

## Chapter 2. Review of the Literature

Chapter 2 is a summary of a review of the relevant literature in the instructional design and educational technology fields. This review addresses four main topics: 1) values and learning goals in social learning environments, 2) the basic characteristics of online learning environments, 3) social interactions in online learning environments, and 4) design guidelines for social interaction in online learning environments, including a discussion of specific situationalities in case studies of environments that utilize social interaction. Informed by this review, I will conclude with a discussion of the specific research questions this study answers.

### 1. Values and Learning Goals in Social Learning Environments

It is important to consider the theoretical foundation or learning assumptions of the designer (or educator), when designing or implementing an online learning environment, just as it is for any learning environment. Assumptions about learning help determine an educator's values and learning goals, which in turn influence the design of the learning environment. A review of the literature describing the essential characteristics of learning environments built upon the theoretical foundations of social constructivist or socio-cultural learning theory reveals a collection of related values, goals, and characteristics that influence the design of online social learning environments. In this review, I will include studies that represent some of the major theoretical positions in the literature.

### Social Constructivist Learning Environments

There is an extensive literature describing social constructivist learning environments. Social constructivist learning can be defined as learning that occurs as students create (construct) understandings of the world they are experiencing through interaction with others (e.g., fellow learners, experts) (Bonk & Cunningham, 1998; Cobb, 1994; Duffy & Cunningham, 1996). Social constructivist values and related learning goals (or characteristics) include the following:

- Meaningful learning - Students are meaningfully engaged in worthwhile learning activities (Brown, Collins, & Duguid, 1989; CGTV, 1992; Kearsley & Schneiderman, 1999).
- Collaborative problem solving - Learners work together to solve problems with a variety of tools and resources (Barrows, 1986; Savery & Duffy, 1996; Wilson, 1996).
- Relevance - Learning should be relevant to the student (Keller, 1979; Lave & Wenger, 1991; Savery & Duffy, 1996).
- Multiple perspectives - Learning environments should enable a student to access learning content through multiple perspectives (Honebein, 1996; Jonassen, 1991; Spiro, Feltovich, Jacobson, & Coulson, 1992)
- Collaborative reflection - Learners co-construct understandings through collaborative reflection in the context of mutual inquiry with their peers (Jonassen, 1994; O'Connor, 1998).
- Self-regulation - Learners should be expected to function as self-motivated and self-directed participants in their own learning (American

Psychological Association [APA], 1995; Corno & Mandinach, 1983; Rohrkemper, 1989; Schunk & Zimmerman, 1998; Wagner & McCombs, 1995).

- Community - Learners should become full participants in learning communities, or communities of practice (Jonassen, Davidson, Collins, Campbell, & Haag, 1995; Lave & Wenger, 1991; Moller, 1998; Scardamalia & Bereiter, 1994).

Many educators use social constructivist learning theory as a foundation for learning environment and course design. The instructional methods they use, such as requiring students to work collaboratively on a significant project, are often chosen because they will help the students achieve one or more of the above goals. Another major group of learning environments is built upon the foundation of socio-cultural learning theory (defined below). Many of the fundamental learning goals or values of the socio-cultural theorists are similar to those of the social constructivists, and lead socio-cultural educators to choose similar instructional methods. Next I will describe some of the major values and goals found in socio-cultural learning environments.

### Socio-cultural Learning Environments

Socio-cultural learning, whose origin is most commonly attributed to the work of Russian psychologist Lev Vygotsky, can be defined as learning that occurs as students engage in learning activities that acknowledge, and may indeed take full advantage of, the social, cultural, and historical contexts of the environment in which the students exist (Moll, 1990; Vygotsky, 1978; Wertsch, 1998). Learning takes place within a learner's ZPD, the conceptual region just beyond an individual's capability to perform (or think)

without external support of some kind. In order to operate in this zone, interaction with an external agent, such as a teacher, more capable peer, or expert, is necessary. Therefore, learning is understood to be an inherently social process (Vygotsky, 1978). Vygotsky's approach to understanding learning as a social process has been used to design and implement many online learning environments that facilitate socially negotiated learning (Bonk & King, 1998a). Socio-cultural learning theory describes values and learning goals that should guide the design of learning environments. These values and goals include:

- Student-centered - Teachers should assist students as they learn, with the focus on the learner rather than the teacher. This leads to teachers taking on the role of models, coaches, and mentors (APA, 1995; Hannafin, Hill, & Land, 1997; Rogoff, 1990; Wagner & McCombs, 1995).
- Peer collaboration - Students learn through interacting on a social plane with more capable peers. This leads to student collaboration in dyads and small groups (Roschelle, 1996; Tharp & Gallimore, 1988; Tudge, 1990; Vygotsky, 1978; Webb & Palinscar, 1996; Wertsch & Blivens, 1992).
- Scaffolded instruction - Students should only be given the minimum necessary support for learning – often referred to as scaffolding (Bruner, 1983; Rogoff, 1990; Stone, 1993; Vygotsky, 1978).
- Dialogue - Participative dialogue between students and teachers in an “instructional conversation” is critical to the learning process (Gallimore & Tharp, 1990; Tharp & Gallimore, 1988).
- Sociohistorical context - It is important to consider the historical and social aspects of the learning context when designing a socially interactive

learning environment (Moll, 1990; Vygotsky, 1978; Warschauer, 1997; Wertsch, 1979).

As with social constructivist learning theory, many educators use socio-cultural learning theory as a foundation for learning-environment and course design. The instructional methods they use, such as using scaffolding methods as part of a “cognitive apprenticeship” approach to teach new complex cognitive skills, are often chosen because they will help the students achieve one or more of the above goals.

These two learning theories, social constructivist and socio-cultural, provide learning goals and values that many online learning environments achieve or fulfill, and many studies use terminology from one or both theories to describe specific online environment designs. Next, I will briefly describe several of the most important general characteristics of online learning environments. A basic understanding of these characteristics will aid in understanding the methods of social interaction that have been effective in online learning environments.

## 2. Online Learning Environments

Online learning has emerged as a field of practice largely as a result of technological developments allowing easy and convenient asynchronous communication among learners, educators, and others (Harasim, 1990a). With the advent of CMC in the 1980's and the WWW in the 1990's, the practice of online education has far outpaced educational research and instructional theory development for online education. Online education (or online learning) can be simply defined as an educational environment that

uses computer communication systems for educational delivery and interaction (Harasim, 1990b).

Harasim (1990b) describes the key attributes of online education as many to many communication, place independence, time independence, text-based, and computer-mediated interaction. Harasim concludes that online education is a place where not only educational collaboration can occur, but also where intellectual amplification is possible. The possibility exists for learners to expand their intellectual powers “beyond what the unaided human could demonstrate” (p. 53) through social engagement in CMC environments that support both active learning and knowledge building communities. Harasim’s focus is on the use of text-based computer conferences in online education. However, in the past decade many online environment designers have created learning environments with more media (e.g., graphics, animation, video, and audio) to engage students and facilitate learning, especially since the emergence of the WWW.

Many of the learning activities and instructional methods implemented in online learning environments require social interaction among participants. The next section of this review addresses social interactions in online learning environments.

### 3. Social Interactions in Online Learning Environments

Many educators and learning theorists consider learning to be a largely social process (Bruner, 1990; Dewey, 1897; Hutchins, 1996; Lave & Wenger, 1991; Rogoff, 1990; Salomon, 1993; Vygotsky, 1978; Wertsch, 1997). While not all learning environments require an explicit social interaction element for effectiveness (e.g., self-

paced tutorials and review guides), most online learning environments are designed to use some measure of social interaction in the learning approaches they implement.

### Defining social interaction

Interaction has been described with many terms and classifications, often in very dissimilar ways. Different authors focus on dissimilar aspects of interaction or sometimes just use dissimilar terminology. Rose (1999) even goes as far as asserting that the concept of interactivity in the instructional technology literature is “a fragmented, inconsistent, and rather messy notion ...” (p. 48). The variation in the literature seems to bear witness to the “messiness” of the concept of interaction. A brief look at several studies supports this view.

Wagner (1994) takes a systemic approach in her development of a functional definition of interaction. She includes the contexts of instructional delivery, instructional design, instructional theory, and learning theory in her attempt to establish conceptual parameters for the function of interaction. Abrami and Bures (1996) describe asynchronous, non-face-to-face interactions as “asocial” in general, but also consider collaborative interactions among students as essential factors in successful distance education. Interestingly, Abrami and Bures acknowledge the importance of the collaborative interactions among students, yet they still describe the interactions as “asocial.” Feenberg and Bellman (1990) describe the importance of “social factors” in designing distance learning environments that use CMC technology. They consider the design of the social environment in distance learning as comparable in importance to the interior design of a face-to-face learning environment, meaning that the effort an educator takes in designing a classroom environment for social interaction (e.g., chairs arranged in

small groups for collaboration or in a large circle for class discussion) should also be taken by an online educator. This may mean creating a unique virtual space for each collaborative group in a class, or creating a common discussion space for a whole-class discussion.

Gilbert and Moore (1998) describe an “interactivity taxonomy” for web-based learning environments, developed along the two factors: social interactivity and instructional interactivity. Gilbert and Moore use this taxonomy to help choose which technological tool is the best fit for an instructional situation, given the educator’s desired levels of social and instructional interactivity and each available tool’s “interactivity affordances” or features. Walther (1996) posits that CMC technologies support impersonal, interpersonal, and “hyperpersonal” communication interactions. Walther describes hyperpersonal interactions as interactions with heightened levels (feelings) of intimacy, solidarity, and liking, which cannot be achieved through face-to-face interactions but can be experienced through CMC facilitated interactions. Yacci (2000) defines interactivity with four major attributes: the existence of a message loop, the completion of the message loop from the learner’s perspective – *from* and *back to* the learner, the provision of both content learning and affective benefits, and the need for mutually coherent messages in each interaction. Yacci points out the need for a common definition of interactivity, and provides the structural process definition as a starting point for future research.

In this study, I define social interaction simply as “intentional communication between two or more participants in the learning environment.”

### Importance of social interaction for effective distance learning

Social interaction in online learning is consistently shown in the literature to be extremely important for effective learning in most learning environments. Gunawardena and Zittle (1997) show that the degree to which a person is perceived as “real” in CMC, a concept also referred to as social presence, is a strong predictor of satisfaction in distance education. Moore (1992), in a study of the general distance education environment, describes the transactional distance between instructors and learners as a function of dialogue and structure. Increasing the amount of dialogue between instructors and students can lead to a smaller transactional distance and more effective learning. In a study comparing online collaborative project teams with face-to-face teams, Trentin (2000) identifies interaction among all participants as a key contributor to overall measures of educational quality.

Several studies report that the greatest determinant for student judgments as to whether an online course is better or worse than a face-to-face course is the amount of interaction between student and instructor and among students (Abrami & Bures, 1996; Hiltz, 1995). Hiltz (1995) also reports that if an instructor can facilitate meaningful, engaging cooperative group experiences online, students are likely to experience a greater sense of interaction than in a traditional face-to-face course. Previous literature reviews have focused: (a) on the building of effective interaction in distance education (Flottesch, 2000), where online education is included only as a minor component in the reviewed research, and (b) on the use of student interaction of both a social and informational nature in online learning (Liaw & Huang, 2000). Both reviews conclude that increasing the amount of interaction among students leads to improved learning.

### Levels and types of interaction

Bonk and King (1998b) present a five-level taxonomy of online interactions that emerged from their work with online collaborative writing techniques. The levels, in order of increasing complexity, include: 1) e-mail, 2) asynchronous discussion boards, 3) synchronous brainstorming (chat), 4) real-time collaborative text (live, shared document), and 5) real-time multimedia/hypermedia collaboration. This taxonomy is useful because it includes more than just text-based interactions and organizes the various interactions by depth and not just amount of interaction. Many other studies assert that using an appropriate mix of synchronous and asynchronous communication tools and fostering a sense of community are important considerations for the designers and implementers of interactive online learning environments (Harasim, 1990b; Hiltz, 1986; Levin, Kim, & Riel, 1990; Romiszowski & Mason, 1996; Zimmerer, 1988).

Moore (1989) distinguishes among three levels of interactions in distance education, a set of distinctions that can be directly applied to online education. Moore's three levels of interaction are learner-content, learner-instructor, and learner-learner. Moore concludes that educators need to design and implement an effective interaction strategy for each particular learning context, addressing each level of interaction as appropriate. This section of the review focuses primarily on two of Moore's levels, learner-instructor (teacher-student) and learner-learner (student-student) interactions, and adds a third component focusing specifically on group interaction. Learner-content interactions are not addressed because they do not directly contribute to the development of design guidance for social interaction in online learning.

### Teacher-Student Interaction

Teacher-student interaction refers to interactions that occur between a teacher and a student. Teacher-student interactions have been, perhaps, the most researched and emphasized social interactions throughout the history of formal education. The educational literature, even in the nascent area of online learning, includes many studies that have reported on characteristics of this level of social interaction. With the availability of an overwhelming amount of information in the online environment, it is critical that teachers actively assist learners to prevent them from becoming “lost in the hyperspace universe” (Hill, 1997). Using both synchronous and asynchronous communication tools in a learning environment designed with interaction in mind, Ahern and Repman (1994) show that the level of teacher-student interaction is increased when effective discussion methods, such as using a graphical discussion interface that displays links visually between messages, are implemented. Several studies show that the instructor can increase interaction by requiring the participation of students, continuously encouraging student participation, and taking the discussion role of peer-participant instead of the traditional instructor-evaluator (Dutt-Doner & Powers, 2000; Harasim, 1990a).

In a study of a graduate course in information systems, Zhang (1998) reports that e-mail was the preferred method of communication between students and the teacher, even though many other modes were available. Apparently, merely providing multiple interaction modes is not enough to ensure their effective use. One study that describes some of the problems experienced when using asynchronous CMC reports that both

teachers and students can be frustrated when trying to keep up with large numbers of messages (Hara & Kling, 1999).

Several studies have shown that teachers need to become aware that within CMC environments, it is very important to structure the varied activities and student experiences to assure effective learning (Ahern & El-Hindi, 2000; Muirhead, 2000). Using conferencing software designed to support collaborative discourse in multi-voiced environments, Ahern and El-Hindi (2000) show that online interactions designed to incorporate features similar to traditional classroom discussion, such as having a focused purpose, connecting related thoughts in the discussion, encouraging democratic participation, and keeping group size small (up to six members), were especially effective. Another study reports that the style of discourse chosen by the instructor is perhaps the most important factor in determining the amount of student participation in an asynchronous conference (Ahern, Peck, & Laycock, 1992). An important conclusion of several studies of teacher-student interaction in CMC environments has been that basic conferencing software may not be able to support teacher-student interactions as well as software specifically designed to structure these interactions (Ahern & Repman, 1994; Duffy, et al., 1998; MacKinnon, 2000). Either the software must be redesigned, or the course discussion dialogic structures must be carefully designed to facilitate more interaction.

#### Student-Student Interaction

Student to student interaction is often de-emphasized as teachers plan instruction. Johnson and Johnson (1985) compare cooperative, competitive, and individual interaction patterns among students and conclude that the most effective interaction

strategy is usually cooperative. Other interaction strategies may be appropriate for other instructional situations, and the authors stress that student-to-student interaction should be specifically designed into the learning experience, and not be forgotten or ignored. In one study, Marttunen (1998) reports that in an e-mail-based student discussion designed to provide a forum for argumentation, student-led e-mail groups tended to be more argumentative than tutor-led groups. A more argumentative discussion led to more student-student interaction, and as a result, more learning was taking place in the student-led discussion group than in the tutor-led group.

In another study of student-student interaction (Ahern & Durrington, 1996), students were reluctant to post messages in a large CMC conference when they were personally identified with the post. However, under the protection of anonymity, students posted messages five times as long and spent ten times as much time visiting the class discussion board. An implication of this study is that it is possible students may be more willing to post when interacting in smaller groups, especially when anonymity cannot be provided. This is important because most online learning environments do not provide an option of student anonymity.

### Group Interaction

In general, group interaction occurs among more than two participants in a learning environment, usually among students, but may also include teachers or other experts in certain situations. Berg (1999) describes how assigning students to teams helped create a successful learning community in an online learning environment in higher education. Several other studies report cases where students work with a group of peers, mentors, instructors, and more advanced students. Graduate students teamed up to

mentor undergraduates using a case-based conferencing system in an online educational psychology course (Bonk, 1998; Bonk, Daytner, Daytner, Dennen, & Malikowski, 2002; Dennen & Bonk, 1999). As part of a graduate course in educational psychology, graduate students were each assigned one undergraduate student in an undergraduate educational psychology course whom they would mentor throughout one semester. The undergraduate student's work was posted online, linked directly to a CMC discussion focused specifically on their work. Throughout the semester, peers, various instructors, and the student's assigned graduate student commented on the student's developing coursework. Bonk and associates found that the mentoring that took place was very helpful to the undergraduate students, with the feedback from "experts" – graduate students and instructors – judged to be of higher quality and more effective than that of the peers.

Many other studies also report successful implementations of group interaction methods in online courses. Dutt-Doner and Powers (2000) report on the use of a newsgroup among elementary pre-service teachers to support their discussions of classroom management, making small group decisions, and providing emotional support to one another. These researchers used student-directed discussions to create an environment that encouraged active student participation. English and Yazdani (1999) report that creating a course structure that requires cooperation, exploration, and mutual construction of ideas can lead to effective group interaction at a distance. They found that course designs that did not require group interaction did not generate interactive learning environments. McDonald and Gibson (1998) explored the dynamics of CMC group interactions and found that they were consistent with classic group interaction theory

(developed without regard to interaction setting). They found that an online environment using CMC can provide the group members' interpersonal interaction needs of inclusion, control, and affection, enabling the students to form themselves into cohesive, functioning groups. Nonis, Bronack, and Heaton (2000) report that it is important to use "facilitative structures" such as adequate technical support, an openness for students to share personal experiences, allowing student discussions to evolve naturally, and communicating clear expectations of discussion quality and participation. Learning environments that include these structures support peer dialogue and group interaction that is meaningful, satisfying to students, and educationally valuable.

Kearsley, Lynch, and Wizer (1995) report that graduate students completing a Masters degree program online have a more positive outlook towards collaboration, teamwork, and human interaction than their counterparts who complete a comparable face-to-face program. Interestingly, Kitchen and McDougal (1999) report that graduate students in a collaborative online course found that sharing ideas, associating with each other, and building knowledge together were very motivating. However, some students did not take full advantage of the collaborative opportunity. Therefore, Kitchen and McDougal emphasize that there is still a clear role for the instructor in facilitating student collaboration.

Many authors have reported success in using social interaction methods in online learning environments, in many different situations, with various types of learners, to accomplish a variety of learning goals. The question remains, however, as to when and how an educator should design an online environment to include instructional methods that require social interaction. For example, given that an educator would like to

incorporate collaborative student groups in their online course design, what methods of social interaction should be chosen? Which methods should not be chosen? For the chosen methods of social interaction, what are the conditions necessary to attain an effective learning experience? Comprehensive design guidelines should be able to provide guidance to educators as they try to answer questions like these. The next section of this review explores the literature that describes design guidelines for social interaction in online learning.

#### 4. Design Guidelines for Social Interaction in Online Learning Environments

Instructional design guidelines, fitted specifically to the online environment, can help educators implement online learning effectively (Khan, 1997a). Unfortunately, most design guidelines offered in the literature suggest various methods (or techniques) that can be used to meet specified learning goals or values while offering little or no discussion of the situationalities (conditions and outcomes) that affect the effectiveness of these methods. This section of the literature review considers several sets of guidelines for online learning, first a review of two collections of papers in edited volumes and then a review of several individual papers, followed by a discussion of specific situationalities reported in descriptive case studies.

##### Edited volumes

One of the first books published on the use of CMC in online learning, Mindweave: Computers, communication and distance education, includes some of the first academic descriptions of online learning (Mason & Kaye, 1989). Most of the chapters (papers) focus on the use of CMC to enable graduate and professional seminars

asynchronously at a distance (Davie, 1989; Harasim, 1989; Kaye, 1989). Taken as a whole, these papers offer insightful descriptions of how CMC discussions can be used in education, how educators can facilitate online seminars effectively, and how the constraints of the overall system (technological, graduate program, new online roles, etc.) can impact the use of online discussions. However, while generally helpful, these early descriptions and basic guidelines do not address situationalities that might be important to specific implementations in online learning.

The book, Web-based Instruction, (Khan, 1997b) includes many case studies of individual online learning environments. As well, the book includes several studies reporting overall design guidelines for using a variety of social interaction methods to meet learning goals. These studies include discussions of the emerging roles for instructors and learners (Shotsberger, 1997), the effective dimensions of interactive learning (Reeves & Reeves, 1997), designing web-based instruction for active learning (Bostock, 1997), and creating learner-centered web instruction for higher-order thinking, teamwork, and apprenticeship (Bonk & Reynolds, 1997).

Shotsberger (1997) offers several general considerations for educators, such as using a combination of both synchronous and asynchronous methods and fostering a sense of community. In Shotsberger's online system, students are assigned to small collaborative groups and required to spend one-half of their "classtime" in synchronous interaction using a chat system. Asynchronous discussion space is provided for groups to use as they want, with no specific class participation requirements. This discussion space is used by groups as they complete collaborative projects. The sense of community is enhanced, according to Shotsberger, when students have a variety of interaction modes

available, when students understand the instructional goals and strategies of the learning environment, and when students feel they can impact the design of the environment as the course progresses (necessitating a flexible environment design). Unfortunately, Shotsberger does not offer generally useful guidelines for determining the appropriate mix of synchronous and asynchronous methods for particular learning environments, nor does he give specific conditions that affect decisions regarding design issues influencing the formation of online community.

Reeves and Reeves (1997) propose a model of web-based instruction that includes ten dimensions of interactive learning. The ten dimensions include pedagogical philosophy, learning theory, goal orientation, task orientation, source of motivation, teacher role, metacognitive support, collaborative learning, cultural sensitivity, and structural flexibility. Reeves and Reeves provide the model to support the design of learning experiences that take advantage of the unique characteristics of, and pedagogical opportunities presented by, web-based instructional environments. This model provides a descriptive tool to help educators understand a specific online environment in terms of the ten dimensions, but does not include any discussion of the conditions that affect the design of the environment.

Bostock (1997) proposes a design emphasis on making the learning environment as active as possible, describing five principles for the use of technology in online learning environments. These principles include the use of data resources, productivity and web-publishing software tools, simulations and programmable models, tutors (both technological and human), and communication through e-mail and CMC. Unfortunately,

Bostock does not provide a discussion of the conditions that should be considered when implementing these principles.

Finally, Bonk and Reynolds (1997) presents thirty methods that educators can use to implement learner-centered online education, classified into three distinct categories of techniques: creative thinking, critical thinking, and cooperative learning. While useful as a “toolbox” of methods, there is unfortunately no discussion of the conditions that affect the decision to choose one or another method.

#### Individual papers

Hill (2001) and Hill and Raven (2001) address the learning goal of building online communities of learners, a goal that requires substantial social interaction. Many instructional methods for community building on the Internet are recommended, including creating a failure safe environment for discussion, encouraging a spirit of adventure, providing structure and organization to help participants manage large amounts of information, and using “connection” messages to create and maintain interpersonal relationships. As with most of the other studies reviewed, there is minimal discussion of the conditions of the learning environment that may affect when to use each of these methods. Klemm and Snell (1995) stress that instructional design must exploit the capabilities of CMC in order to enhance online learning, and provide four design principles for teachers: specify detailed participation and discussion objectives for a conference, create a logical structure for the conference to implement instructional strategies, use team learning approaches whenever possible, and remain actively engaged in the conference. Berge (1999) provides a comprehensive summary of the types of online communications (interactions) factored by the level of student performance

desired, as well as a discussion of various interactive media (e-mail, video, CMC, etc.) and how they should be selected based on a scale of interaction and synchronicity. This summary highlights the challenge instructional designers face as they design online learning environments for interactive learning, but does not structure its guidance with regard to the type of learning, targeted learning goals and values, or other contextual situationalities. Hughes and Hewson (1998) suggest several methods of social interaction commonly found in face-to-face classrooms that can also be used in an online learning environment: participating in formal discussions, teacher questioning with wait time, group brainstorming, quizzing, and informal peer discussions and work groups. Hughes and Hewson (1998) do not offer any discussion of situationalities that affect the use of these interaction methods.

Many other papers report findings that include guidelines for interaction in online environments, but none of them includes a comprehensive discussion of the situationalities that affect the effectiveness of the social interaction methods they recommend (Beaudin, 1999; Harmon & Jones, 1999; Kimball, 1995; Northrup, 2001; Rossman, 1999). One of the few papers that report conditions affecting the choice of social interaction methods is Nonis, Bronack, and Heaton (2000). This paper describes conditions that affect the design of effective online discussions. These conditions include the level of preparation of students to use the technology needed to implement social interaction methods, the amount of “likemindedness” among participants as to the overall purpose of the discussion, the degree of participants’ awareness of the essential attributes of online discourse (such as convenience, familiarity, accessibility, meaningfulness, and focus), and the presence of facilitative structures that address environmental, social, and

motivational issues and expectations. These facilitative structures include providing a professional context that generates relevant discussion topics, allowing for personal expression and relating personal experiences, supplying adequate technical support, using a trained (and accessible) moderator to facilitate discussion, creating the sense of the instructor as co-participant rather than as the center of attention and discussion, and explicit, early communication of expectations concerning the length and quality of message posts and the amount (frequency) of student participation. While Nonis and associates provide a helpful discussion of several important conditions, they do not provide a comprehensive set of design guidelines and do not address methods of social interaction beyond the use of online discussions.

Even though most of the explicit design guidance in the literature does not include an explicit discussion of situationalities, this information can be found through a careful analysis of descriptive case studies. Next, I will address social interaction methods and situationalities that can be found embedded within descriptive case studies in the instructional technology literature.

#### Situationalities in case studies

Reports of specific situationalities (values, conditions, and desired outcomes) that are important to consider when choosing methods of social interaction can be found in many case studies. Often, a case includes a discussion of the particular conditions of the learning environment that influenced design decisions regarding social interaction methods, and how those conditions affected the instructional outcomes. In order to determine the situationalities in a case report, it is necessary to identify the instructional methods, along with the instructional goals, values, and conditions of the learning

environment that affect the effectiveness of these methods.<sup>3</sup> A brief discussion of a sample case follows. This case was chosen because it is typical of many descriptive case studies in the literature.

### Sample case

Zhang (1998) describes the online learning environment of a graduate level course in information systems analysis and design. In the case, Zhang describes the social interaction methods used, the overall learning goals and values, various instructional conditions that affected the effectiveness of the chosen interaction methods, and overall indications of effectiveness. The methods and situationalities (values, goals, and conditions) are summarized below.

#### Situationalities

##### Values

1. Discovery learning
2. Learner-centered education
3. Enforcement - instructor retains some control

##### Learning goals

1. Students learn how to work collaboratively on projects.
2. Students learn how to participate in peer evaluation.
3. Students learn how to choose specific social interaction methods from a range of options.

##### Methods, conditions, and effectiveness

1. Method -- Provide a space for students to create their own web pages in order for them to share information and exchange files with other students.

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<sup>3</sup> The method of case selection and analysis is described in detail in Chapter 3, Methods.

- a. Effectiveness – Only the students with the requisite skills were able to use student-created web pages to exchange files among collaborative group members.
  - b. Conditions – Students need to know how to create their own web pages using HTML programming language or web page creation software such as Netscape™ Composer.
2. Method – Provide a class file transfer protocol (FTP) site for file exchange.
- a. Effectiveness – FTP was not used by students to exchange files among themselves, but was useful to the instructor as a way to distribute and collect a class survey.
  - b. Conditions – Class participants do not share the same e-mail client and cannot reliably download files from a website. This method is not recommended if simpler file sharing options (such as websites with download links or common-format e-mail attachments) are available.
3. Method – Use Internet Relay Chat (IRC or chat) in project groups for group coordination, clarification, and decision-making.
- a. Effectiveness – The students who used IRC were able to coordinate group decisions successfully. However, only a small number of students used IRC; the rest chose to coordinate all group communications and decision-making through other means, primarily e-mail. Additionally, as the number of students in the chat increased, communication became less effective and harder for students to control.

- b. Conditions – Students must have skills in discussion control and IRC client use.
- 4. Method – Students use e-mail to turn in assignments and coordinate group project work.
  - a. Effectiveness – E-mail was the most popular form of interaction.
 

However, the overuse of e-mail can quickly generate a huge volume of e-mails to which the instructor (and other students, in some cases) must respond.
  - b. Conditions – The number of students and assignments must be small in order to keep the volume of e-mail at a manageable level.
- 5. Method – Broadcast course announcements via listserv (automated e-mail list).
  - a. Effectiveness – This method was more effective than posting announcements to the class web page because students checked e-mail more frequently than they visited the class web page.
  - b. Conditions – Students must be able and willing to check e-mail regularly.

#### Situationalities in other cases

Other cases report many other methods and associated conditions. Several of these situationalities are listed in Tables 1 and 2 below.<sup>4</sup> The listing presents situationalities in method-condition pairings, grouped by case study. Included here are the situationality tables for two case studies.

**Table 1. Case report: Poole, 2000**

<b>Method</b>	<b>Condition</b>
Access to all online interaction methods is through a course website.	Students must have ready access – home computers are recommended.

<sup>4</sup> Complete lists of the Methods and Conditions found in all the cases are included in Chapter 5.

<b>Method</b>	<b>Condition</b>
Chat is provided for small group collaboration.	Students must be familiar with chat, otherwise they will choose e-mail.
Students are required to moderate the class discussion (online) for one week. Students are given training in moderator skills.	Students must be willing and able to assume the moderator role.
Use student-centered discussions to motivate participation.	Instructors must be willing to assume new teaching roles – on the side rather than in front of everyone.
Establish trust in class interactions in order to build a learning community.	Participants must be willing to use their real identities –the use of a fictitious student antagonist to provoke discussion participation and present alternative perspectives violates student trust.

**Table 2. Case report: Bourne, McMaster, Rieger, & Campbell, 1997**

<b>Method</b>	<b>Condition</b>
Use a class discussion forum for common student questions and instructor answers.	Students must have ready web access if questions will not be answered via e-mail.
Create private online workspace for project teams.	Co-located students must be willing to meet in the online workspace, or many may choose to meet face-to-face instead. Students must be willing to use team discussion areas instead of e-mail.
Include an expert mentor on each project team.	Sufficient mentors must be available, accessible by project teams, and willing to participate within the resource (\$) constraints of the course.
Encourage peer to peer learning through peer assistance.	Students must be willing to help their peers for the rewards available within the course's motivational system (e.g., extra credit).
Each student creates a publicly accessible web page (website) with their class work and picture.	Students must be amenable to publicly displaying their image and efforts.

In summary, in order to develop and implement successful learning in an online environment built upon social learning theory, it is important for educators and instructional designers to understand the types of social interactions that one might use effectively, along with the situationalities for using each. In most of the instructional

technology literature, the existing design guidance for social interaction in online learning does not include a discussion of situationalities that affect the effectiveness of instructional methods. However, a focused reading of descriptive case studies reveals that many researchers do include discussions of instructional methods and situationalities, though they often do not use this terminology. A systematic survey of descriptive case studies of online learning environments may result in a comprehensive list of instructional methods that use social interaction and related situationalities affecting their effectiveness.

### 5. Research Questions

The bulk of this review considered learning-focused social interactions in the online environment and instructional implementation guidance found in the literature. While there is much in the literature about online learning environments and the instructional use of social interactions in online learning, a primary deficit is a consistent and comprehensive set of design guidelines that specifies which particular interaction-based instructional methods are successful in achieving a particular learning goal, and the situationalities that affect the effectiveness of the chosen method. In order to begin to fill this gap, it is important to start with understanding the methods of social interaction that have been used effectively to meet learning goals and the situationalities that affect the effectiveness of these methods.

As such, this study answers two research questions:

1. In an online learning environment, what are effective combinations of social interaction methods to use, for different conditions and values, in order to achieve specific learning goals?
2. Can these methods and conditions be arranged in a useful classification scheme in a “situationalities framework?”

The rest of this study answers these questions. The next chapter, *Methods*, explains the methodology I have used to answer these questions.