posts for Case 2 was 5.25; the median was 5.00.

For Case 3, an undergraduate liberal studies requirement for graduating seniors, the enrollment was 26 students. Within this group, there were 104 message posts during the semester with a corresponding mean number of posts of 4.00. The final case, number 4, a graduate level business course, had 47 student message posts. The mean number of posts for this group was 4.27, and the median number of posts was 4.00. Overall, there were 275 message

posts by students that were analyzed as part of the study. The mean number of posts was 4.51; the overall median was 4.00.

Within each of the cases, the total number of new message threads posted was measured. A total of 60 new message threads were documented overall in the cases. Case 3, the undergraduate, multi-disciplinary group, developed the greatest number of discussion threads, 24 in total. Case 1, the undergraduate technology-based course, had the fewest number of new threads in their discussion with only 8 total threads.

In each of the cases, students directed their posts to the beginning, or opening, message for a portion of the discussion. New threads were offered, but none of those student messages spurred any immediate discussion by classmates. Table 2 identifies the total number of new threads included in each of the cases, the number of student posts to the opening message until a productive new thread, and the percent of total discussion text that was devoted to the opening message.

Table 2: Analysis of Message Posts to Productive New Thread

Analysis of Message Posts to Productive New Thread			
Case Number	Number of New Discussion Threads	Total Number of Posts to Productive New Thread	Percent of Total Discussion Text to Productive Thread
1	8	31	47%
2	17	15	24%
3	24	35	33%
4	11	18	36%

Students preferred to continue replying to the initial question between nearly one-quarter (24%) and one-half (47%) of the time. During this time, other questions or thoughts were posed

as new threads, but students either did not respond at all, or the thread had only one reply. For Cases 2, 3, and 4, this corresponded to at least one post from each student in the class before a new thread would become productive. For Case 1, three new posts were required for each student before a new thread would become productive.

Individual Case Descriptions

The total number of posts for Case One, 63 posts, is identified in Table 3 and includes the 2 posts made by the instructor. The fewest number of student posts made was 2; the most made by any student was 7. The median for this group was 5 posts during the semester.

Table 3: Messages Posted by Discussion Participant, Case 1

Participant	Number of Posts
I1c1 (Instructor)	2
S1c1	5
S2c1	2
S3c1	4
S4c1	7
S5c1	4
S6c1	7
S7c1	5
S8c1	6
S9c1	5
S10c1	5
Total Messages Posted (Including Instructor)	63

Identified in Table 4, Case 2, the graduate level business and education course, had 12 students enrolled and 66 total student and instructor messages posted. The majority of students in this group were employed full-time and attended class on a part-time basis. The number of posts in this case ranged from a high of 10 to a low of 3.

Table 4: Messages Posted by Discussion Participant, Case 2

Participant	Number of Posts
I1c2 (Instructor)	3
S1c2	5
S2c2	6
S3c2	5
S4c2	5
S5c2	4
S6c2	4
S7c2	4
S8c2	4
S9c2	6
S10c2	10
S11c2	5
S12c2	5
Total Messages Posted (Including Instructor)	66

The largest and most diverse academically of the cases, group 3 had 26 students enrolled and 109 total message posts. This group included all majors across campus and also required that those enrolled had senior status academically at the university. The median for this group was 4 posts per student. The range of number of posts for this group was small, ranging from 2 to 7 messages over the course of the semester. Table 5, on page 80, provides a snapshot of the messages posted by both the instructor and students in the course.

Case 4, identified in Table 6, page 81, was also a graduate level course, had 11 students enrolled, and a total of 47 message posts over the course of the semester. The median number of posts for this group was four. The group was made up of full-time and part-time students, most of who were employed in addition to their graduate studies.

Table 5: Messages Posted by Discussion Participant, Case 3

Participant	Number of Posts
I1c3 (Instructor)	5
S1c3	6
S2c3	5
S3c3	4
S4c3	4
S5c3	4
S6c3	4
S7c3	4
S8c3	4
S9c3	4
S10c3	4
S11c3	4
S12c3	2
S13c3	4
S14c3	4
S15c3	3
S16c3	5
S17c3	4
S18c3	4
S19c3	5
S20c3	4
S21c3	3
S22c3	4
S23c3	4
S24c3	4
S25c3	3
S26c3	4
Total Messages Posted (Including Instructor)	109

Table 6: Messages Posted by Discussion Participant, Case 4

Participant	Number of Posts
I1c4 (Instructor)	3
S1c4	6
S2c4	4
S3c4	4
S4c4	5
S5c4	5
S6c4	3
S7c4	5
S8c4	3
S9c4	7
S10c4	3
S11c4	2
Total Messages Posted (Including Instructor)	50

Research Question One

The first research question was to identify the levels and types of participation demonstrated by learners in the online classroom as identified in an adapted Flanders Interaction Analysis Protocol (FIAP) (1970). The protocol was adapted to allow for the differences in on-line interactions, such as the expectation that other learners would provide much of the instructional conversation. The adapted protocol is available for review in Figure 1, Page 67.

Flanders divided the protocol into “Instructor” and “Student” categories, and then further into instructional types, to detail not only who performs instructional activities, but also how those instructions direct learning. In the case of on-line instruction, the “who” that performs the instructional activities is theorized to be the other learners, as learning is thought to be a social and collaborative activity among and within the group. Further, in addition to basic question and response, on-line learners are expected to direct the learning of others, influence their thoughts and perceptions, and indirectly provide support to the individuals in the group. If this

supposition is correct, then learners will indeed be engaged in many of the instructional activities that Flanders identified in the “Instructor” categories.

Using the adapted protocol as a guide, each of the interactions in each of the cases was coded using NVivo 7™ according to Flanders’s (1970) guidelines. This fracturing process allowed the data to be coded and the associated numbers of words, paragraphs, and references to individual concepts to be broadly identified. The study was done using Flanders’s (1970) research as one of the theoretical bases for investigation; the possibility of emerging themes was also accepted as part of the research. Each case was coded individually using a priori codes based on the interaction analysis protocol and the four cases were then collectively evaluated. Table 7, on page 84, identifies the frequency of discussion posts and associated number of words of text according to the Flanders protocol across all cases.

On the FIAP (1970), two items stand out for student participation in threaded discussions. It is apparent that students engaged themselves in the discussion by building on the ideas of others (N=203), a form of idea acceptance according to Flanders. Building on the ideas of others ranked as the number one form of interaction among students based on the total words dedicated to this form of interaction (N=13,999).

In a discussion thread on videoconferencing in Case 2, graduate students responded to an article and discussion posted by a classmate. One student responds by building on the first post of the thread:

“I see this as something that would be highly useful for large international corporations for meetings and trainings. The cost of having to fly numerous managers and employees all around the world would probably be more than the cost of this system.”

The same student then immediately expresses an opinion:

“As far as using it in a college setting, the main advantage I am seeing is for the college with regard to more tuition for more students in one class.”

Overall, students were very likely to give their opinions as part of a lecture (N=214) and appeared to state them freely, using 8,715 total words to express themselves as part of the on-line discussions. As the on-line discussions progressed, opinions gave way to value judgments made by students regarding specific discussion topics (N=9). While not high in number, students generated 297 words related to them—more text than was dedicated to several of Flanders’s (1970) identified interaction types. One student made a strong comment about sexual predators on-line and who is responsible for the child who is assaulted by one of them:

“Blame the parents who are letting their little girls meet up with older 25 year old man. I mean if she's 14 SOMEONE had to take her to the meeting place...”

While another remarks on an individual giving up social networking sites for Lent:

“Lent is about making sacrifices to show devotion to Jesus. I don’t think that this is a very good thing to give up. it just seems like an easy way out.”

And the group also places blame for childhood obesity:

“It's not only the kids fault that they are becoming obese, it is also the parents fault.”

“I don’t know what the problem is now these days with parents allowing their children to sit in the house in front of the computer and become lazy and fat.”

Also in their interactions, students were likely to agree with others generally (N=104), through comments that ranged from “I agree with you...” to “I’m with you on that one!” to personalized comments such as “I could not agree with you more, (Student Name).”

Table 7: Flanders's (1970) Criteria in Discussion Text: Total Events and Number of Words Written About Criteria

Criteria	Case 1 Students N=10		Case 2 Students N=12		Case 3 Students N=26		Case 4 Students N=11		Total Students N=59	
	Events	No. Words	Events	No. Words	Events	No. Words	Events	No. Words	Events	No. Words
Accepts Feelings	1	17	1	13	0	0	4	98	6	128
Praises or Encourages	3	15	10	101	4	76	1	6	18	198
Acceptance of Ideas	11	144	38	849	38	568	17	426	104	1,987
Clarifying	1	37	3	86	0	0	3	144	7	267
Building on ideas of others	28	1,938	58	3,382	64	4,955	53	3,724	203	13,999
Asks Questions	6	92	24	101	16	336	2	24	48	553
Lecturing – Facts	47	533	17	1,542	8	675	8	715	80	3,465
Lecturing – Opinions	41	1,958	46	1,731	74	2,836	53	2,190	214	8,715
Lecturing - Cites Authorities	6	503	12	432	14	1,018	17	783	49	2,736
Giving Directions/Guiding Research	12	234	12	74	18	350	9	69	51	727
Criticizing or Justifying Authority	2	17	2	61	4	288	7	433	15	799
Responsive Student Talk	8	427	8	491	13	866	8	309	37	2,093
Initiative Student Talk	18	1,362	20	1,430	37	2,825	12	791	87	6,408
Other (Silence/Confusion/Tech. Diff.)	1	6	1	6	0	0	0	0	2	12
Total	185	7,283	252	10,299	290	14,793	194	9,712	921	42,087

Students were likely to initiate new discussions, starting 60 new threads overall and initiating new ideas or lines of thought (N=87). These interactions were also prolific from a text perspective. A total of 6,408 words were dedicated to initiating new ideas, indicating that students did not simply present an idea, but instead discussed the idea among and within their peer group. Students were at times awed by the scope of their threaded discussions with respect to topics and themes. In Case 3, a discussion on social networks became a forum on childhood obesity. One student described his or her amazement at the path the discussion had taken by posting:

“This amazes me that a Threaded Discussion about social networking (MySpace/Facebook) has led to a conversation and discussion on obesity and lack of physical activity amongst children--that just goes to show us how widespread and how obsessed people are with these social networking sites.”

In the same case, a different student started a new thread at 2:19 a.m. on a Saturday morning after watching a re-run of *South Park*, a cartoon-based television show:

“Subject: South Park and my space Ref.

Hey just saw the south park episode, where they made fun of the TV show 24, in fact I watched it on Google, anyways it ties into this discussion, because the characters were using “my space” to do their background checks and then cross referencing it to eBay, and then googling stuff, then cross reference to E-Harmony. They also used picture cell phones among other technology. It was just funny to see them use it as a way to do a background check on the suspected terrorist and was like his favorite color is green, and he has this many friends etc.”

Citing facts as part of the lecture was also common among students in the threaded discussions (N=80) and students used 3,465 words when engaged in this type of

interaction. Facts included items learned as part of the class, as well as previously learned concepts:

“Method stands for the instructional method. The instructional methods are techniques used to aid in obtaining the desired outcome of the lesson. The methods include instructor-centered lectures, group work, interactive activities, and simulations. Distance education is not a teaching method it is a delivery mode. The media and mode help enhance the teaching method.”

Learners engaged in the threaded discussions were also likely to go beyond merely stating facts and to identify ideas, research, and the associated authors:

"A study by Robert A. Wisher and Christina K. Curnow, published in the Handbook of Distance Education (Lawrence Erlbaum Associates, 2003), shows that distance-education students experience greater satisfaction from high-quality video, but that they don't necessarily learn more."

Indeed, citing authorities in lectures was common in both of the graduate Cases, numbers 2 and 4, and in the liberal studies course for graduating seniors (Case 3) as well. Less likely to cite authorities in their responses were the students in the sophomore/junior technology class who likely have less experience in collegiate-level study and writing.

Flanders' (1970) identifies “giving directions” in his protocol as a direct form of interaction in which directions, commands or orders are given to which a student is expected to comply. “Directions” may also include statements that are intended to guide the student’s thought or research. Using this definition, learners posted directions to their classmates as part of discussion threads that typically identified links or attachments for review (N=51).

Interactions that included directions were more common in the graduate and senior level courses. Furthermore, these students were more likely to post a link at the beginning or end of their message, only infrequently asking or suggesting that classmates

review the material. The link itself served as the direction given by these students and it was implied that, merely by posting, all members of the class would understand the meaning of the link or attachment notation.

“I made this attachment using Apple software-if this attachment does not work on your computer the site for the article is:

http://humanresources.about.com/od/trainingtrends/a/training_trends.htm”

Given the high number of posts identified previously for the items in the protocol including “Accepting of Ideas,” “Building on Ideas of Others,” and “Lecturing-Opinions,” it is clear that these directives were understood by members of the group and that the requests were complied with.

Students also engaged in responsive talk with one another (N=37; 2,093 words). Some questions were posed directly, as noted above; however, it was more likely that a student would post an opinion or state a fact and others in the class would respond to those previously made remarks. The responsive talk to the instructor was minimal as she used only broad generalizations to begin the discussions:

“What is meant by these three variables, Method, Media, Mode, and how are they being used to describe the development of distance learning-- what else is discussed here?”

“I've been reading more and more about social networks and what they're offering people (ranging in age from 12-?) in today's society. What are they offering that people aren't getting in a natural order of society -- say, the society of the 50's or 60's or 70's, when people didn't have this technology to use?”

“Right now e-learning is beginning to become a very popular tool for businesses to use in order to train their employees. What does this group see as the implications for this new technology?”

“What have you heard about e-learning, truth or myth? Let's talk more about these: Which do you find the most persuasive arguments or "myths" -- and why?”

The data revealed only one response in which a student directly addressed the professor and her question in the discussion post. All other posts were made to the group.

Within the groups, students did express praise and encouragement to one another on a limited basis (N=18). There was no pattern identified between graduate and undergraduate groups on the basis of praise and encouragement. Criticizing or justifying authority within the discussions was also limited (N=15). For this item; however, nearly half of the instances of this type of interaction were limited to one graduate class (N=7) and were mostly directed at former professors and the University.

The remaining items in Flanders's (1970) protocol received limited responses. Clarifying the ideas of others was noted only seven times. Accepting the feelings of others was noted only six times. Finally, the “Other” category that included periods of confusion or technical difficulties had only two entries, both of which dealt with technical problems experienced by the students using the Web CT™ software.

Findings Outside of Flanders's (1970) Protocol

During the analysis process, additional concepts and themes emerged from the data that the researcher identified as related to learning and learning theory, yet were not identified in the FIAP (1970). These items were coded as they were identified and a

record was made of the number of associated words, paragraphs, and references. Within each of the four cases, several of these new themes often repeated themselves and thus were noted in each of the case statistics. Many of these interactions occurred more frequently than the interaction types identified by Flanders in his protocol. Table 8 identifies the total frequency with which each appeared in the cases.

Table 8: Frequency of Interactions Outside of Flanders’s (1970) Identified Types

Interaction Type	Frequency
Cites personal experience	112
Conversational/addresses by first name	98
Punctuation/flames to express emotion	57
Reflective comment	35
Humor and wit	21
Total Interactions	323

Learners were quick to socialize with others about personal experiences as part of their posts (N=112). There was little hesitation in sharing this related information to make a point; students used 7,817 words—third in volume only to building on the opinions of others and expressing opinions. Clearly it was important to students to make learning more meaningful by relating experiences about subjects such as distance learning at the undergraduate level:

“I have experienced firsthand several types of delivery. I had a college algebra class that was called distance learning. The instructor took turns being at two separate locations. There was a TV at the front of the room and one at the back. The instructional environment was same time, different place. We each had a microphone and there were cameras in the classroom. My experience was a good one - maybe because math came easily for me. Many classmates had a very difficult time because they required more one-on-one assistance. Questions could be asked but on every other week, answers came via the TV from the other location. It led to much peer to peer assistance.”

About a current educational program:

“I had a class in the spring where we had to create a training module with Macromedia Director. Half of the class had never used the software. We were clueless as to what we were supposed to be learning from this and very frustrated because we weren't familiar with the software. Our mistakes were fixed by advanced students in the class or the instructor so we still really didn't learn to use the software to it's full potential.”

About personal use of social networking:

“I myself have fallen victim to 'facebooking' a girl after I've met them somewhere. It is quite pathetic sometimes when you think about it but it is so easy to do that it's hard to resist.”

Identifying novel uses for social networking sites:

“Other uses I have found, at least with facebook, is to find people in my classes if I have a question about materials or something. I have done that quite a bit. I have also made invitations for parties, which was more convenient than trying to contact everyone by phone or face to face. It can serve as a better reminder than someone just telling you. It ALSO helps me remember my friends birthdays!! :o)”

Or about making a personal decision:

“The first thing that comes to mind when I read this article was my "attempt" at an on-line Master's program out of New Jersey. You can see how successful it was for me since I will graduate from this program which is 3 blocks from my house. I remember sitting at the computer watching people post responses to a group project hourly and it felt like the world was in fast forward and I was standing still. People were checking and posting while at work and I am thinking how am I going to keep up, I thought this was at my own pace, I can't think about posting while I'm at work. With that said, I dropped out.”

One student covered a number of related experiences in a prolific post that ultimately generated a discussion thread about organizations using social networking sites to investigate potential employees:

“As I mentioned earlier, I am an RA, and during our spring training I attended the seminar ‘Does your Online Profile reflect the content of your personality??’ The resident director giving the seminar gave us a

handout, which talked about how employers are using 'My Space' and 'Facebook' to prescreen their candidates. They have gone as far as 'Spies' aka interns that still hold a current college e-mail address to access your page, and if private they request to be your friend and hope you accept, and then the spy gives up your information. After I heard this I made the decision to 'delete my identity' not because I was embarrassed of my page and contents, because I never had anything I would not want my mother to see, but because of who I want to work for. I want to work for the FBI or the Secret Service. I thought if anyone could gain access it would be them, when doing their background investigation to issue me a higher security clearance. I had friends that did not want me to get rid of "me" and they told me why not make my page work to my advantage. I thought about that for awhile, and then came to the conclusion that while I could make it work to my advantage, I am unable to keep up with what others post and so on. I also realized that I would be showing the FBI, and Secret Service that I am unable to keep things Secret (which is VERY IMPORTANT), because they would quickly note that I have a Photo ID of my self publicly displayed which could be copied by someone else and could be used for various things, I then have my age and birthday listed once again things that not everyone should know because it could be used to help someone steal your Identity, because if they find a credit card app you tossed or get to the mail before you, and need more info such as your birthday and so on, you just helped them out. So the only way I found to make my online profile to work in my favor was to get rid of them. So I did it I deleted them, it was a very sad day, and I did not know what to do with my spare time, after all I quick cold turkey. After about a month or so I decided that I will create a new Face Book account so I can use it as a tool for the RA job which comes in very handy. To my surprise I discovered that Face book never really deletes your account, I had everything back, it was as though I never left the 'community' every wall comment was still there I had all my friends. So I went in and deleted every field that it would let me, and deleted every comment that others posted, as well as all my photos. I am happy to say that I am doing well, I only sign on to it to do research on my residents only when needed, an example would be when there is personal trash in the restroom or hallway, such as a pizza box, I get the phone number from the label on the box and then go on to Face book and type in the cell phone number and it shows me who was the person who ordered the pizza, and then I go and have them take the pizza box to the trash room where it belongs. I also use it to solve other 'crimes' committed on my floor and to make connections of my residents and who their friends are, so when I see their friends I can put a name to the face when they do not want to cooperate."

Within each of the cases, students were likely to share their personal experiences, and notably some were more delicate than others, with the larger group. Personal experiences were shared to build on another student's idea, to provide an example of a thought or concept, or to build the discussion thread further. Case 1, the undergraduate technology class, had the fewest number of personal experiences shared (N=8); Case 3 the most with 50 experiences shared among the group. With the large number of words dedicated to this type of interaction, and the ability of these interactions to increase learning, their importance to overall learning should be acknowledged.

Learners also began to reflect within the discussions, making meaning within their posts by relating current learning to past learning, by using analogies as examples, or by crystallizing their thoughts related to a specific topic (N=35). Nearly as much text (2,015 words) was dedicated to reflective comments as to responsive talk--one of Flanders's (1970) identified types of interaction. Reflective interaction occurred among the undergraduate population:

“One analogy I can think of is drinking alcohol. Lots of people drink alcohol and do so responsibly. However, there are a small minority who abuse it, drive drunk and cause an accident. Is that alcohol's fault or the fault of the individual who used it irresponsibly?”

As well as among the graduate population:

“As I read the responses, I really began to wonder about the indication of the nonverbal behavior. Are there non-written/nonverbal cues in distance learning...”

“As I look at this from a prospective trainer's point of view, the mode would absolutely be the most important because of the constraints that will be placed on you by the company wanting the training. You will only have so much time with the group of people so you need to have a mode that is highly effective to get the information across. If the mode is not chosen correctly then the instructional method may take too long for the time allotted.”

In the discussions, students were also likely to begin using first names when addressing classmates, or when referring to comments made by others (N=98). Students did not immediately use the names of their classmates, but after discussion had begun, the tone of the posts became much more conversational. Along with the use of first names, learners included emoticons in their posts and started to use punctuation or flames to show emphasis as well (N=57).

Basic forms of courtesy also began to appear shortly after the use of first names. Comments made to enhance civility within the group and to improve the social atmosphere, such as thank you (N=7), apologies (N=9), humor and wit (N=5) also became more commonplace after the discussions had evolved.

“thanks for posting this--It's INCREDIBLE!”

“I also apologize for the proofreading errors. hitting send was an accidental reflex. perhaps I'm /too/ comfortable communicating in an online forum”

“Great point.....I'm actually ‘friends’ with several of my favorite artists....it makes me feel pretty important (hahahah).”

The tone of the discussions changed between the beginning of the discussions and the end. The beginning posts were formal and sometimes awkward; at the end discussions resembled friends conversing amongst themselves, sometimes beginning with “Hi” or being addressed to specific students within the class.

Research Question Two

The second research question was to identify how and to what degree learners meet the communication criteria identified by Palloff and Pratt (1999) for the formation

Table 9: Interactions by Type as Evidence of Learning Community, All Cases (Students N-59)

Palloff and Pratt's (1999) Criteria for a Learning Community	Number of Interactions by Type From FIAP (1970)		Number of Other Interactions by Type to Support Palloff and Pratt's (1999) Criteria	
Active interaction with course content and personal communication	Responsive talk	37	New threads	60
	Initiative talk	87	Student messages	275
			Total words in discussion text	54,790
			Average message length (words)	199
			Mean of messages	4.65
Collaborative learning	Acceptance of ideas	314	First name used	98
	Lecturing	297	Courtesy expressed	75
	Responsive talk	37	Comments learner to learner	37
	Initiative talk	87		
Socially constructed meaning	Asking questions	36	Agreement in open discussion areas	314
	Accepts feelings	6	Questioning in discussion areas	36
	Criticizes/justifies authority	29	Criticizes	29
	Responsive talk	37		
Sharing of resources	Giving directions/ directing thoughts	51	Suggesting research sources	51
	Accepts ideas	314	Sharing other resources:	
	Praises/encourages	18	Reflection	35
		Personal experience	112	
Expressions of support and encouragement	Praises/encourages	18	Show of support and encouragement	18
			Offers to evaluate work of others	0

of a learning community. For this analysis, the five criteria specified were compared to both the FIAP (1970) and the proposed evidence of a learning community by Palloff and Pratt (1999). These criteria are outlined in Chapter Three, Figure 3, page 69. Each case was reviewed individually for evidence of the formation of a learning community. These criteria are presented first in aggregate, followed by individual case summaries.

Active Interaction with Course Content and Personal Communication.

Palloff and Pratt (1999) cite the learner’s interaction with the content of the course and personal communications as the first of their criteria. Without this basic interaction, no further evidence of community would be possible, thus its overall importance within the criteria.

Evidence of active interaction can be seen through the Flanders’ (1970) categories of “responsive talk” and “initiative talk,” both of which indicate that learners are using the communications tools to interact with one another and that they are also using the course content. These are basic interactions and the evidence is merely that the learners are using the course information. Additional evidence that could be used to support active interaction for the Palloff and Pratt (1999) criteria include data on usage, such as the total number of student messages, the number of threads attached to the discussions, the total number of words of discussion text, and the frequency with which learners communicate. Within all of the cases, the following frequencies were noted:

Total student messages	275
New threads	60
Total words of discussion text	54,790
Average message length (words)	199

Mean of messages 4.65

The students were prolific writers overall and most posted 5 messages each; the average message length was 199 words, indicating that the students' writing was more than simple responses to questions posed by others within the group. Within the 275 total messages, 60 threads—or 60 new discussions—were posed by the learners within the class, again indicating that students overall were actively involved with the course content and communications tools.

Collaborative Learning. Collaborative learning is key to the development of community as it promotes interdependence among the learners and helps them to achieve a deeper level of knowledge generation. From Flanders's (1970) perspective, collaborative learning can be evidenced by the number of comments and posts that are directed learner to learner, both responsive and initiative; the acceptance of others' ideas, and lecturing among classmates. Within the cases studied, learners were very likely to accept the ideas of others, and to build onto, or to clarify them (N=285); lecturing the group was also very popular (N=297). Less frequently, learners demonstrated initiative talk within the discussions (N=87). Generally, the discussions were not directed to only one individual. Comments in the discussion were directed to specific learners (N=37) the same number of times as they were responded to (N=37).

Additional data that can be used to support Palloff and Pratt's (1999) ideas were the number of times learners were addressed by first name (N=98) in the discussion posts, indicating that collaboration was purposeful. Further, demonstrations of courtesy such as "hello," "good morning," or "thank you" were also included in the discussion text

(N=75) to suggest that learners were aware of others and the collaboration that was occurring.

Socially Constructed Meaning. For knowledge to be shaped within the group, there must be discussion that questions, criticizes, responds, and finally develops a shared meaning. Flanders' (1970) offers evidence of this by asking questions (N=36), accepting the feelings of others (N=6), criticizing and justifying authority (N=29), and responsive talk (N=37). Suggestions by Palloff and Pratt (1999) for measurement of socially constructed meaning are very similar to the FIAP (1970) and include instances of agreement in open discussion areas (N=314), questioning in discussion areas (N=36), and criticizing others (N=29).

Learners were quick to agree with the thoughts and postings of their classmates. With 314 instances among all of the cases, agreement in open areas was the strongest evidence for socially constructed meaning according to Palloff and Pratt's (1999) criteria. While the learners did ask questions, engage in responsive talk, and criticize the ideas of others to a lesser degree, their behavior was overwhelmingly focused on agreeing with others, rather than pointing out a new idea or perspective in the discussion. The communications platform allowed for learners to quickly and easily identify their assent and then to build on the comments of their peers.

Sharing of Resources. Within a learning community Palloff and Pratt (1999) theorized that students would willingly share ideas, thoughts, and research sources while showing encouragement for others. Flanders's (1970) protocol offers a category "giving directions" that includes interactions intended to direct the thoughts of others. Within the four cases, learners did post messages intended to direct the thoughts or research of

others (N=51). They were more likely; however, to accept the ideas of others and to clarify, or to build on to them (N=314). There were a few instances of learners posting comments that praised or encouraged classmates (N=18).

Palloff and Pratt (1999) provided only limited guidance for the sharing of resources among learners, providing no categories other than “research” sources and “other” sources. Within the cases analyzed, learners did suggest research-based sources (N=51), but were more likely to share personal experiences (N=112) than to suggest a more formal source of information. Further, learners offered reflections (N=35) of past experiences related to current learning, analogies to enhance understanding, or personal thoughts as indicators of the importance of a concept.

Expressions of Support and Encouragement. Flanders offers praise and encouragement as one of the interaction types in his protocol; Palloff and Pratt (1999) use a “show of support and encouragement” in their criteria. Learners did show praise, support, or encouragement (N=18) somewhat in their interactions. Palloff and Pratt (1999) included an additional indicator “offers to evaluate the work of others” as a measure of support and encouragement exhibited in a learning community. Within these four cases, the learners rejected this outright, making no offers to evaluate the work of others.

Case 1, the mid-level undergraduate technology course showed the weakest evidence for a learning community. The details of this group’s interaction are identified in Table 10. Their discussion text was the lowest in number of words (N=7,755), although they posted a mean number of messages of 5.08. This group was similar to the

Table 10: Interactions by Type as Evidence of Learning Community, Case 1 (Students N=10)

Palloff and Pratt's (1999) Criteria for a Learning Community	Number of Interactions by Type From FIAP (1970)	Number of Other Interactions by Type to Support Palloff and Pratt's (1999) Criteria
Active interaction with course content and personal communication	Responsive talk 8	New threads 8
	Initiative talk 18	Student messages 61
		Total words in discussion text 7,755
		Mean of messages 5.08
Collaborative learning	Acceptance of ideas 11	First name used 21
	Lecturing 51	Courtesy expressed 1
	Responsive talk 8	Comments learner to learner 8
	Initiative talk 18	
Socially constructed meaning	Asking questions 6	Agreement in open discussion areas 40
	Accepts feelings 1	Questioning in discussion areas 6
	Criticizes/justifies authority 2	Criticizes 2
	Responsive talk 8	
Sharing of resources	Giving directions/ directing thoughts 12	Suggesting research sources 12
	Accepts ideas 40	Sharing other resources: Reflection 0
	Praises/encourages 3	Personal experience 8
Expressions of support and encouragement	Praises/encourages 3	Show of support and encouragement 3
		Offers to evaluate work of others 0

others with regard to collaborative learning evidenced by responsive talk (N=8) and initiative talk (N=18).

Perhaps because these learners had less experience as students, and thus were less familiar with techniques demonstrated in the traditional classroom, they were less likely to agree with others (N=40), to share personal experience (N=8), or to reflect on other learning or experience (N=0). They were also less likely to accept the ideas of others (N=40) and started the fewest number of new threads (N=8). They communicated and collaborated, but they were less skilled at developing socially constructed meaning, or at sharing resources among and within the group, both identified requirements for the development of a learning community.

The show of praise and encouragement is important for learners to feel recognized within the group. This group offered little praise or encouragement to classmates (N=3) and made no offers to evaluate the work of others (N=0). Their two most popular forms of interaction were giving their opinions (N=41), and building on the ideas of others (N=28). This group of less experienced learners provided the weakest evidence for a learning community according to the criteria provided in the study.

Detailed in Table 11, Case 2 was a graduate class made up of learners from several different programs. These learners made a strong show of active interaction with content and personal communications as evidenced by the amount of text in words (N=14,625), the number of new threads (N=17), and mean of messages (5.25). They initiated many new ideas in their posts (N=20) in addition to the number of new threads.

Table 11: Interactions by Type as Evidence of Learning Community, Case 2 (Students N=12)

Paloff and Pratt's (1999) Criteria for a Learning Community	Number of Interactions by Type to Support FIAP (1970)	Number of Interactions by Type to Support Paloff and Pratt's (1999) Criteria
Active interaction with course content and personal communication	Responsive talk 8	New threads 17
	Initiative talk 20	Student messages 63
		Total words in discussion text 14,625
		Mean of messages 5.25
Collaborative learning	Acceptance of ideas 99	First name used 43
	Lecturing 75	Courtesy expressed 19
	Responsive talk 8	Comments learner to learner 8
	Initiative talk 20	
Socially constructed meaning	Asking questions 24	Agreement in open discussion areas 99
	Accepts feelings 1	Questioning in discussion areas 24
	Criticizes/justifies authority 2	Criticizes 2
	Responsive talk 8	
Sharing of resources	Giving directions/ directing thoughts 12	Suggesting research 12
	Accepts ideas 99	Sharing other resources: Reflection 14
	Praises/encourages 10	Personal experience 22
Expressions of support and encouragement	Praises/encourages 10	Show of support and encouragement 10
		Offers to evaluate work of others 0

This group was also very collaborative as evidenced by the number of interactions they had in which they accepted the ideas of others (N=99), and lectured their classmates (N=75). The group was also courteous to one another (N=19) and often used first names to address one another (N=43). They developed socially constructed meaning by asking questions (N=24), and agreeing with one another in open areas (N=99).

Accepting the ideas of others was also customary for this group (N=99); they shared research sources (N=12), as well as personal experience (N=22) and reflections (N=14). They gave directions and guided each other's research (N=12) and offered praise and encouragement (N=10) for their ideas. While they were supportive of one another's learning, there were no offers made to evaluate the work of others.

As graduate students, this group recorded responses to provide strong evidence to indicate that a learning community is forming. Having experience as both an undergraduate and graduate student, they were quick to pick up the instructional tasks that were required for successful on-line learning.

Case 3 was a liberal studies course that included graduating seniors from a variety of majors across the campus. These students were skilled as learners and demonstrated this through their active interaction with the course content and personal communication tools. They initiated many new ideas (N=37) and discussion threads (N=24). While they posted fewer messages overall, with a mean 4.00, they were productive writers as evidenced by their 19,948 words of text posted.

As Table 12 identifies, the learners in Case 3 were very collaborative; they were accepting of others' ideas (N=102), used first names in their posts (N=20), and were

Table 12: Interactions by Type as Evidence of Learning Community, Case 3 (Students N=26)

Palloff and Pratt's (1999) Criteria for a Learning Community	Number of Interactions by Type to Support FIAP (1970)	Number of Interactions by Type to Support Palloff and Pratt's (1999) Criteria
Active interaction with course content and personal communication	Responsive talk 13	New threads 24
	Initiative talk 37	Student messages 104
		Total words in discussion text 19,948
		Mean of messages 4.00
Collaborative learning	Acceptance of ideas 102	First name used 20
	Lecturing 93	Courtesy expressed 33
	Responsive talk 13	Comments learner to learner 13
	Initiative talk 37	
Socially constructed meaning	Asking questions 4	Agreement in open discussion areas 102
	Accepts feelings 0	Questioning in discussion areas 4
	Criticizes/justifies authority 18	Criticizes 18
	Responsive talk 13	
Sharing of resources	Giving directions/ directing thoughts 18	Suggesting research sources 18
	Accepts ideas 102	Sharing other resources: Reflection 9
	Praises/encourages 4	Personal experience 50
Expressions of support and encouragement	Praises/encourages 4	Show of support and encouragement 4
		Offers to evaluate work of others 0

courteous to one another (N=33). Additionally, evidence of collaboration was seen through their use of lecturing (N=93), initiative talk (N=37), and responsive talk (N=13). They created socially constructed meaning by agreeing with one another (N=102), criticizing or justifying authority (N=18), questioning one another (N=4), and engaging in responsive talk (N=13). This group was also willing to share resources such as personal experiences (N=50), and to give directions or direct thoughts by suggesting research sources (N=18). They accepted the ideas of others, clarifying and building on the ideas provided by others (N=102).

Expressions of support and encouragement were limited; however, with only four instances of support or encouragement recorded. This group met the criteria for a learning community overall, particularly with respect to interaction, collaboration, socially constructed meaning, and sharing of resources. Their only weakness for the development of community was the limited number of posts related to expressions of support and encouragement.

The adherence to learning community criteria was mixed in Case 4, a graduate training and development course. As noted in Table 12, this group posted 12,462 words of discussion text, 47 student messages and 11 new threads. The mean number of messages (4.27) was indicative of this group's participation overall. They recorded average responsive talk (N=8) compared to the other cases and had the lowest number of posts identified as initiative talk (N=12).

This group also demonstrated limited evidence of collaborative learning through the acceptance of ideas (N=73), the lecturing provided to others in the group (N=78), the use of first names (N=14), and the courtesy expressed to others in the group (N=22).

Table 13: Interactions by Type as Evidence of Learning Community, Case 4 (Students N=11)

Paloff and Pratt's (1999) Criteria for a Learning Community	Number of Interactions by Type to Support FIAP (1970)	Number of Interactions by Type to Support Palloff and Pratt's (1999) Criteria
Active interaction with course content and personal communication	Responsive talk 8	New threads 11
	Initiative talk 12	Student messages 47
		Total words in discussion text 12,462
		Mean of messages 4.27
Collaborative learning	Acceptance of ideas 73	First name used 14
	Lecturing 78	Courtesy expressed 22
	Responsive talk 8	Comments learner to learner 8
	Initiative talk 12	
Socially constructed meaning	Asking questions 2	Agreement in open discussion areas 73
	Accepts feelings 4	Questioning in discussion areas 2
	Criticizes/justifies authority 7	Criticizes/justifies authority 7
	Responsive talk 8	
Sharing of resources	Giving directions/ directing thoughts 9	Suggesting research sources 9
	Accepts ideas 73	Sharing other resources: Reflection 12
	Praises/encourages 1	Personal experience 32
Expressions of support and encouragement	Praises/encourages 1	Show of support and encouragement 1
		Offers to evaluate work of others 0

They posted their responses and thoughts, but they were not quick to respond to the posts of others (N=8), nor did they post novel ideas as initiative talk (N=12).

Socially constructed meaning was somewhat evident through the use of agreement with others' ideas (N=73); most of these posts were building on the thoughts of others (N=64). There was limited questioning (N=2), acceptance of others' feelings (N=4), criticism (N=7), or responsive talk (N=8) in the development of meaning. Learners in this case offered limited directions for research sources or to guide the thoughts of others (N=9), but were willing to share their personal experiences (N=32) or reflections (N=12) to assist the learning of others.

There was little praise or encouragement offered among the students in this case (N=1). The purpose of the discussion contributions the students in this group made were to lecture, to give their opinion, and to share their personal experiences. They made no offers to evaluate the work of others in the group.

Overall each of the cases showed some evidence of a learning community according to the criteria offered by Palloff and Pratt (1999). The more academic experience the learners had, the more they tended to participate in the instructional activities taking place in the on-line discussion threads. Learners were most likely to accept the ideas of others and to agree with them in open discussion areas (N=314), to lecture as part of their posts (N=297), and to share their personal experiences (N=112) as part of their class posts.

Learners were least likely to show expressions of support and encouragement (N=18). There were no instances of offers to evaluate the work of others, one of the criteria identified by Palloff and Pratt (1999) as evidence of a learning community.

Research Question Three

The third research question addressed the strengths and weaknesses of the two assessments, the FIAP (1970) and Palloff and Pratt's (1999) Criteria for a Learning Community, for use in developing a measurement of learning community in an on-line setting. When these two assessments were selected for use in the study, each had specific benefits relevant to the research performed. Flanders's (1970) protocol was widely used as a measurement for classroom interaction, the element to be measured in the on-line discussions, and has earned a reputation as one of the standards of interaction analysis in the research literature. The protocol has also been adapted for use in many different classrooms over its 35-year history. Palloff and Pratt (1999) addressed the question of learning community early on in the development of Web-based instruction, proposing their criteria as evidence that a learning community had formed.

Among the strengths of the FIAP (1970) are that it is quantifiable and easy to use. Descriptions of each type of interaction are provided and the researcher needs only to observe and code data according to the categories provided. Descriptions of the interaction data can be made quickly and accurately. Numerical data is available for further statistical analysis by researchers if desired. The FIAP (1970) was also developed with an eye for adaptation; Flanders understood that each classroom had certain nuances that he would not be able to capture with his instrument. His goal was to develop a tool that others could adapt to their own specific classrooms to measure interaction and, as a result, to improve the teaching and learning that occurs within the classroom walls.

At the time of its development and validation, the 1960s to 1970s, classrooms were undergoing rapid change. Flanders understood and acknowledged that changes

would occur in instructional methodology and techniques over time and so encouraged others to adapt the protocol to become situation specific. The adaptability of the FIAP (1970) is its greatest strength; the protocol assists in analyzing classroom interaction regardless of who performs the interaction. As initially designed, the FIAP (1970) is classified by who performs the interactions and is then further classified by the types of interactions observed. The design of the instrument allowed it to be adapted for use in the on-line classroom easily; with students believed to be performing instructional tasks for their peers, observation of “instructional” or “teacher” interaction was easy to quantify.

The strength of Flanders’s (1970) instrument, the identification of interactions by type, also offered its greatest limitation for use in the on-line classroom. Flanders designed a measurement for classifying verbal interaction based on the categories he was aware of at the time. The vocabulary and interaction types observed in the on-line learner propose many distinctions from those taking place in face-to-face classrooms. The culture of the Internet has expanded to the on-line classroom, leading to inclusion of interactions such as “text language,” that abbreviation-ridden language of young adults, or use of flames and punctuation to convey emphasis and meaning. The FIAP (1970) measures interaction extremely well, as it was designed to do, yet offers no guidance on community within the classroom. The description of “community” had to be derived from the research literature, thus the importance of the criteria for a learning community described by Palloff and Pratt (1999).

Palloff and Pratt (1999), in their research on Web-based instruction, offered the “learning community” as the group that provided classroom interaction, as well as

support for other learners. That a learning community developed in on-line instruction was often proposed in the literature, but not often analyzed or confirmed with any evidence. The learning community was charged to provide an extremely important instructional task – supporting the learning of others at a distance – yet the research had little to offer with regard to what the learning community looked like or how it functioned in the unique setting of the on-line classroom. Palloff and Pratt (1999) theorized based on their experience teaching an on-line course, that there were several criteria that would indicate that a learning community was forming. They recognized the need for theory in this area and proposed the definition and criteria as a response.

The Palloff and Pratt (1999) criteria focus on behaviors that suggest collaboration and socialization. Aside from using the course content and communications tools, all other behaviors in the criteria have a group, rather than individual, focus to underscore the importance of on-line learning as a form of community. The criteria address the social and collaborative functions of on-line learning. The learning community criteria identified by Palloff and Pratt (1999) are quite broad to encompass many different types of learners and on-line instructional events.

The strength of the criteria to be broad enough to measure all types of interaction is also its greatest flaw. Because the criteria are so broad, they are also very vague and offer little guidance on how to analyze the interactions in the on-line classroom. They emphasize “active interaction with course content and participants,” but offer no means to identify how to measure “active interaction” in either domain. They suggest that learners in a community will engage in “collaborative learning,” but do not identify what types of collaborative learning tasks they might perform as evidence of collaboration.

For the researcher, the criteria are much too broad to perform any type of research that would result in a study that could be replicated.

Both studies offered a very similar weakness: The limitation of application experience in an on-line classroom. Flanders could not have predicted that his protocol would be used in a classroom where everyone met by computer and where students were responsible for helping their peers to learn. Palloff and Pratt (1999) offered criteria based on their experience in developing an on-line class, yet they had no further data to offer for analysis. Individually, neither of these instruments offered an apt test for on-line community. When combined; however, they did provide a test that was appropriate for an exploratory study that, based upon the results of the analysis, further research could be planned.

Summary

An analysis of four cases of on-line discussions yielded data relating to the types of interactions taking place in Web-based instruction, as well as descriptive data on the frequency of communications. The study classified those interactions, according to proposed criteria for a learning community that was identified in the research literature by Palloff and Pratt (1999). Following the analysis of the data, the study also identified the strengths and weaknesses of each assessment, the FIAP (1970) and the criteria for a learning community identified by Palloff and Pratt (1999).

There were 275 messages analyzed over 4 cases. The total number of words of message text was 54,790; the average message length was 199 words. Sixty new message threads were posted in the four cases. The mean number of messages posted per learner was 4.65.

Research question one was to identify the types and levels of classroom participation according to the FIAP (1970). The learners were found to participate in many instructional tasks for their peers. Additionally, there were several types of interactions that Flanders did not identify in his protocol that were very common in the on-line discussions. The five most common types of interactions overall are identified in Table 14.

Table 14: Most Common Types of Interactions

Interaction Type	Frequency
Lecturing-giving opinions	214
Accepts ideas-builds on ideas of others	203
Accepts and agrees with ideas of others	104
Initiative student talk	87
Lecturing-citing facts	80

In addition to the interaction types identified by Flanders in his protocol, or Palloff and Pratt (1999) in their criteria, analysis of the data also identified several additional types of interactions within the cases. Of these, the relating of personal experience appeared frequently in messages and was third in number of total interactions overall. The interactions were also quite conversational and the use of first names in the data was very also common. Students also made frequent use of punctuation and flames to express emotion and feelings in their posts. Additionally, learners were also reflective at times, bringing to bear previous learning or situations with the current discussion on the board. Finally, expressions of humor and wit also appeared in the discussions. The frequency of these interactions are identified in Table 15.

**Table 15: Most Frequent Interaction Types
Not Identified in Flanders or Palloff and Pratt (1999)**

Interaction Type	Frequency
Cites personal experience	112
Conversational/addresses by first name	98
Punctuation/flames to express emotion	57
Reflective comment	35
Humor and wit	21

An analysis of whether or not learners met the criteria defined by Palloff and Pratt (1999), and to what degree they met the criteria, was the focal point of research question number two. Evidence of community according to Palloff and Pratt (1999) was evident to varying degrees with one exception. No student offered to evaluate the work of others in any of the cases. The majority of the interaction types that appeared in the cases were classified as “collaboration” in the Palloff and Pratt (1999) criteria.

An analysis of the strengths and weaknesses of each of the assessments was performed for research question three. Individually and exclusively, neither the FIAP (1970) nor Palloff and Pratt’s (1999) criteria were effective for analyzing interactions for the determination of learning community existence. Each; however, had unique characteristics that, when combined, provided a more effective analysis of whether or not community developed in the individual case. Using the broad categories provided by Palloff and Pratt (1999), and then identifying specific interaction types in the manner of the FIAP (1970), a more useful instrument could be developed for determining the existence of a learning community in Web-based distance education.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

This chapter compares the results of the study to the goals of the research. The cases in this study were analyzed based on categories identified in the research literature. To answer the research questions posed in Chapter One, the findings were summarized according to interaction frequency and type. Recommendations are then made to facilitate improvement of the instructional design of on-line learning, as well as for additional research and study. These findings, along with the research on the importance of classroom interaction and learning, will provide information to improve the instructional design of on-line courses and, ultimately, to improve the learning that takes place within them.

Research on the importance of community in on-line instruction and classroom interaction formed the basis for this study. The significance of interaction types in the traditional classroom, using the Flanders Interaction Analysis Protocol (FIAP) (1970), was used as the foundation to evaluate discussion posts in four separate cases of on-line discussions. Following this analysis, the discussion data from each of the cases was evaluated against the criteria identified by Palloff and Pratt (1999) for the formation of a learning community. The study also allowed for additional themes and categories to emerge that were not recognized by either of the research sources; these categories were identified and recorded as well.

Discussion

The learners were prolific writers and posted 275 messages over four cases. The mean number of messages posted was 4.51. The students contributed 42,087 words to the message

posts in their classes, representing 281 paragraphs of text according to standards of business writing (Munter, 2007). Learners contributed to the discussions freely expressing themselves with textual conventions such as flames, emoticons, and abbreviations common to instant messaging or text messaging. Their interaction is evidence that a sense of social presence is indeed possible among and within a group of on-line learners. Gunawardena (1995) related that social presence influences the degree to which an individual is perceived as a real person. These learners used text-based verbal cues and writing habits as a substitute for immediacy behaviors such as eye contact, facial expressions, or voice quality.

Overall, discussions required that learners post at least one message each before a discussion thread became productive; one of the cases required that three messages be posted by each student before a discussion thread became productive. Learners in the undergraduate technology class, who had less experience as students in any type of classroom, required more time to begin posting to message threads placed on the discussion by their peers. These students tended to continue posting to the initial comment from the instructor, rather than begin a new conversation with their cohorts. Once one thread became productive, learners were more likely to contribute to and start discussions that progressed from businesslike to conversational. Koh, Kim, Butler and Bock (2007) noted the importance of developing a sense of social presence in their research on on-line interaction; the undergraduate technology class illustrated this principle. With less experience as students, they were not as likely to understand the dynamics of a traditional university classroom and how to translate that experience to an on-line classroom environment. The more experienced students; however, understood classroom interaction and were much quicker to assume the dual roles of instructor and student, posting different types of messages and encouraging communication among and within their peer groups.

Levels and Types of Participation

The FIAP (1970) divides interaction in the classroom into ten categories, adding a category for silence or confusion. High achieving classrooms, according to Flanders (1967) are identified by an environment that provides for students to feel supported in their learning tasks, and to be encouraged to achieve. When the four cases were analyzed using the FIAP (1970), the most commonly identified interactions according this instrument were Lecturing-Giving Opinions (N=214) and Acceptance of Ideas-Building on the Ideas of Others (N=203). Nearly half of the posts that took place in the threaded discussions, 47% overall, was based on students giving their opinions or adding to the ideas of their classmates. Accepting of Ideas-Agreeing With Others (N=104); Initiative Student Talk (N=87); and Lecturing-Facts (N=80) were the next most common types of interactions. These three types of interaction represented an additional 30% of the on-line discussion according to the FIAP (1970). Learners were willing to contribute to the discussion posts and were supportive of the ideas expressed by others, remarking and acknowledging ideas and opinions, thus providing credence to Hillman's (1999) conclusion that interaction patterns in on-line courses resemble discussion.

Students did ask questions of their classmates (N=48) or give directions to guide the thought of others (N=51) and this accounted for 11% of the discussion. The cases most likely to ask questions or make suggestions to guide the research of others were the multi-disciplinary course for graduating seniors, Case 3, and the graduate class of education and business majors, Case 2. The homogeneous cases comprised solely of business majors were less likely to ask questions or guide research overall. Lecturing-Citing Authorities (N=49) and Responsive Student Talk (N=37) made up an additional 10% of the discussions. The remaining items on the FIAP (1970) accounted for only 2% of the classroom discussions.

Dalton (1989), in a discussion of the traditional classroom, stated that classrooms are transformed into a community of learners when the distance is reduced between learners and their peers by constructing lessons from common understanding of each other's experiences and ideas. During the analysis, several types of interactions emerged that were not identified in the FIAP (1970). The learners frequently cited personal experience in their posts (N=112), and addressed one another conversationally by first name (N=98). These interactions were coded more frequently than the majority of Flanders's categories, identifying their importance to the students in the on-line discussion. Additionally, these learners were also likely to use punctuation or flames to express emotion (N=57), to include reflective comments (N=35), or to incorporate humor and wit into their interactions (N=21).

These findings allude to differences in the types of interactions that students use in the on-line classroom versus a traditional, or face-to-face, classroom. These on-line learners are social and express themselves in an open and forthcoming style. They are more concerned with contribution and expression, and less concerned with the techniques and standards of writing that would be required for a class assignment, such as a paper. Goodfellow (2005) has proposed a definition of community that goes beyond the traditional "sharing of information" and includes sharing of stories, jargon, and shortcuts to communication that are used by members to negotiate meaning. The learners in these four cases provided credence to Goodfellow's ideas by using the available communications tools to share their personal experiences, to reflect on previous learning with their peers, and to use common jargon and communication shortcuts as part of their communications.

In an analysis of the interactions within each of the cases according to the criteria identified by Palloff and Pratt (1999), each case was found to meet the criteria to some degree.

The cases in which multi-disciplinary groups formed the student population exhibited greater adherence to the criteria for a learning community. The first item cited in the learning community criteria was active participation with content and communications tools. This was supported in the study by findings related to the number of messages posted, the number of new message threads, and the number of words used in the discussion text. The technology used in the course supported the creation of the community by providing a means for socialization, collaboration, and increased interaction among the participants. The two cases that were formed with students in the same major or program of study demonstrated less interaction overall, but did exhibit a minimum number of interactions in each of the categories, exempting that of offering to evaluate the work of other learners.

Collaborative learning was exhibited by postings directed primarily learner-to-learner. More compelling evidence for the criteria was demonstrated by the number of instructional tasks performed by the students for their peer group. The students lectured, accepted the ideas of others—clarifying or building on to them as necessary, initiated discussions, and responded to one another as they were questioned or challenged. Their discussions included the use of first names and expressions of courtesy that would enhance immediacy and intimacy in the classroom.

Students quickly agreed with the ideas of others when developing socially constructed meaning; however, there was less evidence for the ability of learners to provide more critical analysis for their peers. There was little show of empathy within the cases and only limited questioning and criticism was recorded. The cases that best demonstrated critical inquiry were the multi-disciplinary groups; the same cases that were comprised of same major students provided less support for the learning of others.

When sharing resources among and within the group, learners were most likely to begin by agreeing with their peers, and then adding, or building on, to those comments. Students did give directions to guide the thoughts or research of others, although these directions were very much implied. Learners infrequently made requests or used direct orders to guide peers to a particular research site. Links to articles or Web sites were posted, with or without any direct reference, and learners were simply expected to comply. More frequently learners shared personal experiences as examples that would guide the learning of others. The stories were shared freely and offered rich examples of the concepts under discussion.

Social empathy, which Wenger (1998) identified as a key design issue for the cultivation of learning communities, was remarkably low in this study. Learners did give praise to one another, but made no formal statements of encouragement. Further, they did not meet one of Palloff and Pratt's (1999) criteria for a learning community "offering to evaluate the work of others," in any of the cases studied. Learners would offer ideas, article links, questions, or opinions; however, they recognized the feelings of others only six times and made no offers to evaluate the work of others.

Conclusions

The literature offers a strong critique of interaction in distance learning with interactivity being noted as an essential characteristic when making comparisons between face to face and distance learning. Indeed, without interaction there is no shared meaning or collaboration that leads to learning among and within the group. Cyr (1997) argued that interactivity and interaction would offer the evidence needed to build a case that distance learning is just as good, if not better, than learning in a traditional classroom.

Based on the results of the study, it can be concluded that evidence of community was demonstrated in each of the cases by the following:

- Learners in the study met many of the criteria identified by Flanders (1970) and demonstrated that, in addition to basic interaction with their peers, they also performed instructional tasks typically performed by a teacher in a traditional classroom.
- Remarks and comments in the discussions included many examples of social behaviors, such as addressing one another by name, or the use of conversational language and shared jargon, meeting one of the criteria identified by Palloff and Pratt (1999).
- Learners contributed freely to discussions on a number of levels, including lecturing, building on to the ideas of others, agreeing with others, and sharing resources, measures identified by both Palloff and Pratt (1999) and Flanders (1970).
- Discussions contained evidence of learners questioning one another as part of their interactions and, further, of directing the learning of others through comments, suggestions, and recommendations for reading and review. This result provides further support for both Flanders's (1970) and Palloff and Pratt's (1999) research.
- Learners made encouraging remarks; however, no evidence of "supportive" remarks, such as offering to critique the work of others, was identified. This finding supports the "praises or encourages" category in Flanders's (1970) interaction analysis, but provides limited support to Palloff and Pratt's (1999) criteria of "expressions of support and encouragement."
- The degree to which learners adopted the criteria of either researcher appeared to be related to the number of years of previous university-level study they had completed.

The learners in this study were only a sample of the many different types of students that one encounters in a university classroom. While each case met the criteria as specified by Palloff and Pratt (1999) and Flanders (1970), it can also be said that each case had a very distinct personality, much like one finds in a traditional classroom. Further, each case met the criteria for a learning community in a different way. One case was very reflective and related previous experiences and learning to the topic of the discussion. One case was very social and conversational, developing a largely divergent discussion thread, yet made fewer attempts at providing learning support for others. One case was very business-like in their interactions, including fewer of the conversational elements of interaction and more direct remarks. Finally, one case initially struggled with both social and instructional support, requiring more professor interaction before finally developing its own, introverted personality.

The study of learning communities in on-line instruction is highly dependent on the interactions that take place in the course. As both facilitators and designers of instruction, we are challenged, and at times bewildered, by the proficiencies of students whose educations and personal lives have been assumed by technology for the past 12 or more years. The Millennials, as they are referenced in the research literature, are the group of individuals born between 1977 and 1998. Self-inventive and individualistic, these students often exhibit an irrelevance for institutions and tend to rewrite the rules to accommodate their own need for a nurturing and team-oriented environment (Kaye and Jordan-Evans, 2005).

Interacting freely through cell phones, text-, and instant- messaging, this group of learners speaks a jargon-filled language that we may or may not fully understand. They multi-task with lightning speed and develop social networks, quickly making “friends” with on-line acquaintances. And in the on-line classroom, much like the rest of their interactions with others,

they do it in their own way. As instructors and instructional designers, we are challenged with their high expectations for interactive relationships, a structured, supportive environment, and high demands on our time. We create instruction based on our classroom experiences and on studies that have been performed with previous generations of students. The learners we reach today with on-line instruction clearly have a different expectation from their educations. The need for further study is evident.

Implications for Future Research

This study provided an initial exploration of the basic forms of interaction that indicate a learning community is forming in on-line instruction. The study inspires further research, specifically the development of criteria, or indicators, that can be tested for evidence of community building in on-line learning.

Indicators of a Learning Community. Identification and validation of indicators that support the development of community is an important first step in the study of on-line instruction. Palloff and Pratt's (1999) criteria provided the initial suggestion and were significant in that they suggested that community was important to measure. They offered little guidance; however, on what to measure specifically, nor did they provide any benchmarks for researchers. The FIAP (1970) offered a valid measure of classroom interaction, and was developed with adaptation in mind, yet Flanders could not have envisioned that his instrument would be used for any type of computer-based learning, much less an on-line, Web-based instructional format, when it was developed years ago.

Current research indicates that interaction in an on-line course can be influenced by the communications technology and its ability to provide for socialization, collaboration, increased interaction between learners and the instructor, and community (Allen, 2005; Goodfellow, 2005;

Mayes, 2001). Yet even within those studies no guidelines are offered. Further Roblyer and Wiencke (2004) have identified the instructional design for interaction and rapport-building, along with interactive capabilities, evidence of learner engagement, and evidence of instructor engagement, as essential for interaction in the on-line classroom. But once again, no ideas are proffered for the measurement of these elements.

Of the two measurements used in this study, the FIAP (1970) offers the most promise for measuring instructional behaviors related to interaction and community. Adapted for an on-line classroom, and divided into categories that are applicable to on-line learning, a revised FIAP (1970) could be validated through further quantitative study.

From this research, it is also evident that the concept of learning community is not one that can be easily measured. The term “criteria” lends itself to a construct that can be easily quantified; a nominal reading that relies on “yes” or “no” responses. Community is less clearly defined, is constantly evolving based on the interactions of the individuals within the group, and is open to interpretation based on the individuals within the group. Precise measurement of community is difficult for this reason; however, indicators of community are both possible and useful. If we are truly interested in how community develops, we must also accept that it will do so based on the participants within it.

Community builds and grows based on the personality of the group, their experience with learning in a traditional classroom, their experience with technology, and the sophistication of their communications with others. Not all learning communities will be social, but they will support the learning of others through thought-provoking questions or suggestions of research. Likewise, some learning communities will be quite social, developing a strong sense of social presence and openly sharing ideas and experiences, but provide very little formal critique of

thoughts or discussion. Understanding that learning communities are not static, and that develop based on experience and opportunity for interaction, provides the impetus for development of indicators that support the not only the different types of learning that occur in an on-line classroom, but the very nature of the communities that develop.

Proposed Indicators. The proposed indicators for evaluating the formation of an on-line learning community are based on the FIAP (1970) and the research literature. The FIAP (1970) was selected because of its usefulness in identifying forms of instructional interactions that occur in the on-line classroom, despite its initial development as an instrument for face-to-face classrooms. Palloff and Pratt's (1999) criteria have not been used for the proposed criteria specifically because they were quite broad, provided little direction for evaluation, and encouraged overlap in interaction types because of their vagueness.

Using the research literature as a guide, the following categories were identified for classification: Interaction, socialization, collaboration, and community. Interaction represents how, and how often, the learner interacts with the course content via available communications tools, how often messages are posted, average numbers of messages posted by each student, and the percentage of total messages posted by students. This category is intended to provide a quantitative glimpse into how often the learners use the on-line course tools and into their interactions with others.

Socialization identifies the conversational nature of the interactions, whether or not learners address one another by name, if they use expressions of humor or wit in their interactions, and if they use textual cues to express immediacy with other learners, thereby increasing their social presence. Collaboration is used to describe the instructional activities taking place in the discussions. Based mainly on Flanders' (1970) work, these items have been

adapted to the interactions that take place within an on-line classroom. No designation has been made as to who performs the collaborative activity, as was the case in Flanders' (1970) original protocol, interactions are grouped by the type of learning activity they represent.

Community refers to the experiences shared within the group that make them cohesive. The types of information shared among and within the group supports the definition of community in which trust is a significant part of interaction. Maslow (1971) identified the need for social belonging as part of his hierarchy; community is a place where individuals support others, have their needs supported, and feel a sense of belonging that allows them to reflect and share experiences with their peers. The concept of community also supports the research on the Millennials, including their needs for interactivity, mentoring, nurturing, and a structured, supportive work environment.

The proposed Indicators of a Learning Community in On-line Instruction are shown in Table 16. The criteria are not exclusive or all inclusive; it is important to note that different types of communities will develop on their own based on the learners involved. The personality of each community, determined by the students enrolled in the course, will influence how many of the criteria are met initially within each category. The instructor will still have an integral role in encouraging different types of interactions to meet the instructional needs of the course. Some form of community will develop on its own within the group; however, the instructor must mentor and model the types of interactions he or she would like to increase.

Table 16: Proposed Indicators of a Learning Community in On-line Instruction

Interaction

- Average Message Length
- Number of Student Messages
- Percentage of Message Posted by Students.
- Average Posts Per Student

Socialization

- Addresses by Name: Use of first name or user name in message contents.
- Conversational: Uses conversational expressions such as “hello,” “please,” “see ya,” or “thank you” in message text.
- Wit: Uses expressions of humor and wit.
- Immediacy Cues: Use of emoticons, punctuation, text-based language conventions or flames to express immediacy and to increase social presence.

Collaboration

- Agreement: Acceptance of, or agreeing with, others’ ideas.
- Lecturing: Giving facts or explanations, citing other authorities.
- Building: Building on ideas of others with examples or opinions.
- Clarification: Clarifies ideas of others through thoughtful questions or expressions
- Giving Directions: Providing implicit or explicit directions to guide the thought or learning of others; includes posting links or text-based references as resources.
- Provides Critique: Direct questioning of others in discussion areas, providing constructive critique of ideas of others.
- Responsive Talk: Direct response to another student or instructor.
- Initiative Talk: Initiating discussion beyond existing structure, furthers existing line of thought with new ideas.
- New Discussion Threads: New threads posted by learners to encourage discussion.

Community

- Reflection: Relates current learning to previous learning to benefit peers.
 - Personal Experience: Relates personal experience to benefit learning of peers.
 - Support and Encouragement: Provides comments to praise or encourage other learners.
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To assure that the criteria are reliable, additional qualitative study is recommended to identify examples of other types of interaction that might be included in the proposed criteria. Research needs to be conducted at universities of differing sizes, both public and private, who offer on-line courses to complement the information that has been collected thus far. With a solid set of interaction types identified, quantitative research then needs to be undertaken to validate the criteria.

Research on On-Line Learners. The results of this exploratory study also identified some basic differences in the numbers and quality of interactions based on the amount of experience in a traditional university classroom setting. Research should be undertaken to identify if success in an on-line course is dependent on the amount of experience a student has as a learner.

Further exploration of the separate, but interrelated, issues of communication and interaction from the perspective of the learner are also needed. Students do make attempts at socialization in their comments, but the degree to which social presence is actually felt by their on-line classmates is unknown. Further, the types of interactions that students believe are important to support their learning need to be identified. This type of study would inform not only the research literature, but would impact the practice of instructional design as well. Finally, studies that evaluate the amount and quality of learning that takes place in an on-line classroom, versus the traditional classroom, should be undertaken. This research will contribute to the body of knowledge related to instructional strategies and confirm or deny the effectiveness of on-line learning.

Recommendations for Instructional Designers

On-line instruction is becoming more prevalent at all levels of university instruction. Often considered a necessity for graduate students, many of whom work during the day, undergraduate courses, including core knowledge and major specific studies, are increasingly offered in a Web-based format to meet the needs of increasingly technology-savvy students. Having used technology from an early age, these students are comfortable with the use of computers and view an on-line course as extension of their regular studies.

The desire to meet the financial goals of the university leads to an increased number of courses being made available on-line, thus providing the requested product to the ultimate consumer. Publishers of textbooks offer PowerPoint™ slides and test generators ready for incorporation into Web CT™ and other on-line course software. Giving the impression that developing an on-line course is as easy as installing publishers' ancillaries, instructors forge ahead with "on-line" or "hybrid" courses that they believe will encourage the same learning that a student would get in their class. And when the instructor is questioned about the interaction among students in the course, he or she will often cite the "community of learners" that exists among those who are signed into, and using, the on-line course materials.

Learning is an inherently social process in which knowledge is created and used. Technology provides the tools that can be used in that process, yet learning itself requires that those tools be used appropriately. Likewise, an on-line course provides a channel for communication; the interaction within the group is the means for the instructional message to be disseminated. The absence of a continued instructional presence to model and encourage learning behaviors may impact the ability of the students to achieve optimal learning. Students in this study were collaborative, often using the first names of their peers in comments, and

included many courteous remarks in their posts. They were quick to lecture and to accept the ideas of others, perhaps building on those ideas, in their communications. Additionally, the analysis provided further confirmation that students performed instructional tasks within the threaded discussions, but also indicated that the degree to which this occurs varies among courses and learners.

The amount of experience one has as a student may play an important role in the success of on-line instruction. Those with limited experience in higher education are less skilled at being a student and have observed fewer instructors. Study at the university level is often quite independent; the professor provides for instructional activities that complement, rather than encompass, the required course materials. Discussion, supplementary materials, questioning techniques, and practice activities all are designed by the instructor to enhance learning in the traditional classroom. In the on-line classroom, these items cannot be assumed to occur, they must be encouraged to occur. If “active interaction with course content and personal communication” is a criterion for community building, the course tools and course design must encourage the interaction to occur.

The course syllabus provides information on the instructional methods and techniques that will be used to enhance learning. Most commercial on-line learning products provide an on-line syllabus; the same written document used for a face-to-face class posted to the “course documents” section of the program may not suffice to augment learning. In this study, the learners with more experience as students tended to have more meaningful interaction. They performed more instructional tasks, according to the FIAP (1970), to encourage interaction among and within the group. For the designers of on-line instructional materials this identifies the need to build the necessary interaction into the course.

The message posting area of the product used in this study, Web CT™, offers a space to write a message, to add an attachment, to quote the current message, to preview a message, and to post a message. This area is very text dependent and presupposes that communication in and of itself is all the interaction that is needed. To update this tool to allow a button for posting questions, that would be displayed with a question indicator or other icon in the subject line of the thread, as well as highlighted in a separate box, font style, or color, at the top of the actual message, would identify to learners that questions are part of the on-line learning process and, perhaps, encourage them to ask questions of others.

Similarly, an icon for posting suggested Web links or sites could also be placed on the message dialog box. On-line courses have many options available for icons, including the ability to create them. An intuitive icon, such as a large check mark, could signify “check this out”—an indicator to follow a link or to search for specific information. This would provide a visual cue for the learner and complement the “giving directions/guiding research” portion of the FIAP (1970), in addition to the “sharing of resources” identified by Palloff and Pratt (1999).

To support the social aspect of learning, the study provided data indicating that students were quick to agree with one another, yet they were slower to negotiate meaning within the group. Perhaps because the discussion format did not provide any tools to indicate that questions or criticism were encouraged, learners did not attempt these types of interactions. Learners tended to be quite clever; however, in adapting punctuation and text style. The use of flames, emoticons, or “text message” language, to express shared meaning within their writing, appeared throughout the cases investigated. The learners used conventions for socially constructed meaning in other areas of their lives and applied them to the on-line course materials. That the learners incorporated these “mutually understood” visual images and abbreviations into their

writing indicates that they inherently understand the social aspect of learning, yet they need direction to apply this understanding to the larger instructional task. Providing learners with a pull down menu that offers visual symbols, along with a text box, would satisfy their desire to communicate visually and also encourage them to add text-based comments.

Training for both students and instructors in community-building behaviors, such as questioning, suggesting resources, or directing thought, is crucial for successful community building. Most programs provide a rudimentary tutorial that introduces menu bars and buttons, yet students are never taught what to do once they utilize the menus and enter the instructional areas. Likewise, some on-line instructors rely upon the software to provide the “interaction” that will affect the building of a learning community within their course. Students need to be coached on taking responsibility for their own learning, as well as that of the group as a whole. Instructors must model effective teaching and learning behaviors in the on-line classroom rather than rely on the software to develop community.

The use of Web-based, or on-line, instruction at universities will continue to proliferate over the coming years. Whether a result of meeting the needs of students who have been schooled through technology over the course of their educational careers, of providing a more convenient delivery system for working students, or of universities to continue exploiting a revenue stream, courses will be placed on-line and learners will use them. For the instructors, on-line courses will pose challenges for enrollment and course management. For the designers of these courses; however, the task of developing programs which are truly interactive and based on sound learning principles is not a challenge, but rather an imperative.

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