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**Students' Perceptions of Peer and Self Assessment in a Higher Education Online Collaborative Learning Environment**

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# Students' Perceptions of Peer and Self Assessment in a Higher Education Online Collaborative Learning Environment

**by**

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# Dedication

To my parents

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# Students' Perceptions of Peer and Self Assessment in a Higher Education Online Collaborative Learning Environment

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The purpose of the study was to investigate factors that affect students' perceptions of the use of online peer and self assessment in an online collaborative learning environment, and to explore the impacts of the assessments on the online collaboration of the students. The setting of this study was a university graduate-level online credit course entitled Computer Supported Collaborative Learning (CSCL), in which all course activities were conducted collaboratively through online communications and online peer and self assessment was provided at the end of every group project. Data sources included: face-to-face or online video conferencing interviews with 14 participants; participants' written reflections; their portfolios; messages that each participant posted to their group online discussion board; and peers' and self comments on the online peer and self assessment.

Data were analyzed using Strauss and Corbin's (1998) grounded theory approach. Results of the data analysis showed that many factors allowed students to have varied perceptions, attitudes, and feelings in conducting the online peer and self assessment. The factors were grouped into three: learning context, individual differences, and online learning community. Learning context encompassed all parts of the CSCL online course strongly related to the peer and self assessment, including course elements, online assessment system, types of assessment feedback, and graduate school environment. Categories under the factor of individual differences included stringency-leniency in ratings, objectivity of ratings, previous assessment experience, purpose of the assessments, and degree of self-confidence in assessing their own contributions to the group activity. Categories related to the online learning community included group composition, engagement of group members, and sense of community. Additionally, the results revealed the impact of the use of peer and self assessment on the group collaboration in terms of understanding others' perspectives, reflections on themselves, awareness of the assessments, interpersonal skills for collaboration, accountability, participation, personal criteria for the assessments, level of confidence with the assessments, and group collaboration.

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# Chapter I. Introduction

**BACKGROUND**

Collaborative learning refers to the instructional use of small groups so that students work together to maximize each other's learning (Johnson & Johnson, 2004; Kirschner, 2001; Panitz, 1996; Slavin, 1997), which is based on the following fundamental assumptions: that individuals are active agents purposely seeking and constructing knowledge within a meaningful context, all knowledge is basically situated in the environment in which it was acquired, and learning is the development of shared meaning through interacting with others (Derry & Lesgold, 1996; Doise, 1990; Lave & Wenger, 1991; Wilson, Teslow, & Osman-Jouchoux, 1995). A number of researchers indicated that collaborative learning is more effective than traditional instructional methods for students' learning and academic achievement progresses, and it has been widely applied in school curriculums involving collaborative projects across a wide variety of subject domains (Freeman, 1995; Garvin et al., 1995; Johnson & Johnson, 2004; Lejk, Whyvill, & Farrow, 1996; Rafiq & Fullerton, 1996; Rogoff, 1990).

Meanwhile, with the development of computer and online communication technology, it has been expected that the use of such technology in education will play an important role in reconstructing teaching and learning processes to better prepare students for the challenges of a network information society, one in which knowledge is the most critical resource for social and economic development. In particular, a number of researchers in education have explicitly considered the technology's possibilities to

facilitate collaborative learning because students can share their ideas and communicate with each other without the constraints of time and location (Bates, 1995; Crook, 1996; Dede, 2006; Liu, Chiu, Lin, & Yuan, 1999; Phelps, Wells, Ashworth, & Hahn 1991). Thus, collaboration through the use of the computer and online communication technology has become more common in educational environments, and this kind of learning is called "online collaborative learning."

One of the online collaborative learning approaches is Computer-Supported Collaborative Learning (CSCL). CSCL can be defined as the use of appropriately chosen or designed computing software and networked computer hardware in an instructional context that supports group learning processes (Newman, Johnson, Webb, & Cochrane, 1997). CSCL not only delivers a collaborative environment that deals with learning but also presents an environment in which a student interacts with one or more collaborating peers to solve a given problem.

There are numerous studies on CSCL environments demonstrating encouraging effects on the amount and quality of social interaction and other procedural features of teaching-learning processes. The studies have reported that CSCL tends to: increase achievement; promote positive attitudes toward technology and collaboration; encourage cognitive development, learning control, and social competencies; promote positive relationships with group members; promote positive effects on both high- and low-performing students and both male and female students; be cost effective; and promote innovation in groupware and hardware (Amigues & Agostinelli, 1992; Crook, 1996; Davis & Huttenlocher, 1995; Fishman & Gomez, 1997; Johnson & Johnson, 2004;

Lamon, Secules, Petrosino, Bransford, & Goldman, 1996; McConnell, 1994; Rysavy & Sales, 1991; Scardamalia & Bereiter, 1994; Suzuki & Hiroshi, 1997). In addition, a number of studies have been conducted to examine the benefits of group collaboration in the CSCL context; namely, exposing students to other points of view from which they can learn, facilitating active learning, and developing interpersonal relationships and individual responsibilities (Freeman, 1995; Garvin et al., 1995; Harvey & Green, 1994; Jacques, 1991; Mello, 1993; Michaelsen, 1992).

Despite the potential benefits of group collaboration in CSCL, some concerns, problems, and criticisms have been identified. The main problem in group collaboration is the free-rider effect, which is when one or more students in the group does little or no work, thereby contributing almost nothing to the well-being of the group and consequently decreasing the group's ability to perform to their potential (Brooks & Ammons, 2003; Johnston & Miles, 2004; Kerr & Bruun, 1983; Roberts & McInnerney, 2007; Tu & Lu, 2005; Web, 1995). Another problem is the assessment of individuals within the groups; specifically, accurate individual assessment is difficult in the collaborative learning environment because it allows students to contribute at varying levels (Burd, Drummond, & Hodgson, 2003; Webb, 1995). Therefore, in motivating students to become involved in group collaboration and encouraging their group work, it is essential that students feel confident that they will be rewarded fairly for their contributions and that students who do not participate in contributing to the work of the group will not benefit unduly from the efforts of others (Johnston & Miles, 2004).

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On this point, peer and self assessment represents one way of dealing with the assessment problems of group collaboration (Brooks & Ammons, 2003; Johnston & Miles, 2004; Kirschner, 2002; Sluijsmans, 2002; Rafiq & Fullerton, 1996; Roberts & McInnerney, 2007; Tu & Lu, 2005). That is, many researchers have indicated that using peer and self assessment in collaborative learning can engage students in their group work, have them take responsibility for their learning, and minimize the free-riders (Anderson & Freiberg, 1995; Brooks & Ammons, 2003; Dochy & McDowell, 1997; Griffiths & Partington, 1992; Keaten & Richardson, 1992; Kirschner, 2002; Loacker & Jensen, 1988; Slavin, 1995; Sluijsmans, 2002; Tu & Lu, 2005). In addition, some studies indicated that by using peer and self assessment, instructors can be provided with multiple levels and types of assessment information, monitor the progress and participation of individual students, and identify to some degree students' contributions to the group work (Resta, Awalt, & Menchaca, 2002; Roberts & McInnerney, 2007; Tu & Lu, 2005).

Peer and self assessment are based on the social constructivist assessment approach that gives students the responsibility of monitoring and assessing their collaborative process, which basically has the assumption that the student is an active learner and partner with the instructor in making judgments about the student's own learning (Anderson, 1998; Dochy & McDowell, 1997; Fardouly, 2000; Gipps, 2002; Shepard, 2000). Peer assessment can be defined as an arrangement for peers to consider the level, value, worth, quality or successfulness of the products or outcomes of learning of others of similar status (Topping, Smith, Swanson, & Elliot, 2000). Researchers have

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often claimed that peer assessment encourages students to become critical learners and to develop responsibilities and a sense of ownership for their peers' learning (Dochy, Segers, & Sluijsmans, 1999; Orsmond, Merely, & Reining, 1996; Topping et al., 2000). Self assessment can be defined as a procedure by which the students themselves evaluate their knowledge and learning (Boud & Falchikov, 1989). The usefulness of self assessment has been noted by various researchers. The primary benefit of self assessment is that it guides students in making decisions about what they know and what they need to learn as well as gives them more responsibility for their own learning (Anderson, 1998; Dochy & McDowell, 1997; Evans, McKenna, & Oliver, 2005; Hanrahan & Isaacs, 2001; Marienau, 1999).

Peer and self assessment have been widely applied to many academic environments. In particular, the benefits of using peer and self assessment in higher education have been noted by many researchers (Boud, 2000; Boyd & Cowan, 1985; Broadfoot, 1996; McConnell, 2002; Somerville, 1993; Stephenson & Weil, 1992). Its use has been growing across different disciplines such as medicine, nursing, biology and biological sciences, engineering, optometry, management, business, leisure studies, and languages. Many of the studies have reported the effectiveness of the use of peer and self assessment: increased student confidence in the ability to perform; increased awareness of the quality of the student's own work; increased student reflections on their own behavior and/or performance; increased student performance on assessments; increased quality of the learning output; effectiveness of approaches to learning; taking responsibility for learning; increased student satisfaction; and ameliorated learning

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climate (Anderson & Freiberg, 1995; Brooks & Ammons, 2003; Cheng & Warren, 1997; Conway, Kember, Sivan, & Wu, 1993; Cutler & Price, 1995; Druskat & Wolff, 1999; Freeman, 1995; Gentle, 1994; Griffee, 1995; Hassmen, Sams, & Hunt, 1996; Horgan, Bol, & Hacker, 1997; Keaten & Richardson, 1992; Loacker & Jensen, 1988; Longhurst & Norton, 1997; Martens & Dochy, 1997; McNamara & Deane, 1995; Melograno, 1996, 1997; Orpen, 1982; Orsmond et al., 1996; Sambell & McDowell, 1997; Sobral, 1997; Stefani, 1992; Warkentin, Griffin, Quinn, & Griffin, 1995; Williams, 1992). Resta et al. (2002) also mentioned the effectiveness of peer and self assessment for both students and instructors. That is, by using the peer and self assessment, students are exposed to multiple perspectives; learn to work effectively in high-performance learning teams; use assessment standards to judge their own efforts; and work in the classroom, online, and in their future professional lives. In the view of instructors, peer and self assessment can provide multiple levels and types of assessment information, and help provide information to monitor the progress and participation of individual students. Instructors can also share the assessment burden with students and shift roles from information transmitter to learning facilitator.

Moreover, as Topping (1998) anticipated, the computerized online peer and self assessment system has been increasingly popular in the higher education sector. The rapid development of Internet technologies has ushered in an increasing interest in online peer and self assessment in online collaborative learning (Barrett & Lally, 1999; Fabos & Young, 1999; Mason & Bacsich, 1998; Steeples & Mayers, 1998). Liu et al. (1999) indicated that computerized online assessment systems have some benefits over normal

peer and self assessments, namely: higher assurance of anonymity than traditional assessments; increased freedom of time and location for learners; cross-platform tools for hypertext access; ability of students to modify their work more timely; increased teacher-student and student-student interaction and feedback; significantly lower transmission and delivery costs than traditional assessments; and fewer limitations on the transmission of data than traditional assessments.

Recently, with the growing interest in peer and self assessment in collaborative learning, a number of studies have examined students' perceptions, attitudes, and level of satisfaction toward the assessments in collaborative learning environments. The studies have presented a mixed picture. That is, while some studies indicated that students had positive perceptions of the use of peer and self assessment, other studies reported that students were not always favorable toward the assessments. Students with positive perceptions expressed that they enjoyed the peer and self assessment, benefited from assessing peers as well as receiving peers' comments, and could understand the value of the assessments. Moreover, they held the view that peer and self assessment contributed to their learning through the assessment process, increased their involvement in the group work, enhanced their performance, helped them to better reflect on and evaluate their work, helped them to develop problem-solving skills, and enhanced higher order skills for functioning in the group collaboration.

On the other hand, some of the students revealed their concerns and negative perceptions of the use of peer and self assessment. Several studies indicated the factors causing students' negative perceptions: lack of ability to judge peers' works; lack of

knowledge, content expertise, and experience; difficulty of being objective; personal bias; limited and informal assessment training; different interpretation of criteria; peer pressure; friendships and relationships with peers; and the assessment being time-consuming (Brindley & Scoffield, 1998; Cheng & Warren, 1997; Daniels & Magarey, 2000; Hanrahan & Isaacs, 2001; Lopez-Real & Chan, 1999; Rees, Sheard, & McPherson, 2002; Sluijsmans, Brand-Gruwel, & van Merrienboer, 2002).

For instance, some studies indicated that due to the lack of assessment training, students felt uncomfortable in judging their peers and themselves. They were unsure of the markings and feedback that they gave their peers, and even though they rated their peers, they were concerned about damaging personal relationships by hurting their peers' feelings. This is because the students did not completely understand the purpose and role of the assessments. To resolve this, the students mentioned that if they were provided with an assessment training that included what the purpose of the assessments is, how to fairly evaluate others, what each of the assessment criteria means, and how to give and receive constructive feedback, they could feel more confident in evaluating others (Cheng & Warren, 1997; Dana & Tippins, 1993; Evans et al., 2005; Orsmond et al., 1996). As another example, some students indicated the unclear assessment criteria as a factor causing their negative perceptions of the assessments. Due to this lack of clarity, the students encountered difficulties in the interpretation of assessment criteria, and furthermore it made it difficult for students to be aware of what was expected during the course. Therefore, the students thought that if clearly expressed assessment criteria were offered, it could force them to orient themselves on the course demands and promote fair

assessment (Andrade, 2007; Bloxham & West, 2004; Brindley & Scoffield, 1998; Evans et al., 2005; Prins, Sluijsmans, Kirschner, & Strijbos, 2005).

Based on past research, it would be reasonable to assume that if the critical factors affecting students' negative or even positive perceptions toward peer and self assessment are explored, and instructors consider the factors when applying the assessments in their collaborative activities, then the positive effects of peer and self assessment can be enhanced. However, most of the previous studies have simply described students' feelings, levels of satisfaction, and attitudes toward peer and self assessment without exploring closely why they were positive or negative, which factors influenced their perceptions of the use of the assessments, and how the experiences of the assessments impacted their group collaboration process and product in the collaborative learning environment. In addition, even though peer and self assessment have been widely applied in higher education curriculums, there are very few studies focusing on online graduate courses using computerized online assessment systems in the field of education. That is, most previous studies focused more on undergraduate courses using the traditional peer and self assessment which is paper-based systems, and across other fields such as medicine, nursing, biology and biological sciences, engineering, optometry, management, business, leisure studies, and languages.

Therefore, in order to have a deeper level of understanding of students' perceptions of the use of online peer and self assessment and to implement appropriately the assessments in our educational settings, particularly in online graduate courses in the education field, it is necessary and important to examine the factors related to influencing

students' perceptions of the use of online assessments, and their perceptions of how the use of these assessments impact their group collaboration process.

## PURPOSE OF THE STUDY

The main purpose of this study was to understand how students perceive online peer and self assessment in a graduate online course in the field of education; the course was designed to help students explore, use, and develop their knowledge and skills of computer-supported collaborative learning environments. In particular, this study investigated factors that affect students' perceptions of the use of online peer and self assessment in an online collaborative learning environment, and explored impacts of the assessments on the online collaboration of the students.

## RESEARCH QUESTIONS

The study focused on the following research questions:

1. What are the factors that influence students' perceptions of the use of online peer and self assessment in an online collaborative learning environment?

2. What are the students' perceptions on how the online peer and self assessment impacts the online collaboration?

**SIGNIFICANCE OF THE STUDY**

With the growing use of peer and self assessment in higher education collaborative environments, studies regarding the effects and students' perceptions of the assessments have been increasingly conducted. Most of the studies have reported mixed findings; namely, some students positively perceived peer and self assessment and acknowledged the value of the assessments, while other students had concerns and negative perceptions of the use of the assessments. And very few studies indicated the reasons why students were positive or negative on the use of the assessments. In order to maximize the effects of peer and self assessment, it is necessary to explore the critical factors influencing the students' perceptions, and to consider ways to reduce the factors contributing to negative perceptions. On this point, the study will be able to: contribute to the body of knowledge related to students' perceptions toward peer and self assessment, including the factors affecting students' perceptions of the use of the assessments; and to enhance students' positive perceptions of the assessments by suggesting critical values to reduce factors causing students' concerns.

In addition, this study focuses particularly on an online graduate course in the field of education that uses a computerized online assessment system. Thus, it will be able to give further information, insight, and guidance on how to implement the online assessment system in online courses -- specifically in online graduate courses; how the online assessments work in collaborative learning environments; and how to use the assessments in the field of education.

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With the knowledge from this study, it will be possible for instructional designers to gain insight into how they can design effective online collaborative learning courses using online peer and self assessment. Also, this study would better equip them with practical models of online peer and self assessment in such environments.

Finally, this study can provide higher education instructors with insightful information on the merits of peer and self assessment, as well as implementation information and guidance to identify and design better online collaborative learning contexts that incorporate the assessments. By understanding the factors that influence students' perceptions and the impacts of the peer and self assessment in collaborative learning environments, it is also anticipated that instructors can encourage students to be involved actively in the assessment process, enhance students' positive perceptions, and finally increase students' favorable perceptions of peer and self assessment to maximize the beneficial effects. Overall, this study will help instructors properly apply peer and self assessment to their courses.

# Chapter II. Literature Review

Literature covering online collaborative learning and peer and self assessment is examined to provide a foundation for the questions of this study. The review of literature is divided into three sections. The first section addresses online collaborative learning. The second section discusses peer and self assessment in online collaborative learning. The third section presents previous studies on students' perceptions of peer and self assessment in a collaborative learning environment, and indicates limitations of the previous studies.

## ONLINE COLLABORATIVE LEARNING

### Collaborative Learning

Collaborative learning has been already an important element in progressive pedagogies even as far back as the early 1900s. According to Slavin (1997), research on collaborative learning can be considered one of the greatest success stories in the history of educational research. The amount and quality of that research greatly accelerated in the early 1970s and is currently one of the most quickly-expanding topics in educational research. Furthermore, collaborative learning has proved to be more effective than traditional instructional methods for students' learning and academic achievement progress (Rogoff, 1990). Many studies have also shown that students who constantly use in-class collaborative learning procedures and actively interact with each other are more

satisfied with their learning experiences (Johnson & Johnson, 2004). In particular, collaborative learning has been frequently included in higher education courses across a wide variety of subject domains, including biology (Garvin et al., 1995), business studies (Freeman, 1995), civil engineering (Rafiq & Fullerton, 1996), and computing and information systems (Lejk et al., 1996).

However, there seems to be an almost irresolvable discussion as to what 'collaborative' and 'cooperative' learning are and what their differences and commonalities are. This is confounded by the fact that educational researchers often have different purposes, goals, and perspectives that prohibit a clear distinction between the two approaches to group learning. Panitz (1996) saw collaboration as a philosophy of interaction and personal lifestyle, and cooperation as a structure of interaction designed to facilitate accomplishment of an end product or goal through people working together in groups. Slavin (1997) associated cooperative learning with well-structured knowledge domains, and collaborative learning with ill-structured knowledge domains. Roschelle and Teasley (1995) stated that: "Cooperation is accomplished by the division of labor among participants, as an activity where each person is responsible for a portion of the problem solving while collaborative learning involves the mutual engagement of participants in a coordinated effort to solve the problem together" (p. 70).

The debate is still going on; however, it is more important to stress that there are far more similarities than differences between the two (Kirschner, 2001). Kirschner noted in both collaborative and cooperative learning that: 1) learning is active, 2) the teacher is usually more a facilitator than a "sage on the stage," 3) teaching and learning are shared

experiences, 4) students participate in small-group activities, 5) students must take responsibility for learning, 6) students are stimulated to reflect on their own assumptions and thought processes, and 7) social and team skills are developed through the give-and-take of consensus-building. Because there are far more commonalities than differences, the two could be considered equivalent.

Based on the commonalities of collaboration and cooperation, collaborative learning can be thereby defined as the instructional use of small groups so that students work together to maximize their own and each other's learning (Johnson & Johnson, 2004). It could also be said that the main purpose of collaborative learning is for learners to work together and use each other as a resource as they share knowledge, challenging each other and their own views, hence to serve as a source of puzzlement that stimulates new learning (VonGlasersfeld, 1989).

In order to work together and to see the value of sharing of others' views and knowledge, Johnson and Johnson (2004) presented five basic elements that must be structured within the collaborative learning situation: positive interdependence, individual accountability, promotive interaction, social (team) skills, and group processing. Positive interdependence means that students need to perceive that they need each other in order to be able to complete the group's task. Individual accountability denotes that students should be responsible for their own learning, and be able to perform at a comparable level with or without their team. Promotive interaction is where students promote each other's learning by helping, sharing, and encouraging efforts to learn. Social (team) skills means that for a team to function effectively, its members need to use

and practice leadership, decision-making, trust-building, communication, and conflict-management skills. Group processing implies that groups need specific times to discuss how well they are achieving their goals and maintaining effective working relationships among members.

In addition, Resta et al. (2002) mentioned four factors related to the effective collaborative group: social interaction, task management, leadership, and trust. Social interaction means the interpersonal behaviors required for positive group interaction, which communicate respect, acceptance, and a willingness to work together. Task management entails team-functioning skills and actions defined by meeting responsibilities, sharing, and helping others to successfully complete team tasks. Leadership implies facilitating and coordinating team efforts, encouraging participation, mentoring, and assuring all voices in the group are heard. Trust refers to interpersonal and communication skills that lead to getting to know and trust others, and managing conflict.

Therefore, if the basic elements mentioned by Johnson and Johnson and the factors related to effective collaboration presented by Resta et al. are appropriately structured in the collaborative learning environment, collaborative learning can be specifically associated with 1) promoting active student participation and responsibility for learning (Griffiths & Partington, 1992), 2) deepening student understanding (Brown & Atkins, 1996), 3) developing independent skills of problem-solving, decision-making and critical thinking (Beard & Hartley, 1984), and 4) enhancing greater teamwork (Kremer & McGuiness, 1998).

**Theoretical Foundations of Collaborative Learning**

In studying collaborative learning, several theoretical standpoints are normally used: socio-cultural theory, constructivist theory, and shared cognition theory (Dillenbourg, Baker, Blaye, & O'Malley, 1995; Johnson & Johnson, 2004; Stahl, 2003). These theories are based on the same underlying assumptions that individuals are active agents purposefully seeking and constructing knowledge within a meaningful context, and that all knowledge is fundamentally situated in the environment within which it was acquired (Derry & Lesgold, 1996; Wilson et al., 1995).

The socio-cultural theory is usually identified with Vygotsky. Wertsch (1991) has proposed three major themes in Vygotsky's writings that explain the nature of the interdependence between individual and social processes in learning and development. That is, human activities 1) take place in cultural contexts, 2) are mediated by language and other symbol systems, and 3) are best understood when investigated in their historical development. Among these themes, the first theme is related strongly to collaborative learning. This theme focuses on the causal relationship between social interaction and the individual's cognitive development. It is also derived from Vygotsky's zone of proximal development (Vygotsky, 1978). In this concept, each internal cognitive change is mapped onto a causal effect of a social interaction. In Vygotsky's words:

The Zone of Proximal Development is the distance between the actual

developmental level as determined by independent problem solving and the level

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of potential development as determined through problem solving under adult

guidance or in collaboration with more capable peers (Vygotsky, 1978, p. 86).

Based on this, the zone of proximal development defines meta-conceptions that might

evolve as learned concepts after a period of social interaction. Thus, the inter-

psychological processes are internalized during social interactions.

The constructivist theory advocates that students master new approaches of

learning through interacting with others (Doise, 1990). This theory is an extension of the

work of Piaget and his disciples: "Cognitive conflict created by social interaction is the

locus at which the power driving intellectual development is generated" (Perret-

Clermont, 1980, p. 12). From this theory, contradictions between the learner's existing

understanding and what the learner experiences give rise to disequilibrium, which in turn

leads the learner to question his or her beliefs and to try out new ideas. In Piaget's words

(1985), "Disequilibrium forces the subject to go beyond his current state and strike out in

new directions" (p. 10). Therefore, within the constructivist theory, emphasis is given to

interactions rather than actions themselves. And a given level of individual development

allows participation in certain social interactions which produce new individual states

which make possible more sophisticated social interactions (Dillenbourg et al., 1995).

In the theory of shared cognition, the environment is an integral part of cognitive

activity. According to this theory, the environment consists of the physical and social

context. However, the shared cognition theory places the focus directly on the social

context that is claimed to make the collaborations happen (Dillenbourg et al., 1995).

Shared cognition aims at letting the students acquire knowledge and skills in contexts where they are applicable (Brown, Collins, & Duguid, 1988; Lave & Wenger, 1991). Some advantages of the shared cognition theory are: 1) by linking together specific contexts and the knowledge to be learned, students learn conditions under which the knowledge should be applied; 2) situations foster creative thinking - students often learn how the knowledge they have can be applied in new situations; and 3) situatedness leads to the acquired knowledge being more practical in nature. According to this theory, collaboration is viewed as a process of building and maintaining the shared conception of a problem (Brown et al., 1988; Lave & Wenger, 1991).

**Collaborative Learning and Technology**

Many researchers have shown how very different technical applications can be used to facilitate collaborative teaching and learning (Dede, 1996). It is not only the features of the applied technology but especially the method of implementing the technology which support student collaboration. Crook (1996) has widely analyzed how computers can facilitate collaborative learning in schools. He made a distinction between interacting around and through computers.

The first perspective, interacting around computers, stresses the use of computers as tools to facilitate face-to-face communication between student pairs or students in a small group. According to Crook, technology may be serving to support collaboration by providing students with what he calls points of shared reference. He claimed that a

traditional classroom situation is too thinly resourced for successful collaboration. There

are not enough available anchor points at which action and attention can be coordinated.

The capabilities of computers can be used as mediating tools which help students to focus

their attention on mutually-shared objects (Jarvela, Bonk, Lehtinen, & Lehti, 1999).

Many different types of programs such as databases, spreadsheets, mathematics

programs, programming languages, simulations, and multimedia authoring have been

successfully used as tools to promote collaborative learning (Amigues & Agostinelli,

1992; Brush, 1997; Eraut, 1995; Lehtinen & Repo, 1996).

In Crook's distinction, interacting through computers refers to the use of

networks. Local area networks (LAN), wide area networks (WAN), and the global

version of the latter (Internet) provide education with a variety of mediating tools for

collaboration such as e-mail, electronic bulletin boards, conferencing systems, and

specialized groupware. E-mail is a normal communication tool in many schools.

Although the basic idea of e-mail is to serve as a tool for dyadic communication, it can

also be used in larger collaboration (Steeples, Goodyear, & Mellar, 1994). Online

computer conferencing is an interactive medium that has existed since the first computer

networks (Rheingold, 1993) but has only recently been implemented as a common

resource for educational environments. One of the features of online computer

conferencing is the efficient management of conversations. Other supporting features are

time independence and location independence which allow a combination of synchronous

and asynchronous discussions (Bates, 1995; Phelps et al., 1991).

Therefore, as the use of computer technology and Internet communication technology has increased, collaboration via online networks has become more common in educational environments. We simply call it online collaborative learning. One of the most dynamic types of the online collaborative learning is Computer-Supported Collaborative Learning (CSCL). More detailed characteristics of CSCL are described next.

**Computer-Supported Collaborative Learning**

In a networked information society in which knowledge is the most critical resource for social and economic development, preparing students for participation in this society has become a basic requirement for education. At this point, educational institutions are being forced to find better pedagogical methods to cope with the challenge, and they expect that computers will play an important role in restructuring teaching and learning processes to better prepare students. Computer-Supported Collaborative Learning (CSCL) is one of the most promising ideas to improve teaching and learning with the help of modern information, computers, and communication technology.

In particular, CSCL not only delivers a collaborative environment that deals with learning but also presents an environment in which a student interacts with one or more collaborating peers to solve a given problem. With CSCL the student may be able to discuss these strategies with a group of fellow students who advise, motivate, criticize,

compete, and direct the student towards a better understanding of the subject matter (Kumar, 1992). Even if CSCL is used interchangeably with Computer-Based Collaborative Learning (Taylor et al., 1990), Collaborative Intelligent Educational Systems (Cumming & Self, 1989a, 1989b), Collaborative Intelligent Tutoring Systems (Kumar, 1992), Intelligent Collaborative Learning Systems (McManus & Aiken, 1993), Multi-Agent Cooperative Learning (Robertson, Zachary, & Black, 1990; Galliers, 1988, 1989), and Peer Learning (Chan, 1991; Chan & Baskin, 1988; VanLehn & Ohlsson, 1994), CSCL can be defined as the use of appropriately chosen or designed computing software and networked computer hardware in an instructional context that supports group learning processes (Newman et al., 1997).

There are numerous studies on CSCL environments demonstrating encouraging effects on the amount and quality of social interaction and other procedural features of teaching-learning processes (Amigues & Agostinelli, 1992; Crook, 1996; Davis & Huttenlocher, 1995; Fishman & Gomez, 1997; Lamon et al., 1996; McConnell, 1994; Rysavy & Sales, 1991; Scardamalia & Bereiter, 1994; Suzuki & Hiroshi, 1997). Johnson and Johnson (2004) also introduced various research studies on technology-supported cooperative learning, and then summarized the results of the studies as follows: technology-supported cooperative learning tends to 1) increase achievement in both academic achievement and learning how to use technology, 2) promote positive attitudes toward technology and cooperation, 3) encourage development (cognitive development, learning control, and social competencies), 4) promote positive relationships between team members, 5) promote positive effects on both high- and low-performing students

and both male and female students, 6) be cost effective, and 7) promote innovation in groupware and hardware. In addition, several empirical experiments have offered evidence that CSCL has proven to be helpful for higher order social interaction and subsequently for better learning in terms of deep understanding (Scardamalia & Bereiter, 1994; Suthers, 1998).

## PEER AND SELF ASSESSMENT IN ONLINE COLLABORATIVE LEARNING

### Necessity of Peer and Self Assessment in Collaborative Learning

As mentioned in previous sections, collaborative learning, including CSCL, has a number of benefits, comprising of exposing students to other points of view from which they can learn and permitting the development of more comprehensive assignments than is possible for individual-based projects (Freeman, 1995; Jacques, 1991; Michaelsen, 1992). Collaborative learning also provides an opportunity for the development of interpersonal and teamwork skills, such as communication, leadership, planning, and time management (Harvey & Green, 1994). According to Mello (1993), the main benefits derived from collaborative learning can be addressed as follows: 1) the students gain an insight into group dynamics and processes, 2) the students develop their interpersonal skills, 3) the students are exposed to the viewpoints of other group members, and 4) the students are further prepared for the real world than by traditional classroom methods alone.

Despite the potential benefits of collaborative learning, some research has also identified that the inclusion of collaborative learning within the curriculum is not without its problems. According to Webb (1995), some of the problems include: 1) 'social loafing' or 'free-riding' when a member of the group contributes little or nothing to the group's activities, 2) students who are only involved in parts of the group work may be denied the sense of completeness, and 3) issues with formal assessment lead to the dilemma of proving equal or different marks to individuals within the group.

The problems listed above make assessments in collaborative learning difficult. Also the essential problem is that with the assessment of collaborative learning processes and products, we need to ensure that we are fair to all individuals. However, accurate individual assessment is difficult in an environment that allows students to contribute at varying levels (Burd et al., 2003). Generally, there are two approaches for the instructor to distinguish each individual's contribution in a group. The first approach is for the instructor to conduct an investigation, such as reading logbooks designed to show the sequential progress of a group project and the detailed descriptions of each member's activities towards the project. However, the instructor needs to spend extra time and energy for such investigations. The second approach is to ask the students to report the efforts of all the people in their group (Tu & Lu, 2005). This is called peer and self assessment. Because this approach focuses on the individual's efforts and inputs to the final group output, peer and self assessment can be one way of dealing with the assessment problems in collaborative learning.

As already noted in the previous section, Johnson and Johnson (2004) offered five basic elements that must be structured within the learning situation: positive interdependence, individual accountability, promotive interaction, social (team) skills, and group processing. Among the elements, most approaches to collaborative learning rely on two central mechanisms, which are individual accountability and positive interdependence. These two elements have major roles in the assessment of group collaboration. Individual accountability refers to the extent to which group members are held individually accountable for the jobs, tasks, or duties central to group performance or group efficiency. It was introduced by Slavin (1980) to counter the free-rider effect that can allow some students to carry the instructional burden, while others do not contribute but may still gain the same rewards. Slavin (1995) also described successful collaborative learning as the ability to have group goals while being capable of assessing individual accountability. Thus, peer and self assessment is expected to make students individually responsible for an active contribution to group activities (Sluijsmans, 2002). In addition, positive interdependence refers to the extent that the performance of a single group member depends on the performance of all other members. Brush (1997) implemented it to foster group cohesion and a heightened sense of belonging to a group. This can be achieved through the tasks, resources, goals, rewards, roles, or the environment. In the view of peer and self assessment, positive interdependence can also be enhanced through role interdependence by assessing the roles of assessor and assessee. Therefore, it is apparent that through the use of positive interdependence and individual

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accountability, peer and self assessment can enhance a student's sense of task ownership and stimulate involvement in his/her learning (Kirschner, 2002).

Resta et al. (2002) mentioned the reasons for using peer and self assessment in collaborative learning environments: 1) collaborative learning is based on understanding that learning is a social process best done in groups; 2) the need to establish positive interdependence of group members for successful collaborative learning environments; 3) the need to provide both individual and group accountability in the completion of learning tasks; 4) collaborative learning cannot be assessed in traditional true/false, multiple-choice ways; 5) collaborative learning involves a process, therefore formative assessment is more suitable; 6) the instructor is better able to monitor and assess work done within the group; 7) students have a chance to learn how to assess their work in a group over a series of projects; and 8) students have the opportunity to use the assessments to help them improve their performance as a group member.

There are several studies on the effects of peer and self assessment in collaborative learning. According to DeNisi, Randolph, and Blencoe (1983), peer and self assessment can affect individuals' perceptions about the cohesiveness and performance of their groups. In a meta-analysis of studies that examined group evaluation, Karau and Williams (1993) discovered that the potential evaluation of individual contributions to group work had an especially strong influence in ensuring that each team member did a fair share of the work. Also, Druskat and Wolff (1999) found that peer appraisals can have a positive influence on a group's ability to work well together and on team members' satisfaction with the group. Based on these studies, it can be assumed that peer

and self assessment impact and enhance students' participation in group collaboration. In the following sections, how peer and self assessment emerged in collaborative learning environments, the definitions and effectiveness of peer and self assessment, and the characteristics of online assessment system are presented.

**Assessment in Collaborative Learning**

As previously addressed, collaborative learning depends on the theoretical frameworks of socio-cultural theory, constructivist theory, and shared cognition theory, based on the works of Vygotsky (1978), Piaget (1985), and Lave and Wenger (1991). In this context, students must play an active part in their learning process and not remain as passive learners, as they had in the teacher-led instruction process in which the teacher is the sole authority and distributor of knowledge. Additionally, in the constructivist mode of learning, the learning process is shifted towards a student-centered mode and students become active learners taking more responsibility for their learning, and in the process learn to construct knowledge on their own and determine their own learning outcomes. Particularly in the social constructivist perspectives, assessment is frequently referred to as dynamic assessment (Feuerstein, 1979). This characterizes approaches in which the performance of the individual being assessed is mediated or guided by another individual to determine their potential to profit from assistance or instruction. In Vygotskian terms, while traditional static measures at best inform us about an individual's actual level of

development, dynamic assessment is designed to reveal the child's potential level of development:

> The state of development is never defined alone by what has matured. If the gardener decides only to evaluate the matured or harvested fruits of the apple tree, he cannot determine the state of his orchard. The maturing trees must also be taken into consideration. Correspondingly, the psychologist must not limit his analysis to functions that have matured; he must consider those that are in the process of maturation…the zone of proximal development (Vygotsky, 1986, p. 203).

With the changing conceptions of learning emphasizing its social and constructive nature, there is a need to develop social-constructivist assessment approaches that give students the responsibility of monitoring and assessing their collaborative processes (Gipps, 2002; Shepard, 2000). Brooks and Brooks (1993) also pointed out that within a constructivist framework, assessments of student learning should be interwoven with teaching. Therefore, the new role of assessment has spawned what is called "alternative assessment." Alternative assessment, also called dynamic assessment as well as innovative assessment (Mowl, 1996), aims to improve the quality of learning and empower learners, while traditional forms can bypass learners' needs. It can include student involvement not only in the final judgments made of student work but also in the prior setting of criteria and the selection of evidence of achievement (Biggs, 1999; Brown, Rust, & Gibbs, 1994).

The difference between alternative and traditional assessment is distinct. Traditional assessment, comprising of multiple-choice and standardized tests and grades, postulates that the student is a passive learner, a receiver of knowledge, and that the teacher is in an authoritarian role in making judgments on the learner. Learning is seen as an individual process. Traditional assessment is value-free and neutral (Anderson, 1998) and focuses on assessing "surface learning," which includes rote memorization, recitation of facts, and extrinsic motivation. Its relationship to learning is hierarchal (Boud, 1990). Alternative assessment, on the other hand, is collaborative. It is based on the assumption that the student is an active learner and students are partners with teachers in making judgments about their own learning. Alternative assessment is subjective and value-laden, and focuses on assessing "deep learning," the tenets of which include the ability to relate new and previous knowledge and theories to experience; learning as an active process; group work; reflection; and intrinsic motivation (Anderson, 1998; Fardouly, 2000). Dochy and McDowell (1997) explained that alternative assessment encourages students to engage continuously and foster a deep approach to learning, and that the key elements of this approach are reflection, feedback, and the integration of learning and assessment.

Alternative means of assessment include new forms of examinations such as open-book exams (Feller, 1994; Krarup, Naeraa, & Olsen, 1974; Theophilides & Dionysiou, 1996) and take-away exams (Weber, McBee, & Krebs, 1983). Other alternative forms of assessment include projects and investigations (Allison & Benson, 1983; Hirst & Shiu, 1995; Winn, 1995); varied writing assignments (Sarig, 1996; Young & Fulwiler, 1986); oral assessment (Hammar, Forsberg, & Loftas, 1995; Hughes &

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Large, 1993); realistic or problem-solving tasks (Hammar et al., 1995; Segers, 1996);

simulations (Smit & Van der Molen, 1996); portfolios (Birenbaum, 1996; Larsen, 1991;

Valeri-Gold, Olson, & Deming, 1991); profiles (Assiter, Fenwick, & Nixon, 1992;

Assiter & Shaw, 1993; Broadfoot, 1990); group assignments (Arnold, O'Conell, &

Meudell, 1994; Thorley & Gregory, 1994; Winstanley, 1992); and peer, self, and

collaborative assessment (Falchikov & Boud, 1989; Oscarson, 1989; Shechtman &

Godfried, 1993; Stefani, 1994).

As mentioned, alternative assessment approaches include such methods as peer

and self assessment (Falchikov, 1986). Self assessment is probably the most extreme

form of this. It concerns the involvement of students at all stages of the assessment,

removing the barrier between teacher and student and allowing the student to control the

process. Just as the process of self-directed learning places the student in control of the

learning process, so self assessment places the student in charge of the assessment of that

process. Peer assessment requires students to use their knowledge and skills to review,

clarify, and correct others' work (Ballantyne, Hugher, & Mylonas, 2002). Peer

assessment can thereby help students to develop their own skills of reflection, and

enhances the final product.

Many studies have found that peer and self assessment help to remove the

student/teacher barrier, develop enterprising competencies in students, and can lead to

greater motivation (Boud, 1989a, 1989b, 1990; Boyd & Cowan, 1985; Falchikov, 1986;

Heron, 1981). Peer and self assessment have been also observed to be effective in several

applications, particularly in the higher education sector including professional education

(Boud & Tyree, 1979; Patterson, 1996), teaching evaluation (Cosser, 1998; Doyle & Green, 1994; Hughes & Large, 1993; Osborne, 1998; Quinlan, 1996), and management development (Kane & Lawler, 1978; Roadman, 1964; Williams, 1992). Therefore, based on those concepts and studies, it is suggested that peer and self assessment should be part of a process of change towards a student-centered approach. The next section presents the definitions and effects of peer and self assessment.

**Self Assessment**

Self assessment is one form of alternative assessment that allows students to make judgments on their own learning, as well as reflect upon that learning. Self assessment refers to

> …the involvement of learners in making judgments about their own learning, particularly about their achievements and the outcomes of their learning. Self assessment is formative in that it contributes to the learning process and assists learners to direct their energies to areas for improvement, and it may also be summative, either in the sense of learners deciding that they have learned as much as they wished to in a given area, or, in formal institutional settings, it may contribute to the grades awarded to students (Boud & Falchikov, 1989, p. 529).

The ability to assess one's own work is seen as a necessary "real world" skill that students in the 21st century need to possess. It is also a way for students to develop meta-

cognitive, authentic learning competencies. Therefore, as Brooks and Brooks (1993) explained, one of the most valued tenets of the constructivist practice is deep introspection into one's own learning process. By engaging in the self assessment, one may be able to develop reflective practice, as well as foster deep learning in general (Boud, 1990). Self assessments can also "guide students in making decisions about what they know and what they need to learn, which influences what tasks they will complete next" (Anderson, 1998, p. 11). Furthermore, from the faculty or institutional point of view, self assessment gives students more responsibility for their own learning. Implementing it "may decrease the time-investment professors would otherwise need to make more frequent assessments" (Dochy & McDowell, 1997, p. 284).

**Peer Assessment**

Falchikov (1995) simply defined peer assessment as the process through which groups of individuals rate their peers. That is, peer assessment requires students to use their knowledge and skills to review, clarify, and correct others' work (Ballantyne et al., 2002). These tasks are cognitively demanding and, as they actively engage students with new knowledge, have the potential to reinforce and deepen the understanding of the student assessor (McDowell, 1995; Topping, 1998). These benefits are particularly apparent if students are involved in evaluating multiple assessment tasks, as they will be repeatedly exposed to the material presented in a variety of formats. Thus peer assessment encourages students to be critical, independent learners as they become more

familiar with the application of assessment criteria and develop a clearer concept of the topic being reviewed (Falchikov, 1995; Searby & Ewers, 1997). Additionally, implicit in the design of peer assessment is the assumption that students will be accurate and fair when assessing their peers. This, it is claimed, encourages students to develop responsibilities and a sense of ownership for their peers' learning (Dochy et al., 1999; Orsmond et al., 1996; Topping et al., 2000).

In summary, the literature has suggested that peer assessment improves students' learning by 1) encouraging students to consider the objectives and purposes of the assessment task as well as the course itself (Topping et al., 2000); 2) forcing student assessors to contemplate the question of what constitutes a good or poor piece of work (Searby & Ewers, 1997); 3) taking the mystery out of the assessment process, thereby enabling students to appreciate why and how marks are awarded (Brindley & Scoffield, 1998); 4) providing students with a better understanding of what is required to achieve a particular standard and what academic staff are looking for when conducting assessments (Falchikov, 1995; Hanrahan & Isaacs, 2001; Race, 1998); 5) enabling students to view and critique a range of writing styles, techniques, ideas, and abilities, thus encouraging them to learn from both the mistakes and exemplary performances of their peers (Race, 1998); 6) alerting students to the dilemmas teacher face in assigning marks (Billington, 1997; Hanrahan & Isaacs, 2001) and highlighting the importance of presenting work in a clear, logical format (Brindley & Scoffield, 1998; Race, 1998); 7) encouraging students to reflect on their own approaches to assessment tasks (Dochy et al., 1999); and 8)

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improving students' understanding and self-confidence, as well as the quality of subsequent work (Dochy et al., 1999; Mowl & Pain, 1995; Topping et al., 2000).

However, the following can also be observed during peer assessment (Pond, Ul-haq, & Wade, 1995): friendship marking, resulting in over marking; collusive marking, resulting in a lack of differentiation within groups; decibel marking, where individuals dominate groups and get the highest marks; and parasite marking, where students fail to contribute but benefit from group marks. These problems can be prevented by combining peer assessment with self assessment (Dochy et al., 1999).


**Peer and Self Assessment**

Peer and self assessment are combined when students are assessing peers and themselves because the self is also a member of the group that must be assessed (Dochy et al., 1999). This combination fosters reflection on the student's own learning process and learning activities compared to those of the other members in the group or class. Therefore peer and self assessment have been widely applied to many academic environments. In particular, peer and self assessment have been increasingly tried out at the undergraduate level across different disciplines such as medicine (Arnold, Shue, Kritt, Ginsburg, & Stem, 2005; Burnet & Cavaye, 1980; Evans et al., 2005; Rees et al., 2002), nursing (Patterson, 1996), biology and biological sciences (Falchikov, 1986; Stefani, 1994), engineering (Brindley & Scoffield, 1998; Boud & Holmes, 1995; Davies, 2000; Fry, 1990; Helmore & Magin, 1998; Kennedy, 2005; Liu et al., 1999; Oldfield &

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MacAlpine, 1995; Rafiq & Fullerton, 1996), optometry (Conway et al., 1993),

management (Kwan & Leung, 1996; Sivan, Yan, & Kember, 1995), law (Boud, 1989a),

business (Brooks & Ammons, 2003; Lejk & Wyvill, 2001; Williams, 1992), leisure

studies (Wicks & Stribling, 1991), and languages (Caulk, 1994; Cheng & Warren, 1997;

Malabonga, Kenyon, & Carpenter, 2005; Patri, 2002; Ross, 1998; Saito & Fujita, 2004).

Many studies have reported that the involvement of students in the process of peer

and self assessment can develop their critical appraisal skills (Jacques, 1991), increase

their awareness of a range of solutions to problems (Gibbs, 1981), develop their reflective

skills (Schon, 1983, 1987), and contribute to the development of self-reliant and self-

directed learners (Boud & Holmes, 1995). In addition, based on the analysis of 63 studies

on peer and self assessment, Dochy et al. (1999) summarized eight positive effects of

peer and self assessment: 1) increased student confidence in the ability to perform (Cutler

& Price, 1995; Griffee, 1995; Orpen, 1982); 2) increased awareness of the quality of the

student's own work (Anderson & Freiberg, 1995; Gentle, 1994; McNamara & Dean,

1995); 3) increased student reflections on their own behavior and/or performance

(Anderson & Freiberg, 1995; Gentle, 1994; Longhurst & Norton, 1997; McNamara &

Dean, 1995; Sobral, 1997); 4) increased student performance on assessments and

increased quality of the learning output (Cutler & Price, 1995; Freeman, 1995; Hassmen

et al., 1996; Horgan, et al., 1997; Loacker & Jensen, 1988; Martens & Dochy, 1997;

Orsmond et al., 1996; Sambell & McDowell, 1997; Stefani, 1992; Warkentin et al.,

1995); 5) increased effectiveness of approaches to learning (McNamara & Deane, 1995);

6) students taking responsibility for learning because of greater independence (Anderson

& Freiberg, 1995; Keaten & Richardson, 1992; Loacker & Jensen, 1988); 7) increased

student satisfaction (Cheng & Warren, 1997; Conway et al., 1993; Cutler & Price, 1995;

Orsmond et al., 1996; Peters, 1996; Sambell & McDowell, 1997; Warkentin et al., 1995;

Williams, 1992); and 8) ameliorated learning climate (Keaten & Richardson, 1992).

Resta et al. (2002) also mentioned the effectiveness of peer and self assessment

for both students and instructors. That is, by using the peer and self assessment, students

can have multiple perspectives, learn to work effectively in high-performance learning

teams, use assessment standards to judge their own efforts, and work in the classroom

and in their future professional lives. In the view of instructors, peer and self assessment

can provide multiple levels and types of assessment information, and help provide

information to monitor the progress and participation of individual students. Instructors

can also share the assessment burden with students and shift roles from information

transmitter to learning facilitator.

**Online Peer and Self Assessment**

An online environment can enable students to use computers to develop their own

learning processes and assess those of their peers. Topping (1998) summarized the main

functions of computers in assessment as: record-keeping, assessor allocation, integration,

and calculation of weighted marks. Topping also anticipated the increasing popularity of

computerized online peer and self assessment in the new century because the rapid

development of Internet technologies has ushered in a rising interest in online learning

(Barrett & Lally, 1999; Fabos & Young, 1999; Mason & Bacsich, 1998; Owston, 1997; Steeples & Mayers, 1998; Yagelski & Powley, 1996).

The implementation of computerized online peer and self assessment systems can not only speed up grading time but also make anonymous assessments possible (McGourty, 2000; Wen & Tsai, 2006). Using the Internet as a tool for implementing the assessments can provide students with an anonymous environment to express freely their thoughts and ideas about others' work, and students can interact with the teacher and other students with less restriction of location and time (McConnell, 2002; Rubin, 2002; Topping, 1998; Tsai, Lin, & Yuan, 2002; Tsai, Liu, Lin, & Yuan, 2001; Wen & Tsai, 2006).

Liu et al. (1999) also investigated and summarized the benefits of computerized online peer assessment systems over ordinary peer assessment; namely, 1) higher assurance of anonymity than traditional assessments, 2) increased freedom of time and location for learners, 3) cross-platform tools for hypertext access, 4) ability of students to modify their work more timely, 5) increased teacher-student and student-student interaction and feedback, 6) significantly lower transmission and delivery costs than traditional assessments, and 7) fewer limitations on transmission of data than traditional assessments.

**STUDENTS' PERCEPTIONS OF PEER AND SELF ASSESSMENT IN COLLABORATIVE LEARNING**

In order to apply and use appropriately the peer and self assessment in our educational setting, it is necessary and important to know how students perceive the assessments and what attitudes students have toward them. By exploring the students' perceptions and attitudes, we may be able to develop and provide better peer and self assessments. It can also enhance students' learning and group effort in the collaborative learning environment. This section presents previous studies on students' perceptions and attitudes of peer and self assessment in collaborative learning environments. The section is divided into five parts: 1) students' perceptions on the effects of peer and self assessment, 2) students' positive perceptions of peer and self assessment, 3) students' mixed perceptions of peer and self assessment, 4) limitations of previous studies, and 5) students' perceptions of peer and self assessment using grounded theory.

**Students' Perceptions on the Effects of Peer and Self Assessment**

A number of studies have reported the effects of the use of peer and self assessment in varied aspects. Druskat and Wolff (1999) conducted peer assessments for developmental purposes in self-directed work groups. They reported that peer assessments can have a positive effect on relationships and task focus, and also provided empirical evidence that peer assessments are associated with group members' perceptions of improved communication.

Melograno (1996, 1997) also provided empirical evidence which suggested that peer assessment can enhance both accountability and student-centered learning. More

specifically, peer assessments can facilitate student interactions, help students develop their interpersonal skills, enhance problem solving and self-confidence, and promote active student involvement in the learning process by helping students develop a sense of responsibility for their learning. Melograno also suggested that peer assessment, if carried out appropriately, is a process of giving and receiving feedback with a peer or group of peers, and can serve to enhance learning and promote trust among diverse groups of learners. Finally, Melograno viewed peer assessment as useful in small-group settings where one person might be an observer, another might be a recorder, and two or three might be performing a given task.

In Brooks and Ammons' (2003) study, the researchers presented a group assessment instrument (including peer and self assessment) that was characterized by early implementation, multiple assessment points, and the use of specific assessment criteria. Brooks and Ammons tested their assessment method on a sample of 330 undergraduate students enrolled in an introductory, cross-disciplinary business course. Their results indicated that an assessment system that provided feedback on specific criteria at both early and multiple points during a group project can reduce free-rider problems and lead students to view group experiences in a more positive light. Fiechtner and Davis (1992) also suggested that providing assessment at multiple points allows students to be more involved in the assessment process, and thus promoted interactions between group members.

**Students' Positive Perceptions of Peer and Self Assessment**

Many studies have found that students were generally positive toward peer and self assessment. Warkentin et al. (1995) investigated peer and self assessment in a study with 83 undergraduate educational psychology students. They found that the reactions to the peer and self assessment procedure they used were overwhelmingly positive. The students liked the peer and self assessment and thought it contributed to their learning as they discussed and debated test items through this process. Sambell and McDowell (1997) also studied six cases that included peer and self assessment, and found that students' attitudes towards involvement in the assessment process were generally positive. Students' awareness was high that peer and self assessment had helped them to develop important skills, such as problem-solving.

In the studies of Gatfield (1999) and Stefani (1994), positive student attitudes of peer assessment were also investigated. Gatfield (1999) utilized peer assessment in a compulsory international marketing management course. After the peer assessment, students were asked to respond to a survey regarding their attitudes towards it. Data analysis indicated that students in general held an approximate level of agreement and showed an acceptance of the method of peer assessment. Data also revealed that overall there was a high level of student satisfaction. In Stefani's study (1994), students reported that peer assessment made them think more, and 85% of the students were in favor of peer assessment in the learning process when compared with traditional assessments.

Bloxham and West (2004) also examined how involvement in the assessment process affected students' perceptions and performance. More specifically, this study

explored how teaching about the assessment process might improve students'
understanding of assessment criteria. The findings showed that students largely perceived
assessment criteria to be useful in preparing their work, and the assessment criteria
appeared to help them predict their performance and mark others with a degree of
accuracy that might not otherwise be expected. In relation to the experience of both
marking and being marked by peers, over two-thirds of the students were positive.
Reasons included "We felt mature enough to mark other students' efforts accurately
without bias" and "You can see where you've gone wrong and where you can improve
next time." Overall, students saw peer marking as a positive experience which assisted
their understanding of the assessment process.

In addition, Evans et al. (2005) explored the perceptions of trainees and
postgraduates on assessment and self-assessment of surgical skills. Data were collected
through semi-structured interviews conducted with six trainees and postgraduate students
in Oral Surgery. Eight themes were identified, and trainees' comments on these themes
were analyzed. The themes identified were 1) assessment and stress, 2) pressure to over-
or under-score, 3) the impact of self-assessment on learning, 4) reflection and
performance, 5) confidence and the necessity of preparation, 6) acceptability of the scales
and criteria used, 7) feedback, and 8) the acceptability of self assessment. Overall, it was
found that the trainees perceived self assessment as positive and helpful, and nobody
raised serious doubts about its validity or practicality.

Li and Steckelberg's (2006) study investigated students' perceptions and attitudes
toward online peer assessment. The study used an anonymous online system for peer

assessment in an undergraduate course, and explored students' perceptions of the system.

Forty-one students participated in the study and completed the post-assessment survey.

The majority of students saw the peer assessment as a worthwhile activity, and indicated they benefited from marking peers' projects as well as receiving peers' comments. As the best-liked features of the online peer assessment process, four major themes were identified from the students' responses; namely, 1) feedback that students received from peers helped them reconsider and improve their projects, 2) the opportunity to review and grade their peers' performance urged students on to greater efforts in the content area and the marking criteria, 3) anonymity provided by this online peer assessment system provided students a rather "relaxing" environment and less pressure from peers, and 4) students appreciated instant feedback. As identified in the themes, one of the special features of this online peer assessment system is to provide student anonymity to minimize the impact of peer pressure, thus improving the accuracy of the assessment. Li and Steckelberg therefore suggested that online assessment systems should guarantee anonymity to reduce peer pressure, which contributes directly to students' negative feelings regarding peer assessment.

Lejk and Wyvill (2001) compared the results of anonymous and non-anonymous peer and self assessment of contributions to a group project. One hundred seventy-two students studying a Level 2 Business Systems Analysis module undertook a group assignment and assessed their own and each other's contributions. The results revealed that students were more discriminating in their peer assessment when it was performed anonymously than when it was performed non-anonymously within the group. The

students' consensus was that an anonymous assessment would provide a more honest and accurate view. The findings of the study also indicated that students who performed better in the group were more modest about their own achievements than the general consensus of their peers, whereas students who performed less well seemed to have an over-inflated impression of their own contribution. Therefore, Lejk and Wyvill concluded that it is stronger students who under-rate themselves but weaker students have a tendency to over-rate themselves. At this point, Lejk and Wyvill suggested that if peer and self assessment are to be used as a quantitative measure to distinguish between group contributions, then the self assessment element should be ignored or not performed at all. The researchers also claimed that this would obviously be a more important consideration with smaller groups than with larger groups, as the distorting effect will be greater with smaller groups.

**Students' Mixed Perceptions of Peer and Self Assessment**

Students who experienced peer and self assessment did not seem to always have positive perceptions of the assessments. In a number of studies, even if most of the students had positive perceptions, their concerns and negative perceptions were also explored. First of all, Hanrahan and Isaacs (2001) presented an analysis of the views of 233 students who had just experienced peer and self assessment. The students were enrolled in a third-year health psychology course at a British university. The results showed that students felt that they benefited from the peer and self assessment. The

analysis of students' views revealed eight general dimensions under which are grouped twenty higher order themes. The general dimensions found were: Difficult; Gained Better Understanding of Marking; Discomfort; Productive (including learning benefits and improved work); Problems with Implementation; Read Others' Work; Develop Empathy (with assessing staff); and Motivation (especially motivation to impress peers). Although most students enjoyed the peer and self assessment and understood its values, not all the experiences associated with the assessments were favorable. Besides positive dimensions like gained better understanding, productive, and motivation, data from Hanrahan and Isaacs's study also revealed negative and unsure dimensions such as discomfort caused by peer pressure (associated with having peers rating own paper and critiquing others) and problems with implementation (such as students finding it time-consuming or feeling that the process is not taken seriously or doesn't count for marks).

Cheng and Warren (1997) examined the attitudes towards peer assessment of 52 undergraduate Hong Kong Chinese students enrolled in English for Academic Purposes. The researchers used pre- and post-questionnaires and interviews prior to and following a peer assessment activity. The students assessed the contributions of their fellow group members to the group project. The results revealed that they were mostly in favor of peer assessment. Initially, students were not entirely comfortable or confident in their ability to assess their peers. Nevertheless, after the peer assessment activity there was a positive shift overall in both attitude and confidence. Cheng and Warren, however, indicated that there was still a substantial minority who became or remained negative towards the notion of peer assessment. The reasons that caused students to have negative perceptions

of peer assessment included: 1) the students did not feel qualified to award marks, 2) the students doubted their own and other's subjectivity when awarding marks, 3) very limited and informal training in peer assessment was provided to them, and 4) the students felt too much responsibility for the distribution of marks for their peers. Therefore, Cheng and Warren suggested that in order to help students develop positive attitudes towards peer assessment, it is necessary to give systematic and comprehensive training to them, involve them in discussing and establishing the assessment criteria, come to an agreement on an appropriate weighting of the final grade/mark between the teacher and students, and build up a sense of awareness and responsibility in the group of students.

Rees et al. (2002) explored medical students' perceptions of peer and self assessment methods in evaluating their communication skills. Five focus group discussions were conducted with 32 students from each of the 5 years of the medical degree course at Nottingham University in England. The results indicated that the students had mixed views about peer assessment. Some students, particularly those in their clinical years, perceived peer assessment positively, either because they thought that peer assessment offered them opportunities to compare their communication skills with the skills of other students or because assessing their peers' communication skills was a useful learning experience. On the other hand, non-clinical students seemed to be more dissatisfied with peer assessment because they felt that students were too polite to criticize, it was difficult for them to be objective about friends' communication skills, or they were unable to offer constructive criticism due to a lack of knowledge and experience. Students also viewed self assessment either as valuable or difficult; namely,

some students thought that it was important to be able to assess themselves because they could identify what they did well and which aspects of their communication they could improve while other students revealed their difficulty with reflecting more globally on their communication skills.

In addition, Lopez-Real and Chan (1999) implemented peer assessment with a group of students at Hong Kong University and evaluated them using questionnaires and in-depth interviews. On the feedback questionnaire, most of the students indicated that the peer assessments had increased their involvement in the project as well as enhanced their performance. However, some of the students expressed their uncomfortable feelings when assessing their peers. Namely, they did not want to use "Fair" or "Poor" on their own group members because they believed this could hurt the person's feelings, damage relationships, and make the group look bad to the teacher and to the other groups. The students therefore offered these suggestions: using friendship groups in order to minimize conflict and to promote efficiency, and assigning students into small groups consisting of 3 or 4 members to facilitate an even distribution of work and interaction.

Brindley and Scoffield (1998) study also investigated students' attitudes of peer assessment. In this study, peer assessment was introduced into the assessment strategy of two marketing modules in two undergraduate programming courses at Manchester Metropolitan University. A questionnaire was used to elicit responses from a sample of 80 students concerning their attitudes to and experience of the peer assessment exercise. The results showed that students felt the benefits of peer assessment were: the increase in personal motivation as a result of their active involvement in the assessment process; the

opportunity to compare and discuss the assignment; and the opportunity to gain knowledge and develop a greater understanding of the assignment content and assessment process. Some students, however, revealed the criticisms of peer assessment, including the effects of personal bias on the marks awarded, the interpretation of criteria, and the ability of the students to assess. Some students regarded peer assessment as an incentive to perform, while others saw it as an unfair system that lacked objectivity. Over half the students regarded assessment as solely a role for the teacher. However, students overall felt that they had performed better as a result of participating in the peer assessment process.

Daniels and Magarey (2000) conducted a study to describe the implementation and evaluation of peer assessment in the nutrition and dietetics awards at the Flinders University of South Australia. Daniels and Magarey indicated that peer assessment appears to be well accepted by the nutrition and dietetic students and merits the additional investment of staff and student time. Overall, most students in the study felt the experience helped them to better reflect on and evaluate their work. There was also general agreement that qualitative feedback was more helpful than grades. However, several students felt they lacked content expertise and were not well qualified to judge the work of other students.

Sluijsmans et al. (2002) engaged students in peer assessment training to help them build critical assessment skills. Ninety-three students were randomly assigned to control groups and experimental groups. The experimental groups were trained in defining performance criteria, giving feedback, and writing assessment reports. The results of the

study showed that the experimental groups surpassed the control groups in the quality of the assessment skill; namely, the experimental groups were more likely to use the criteria and to give more constructive comments than the students from the control groups. As a result of the training, students from the experimental groups also had significantly higher grades for the end products of the course than students from the control groups. Finally, the students indicated a positive change in their views on assessment and instruction. In summary, the researchers indicated that students can be trained in assessment skills and that such training positively affects their performance as well as their attitudes. However, the researchers also put forth their finding that among the various factors causing students' negative feelings, some are hard to control, such as peer pressure.

Marienau's (1999) study examined the outcomes of engaging in self assessment as perceived by students in an experience-based graduate program. Fifty students in three groups participated in an iterative process of focus group interviews and follow-up surveys over 12 months. An additional 30 students generated data upon graduation. Fifteen themes representing specific outcomes of self assessment emerged from an inductive analysis of the data within and across groups. In particular, the most prominent finding was that all of the participants indicated that engaging in self-assessment had some positive impact on their capabilities in both learning and performance. That is, the findings indicated that self assessment serves as a powerful instrument for learning, strengthens commitment to competent performance in the workplace, enhances higher order skills for functioning in the workplace, and fosters self-agency and authority.

Nonetheless, some students expressed mildly negative concerns about the challenge of doing "honest" self assessment.

Kennedy's (2005) study investigated the attitudes of students on the use of peer assessment and the effect that its use has had on the group work and group processes. Data was collected from a class of 90 students undertaking a system development project at an Australian university. The results revealed that the students reacted in different ways to the requirement to provide assessments of their peers. Some students indicated that they were reluctant to mark their peers down, even if they appear to have contributed less than others. Alternatively, other students were quite prepared to mark down those who had not done their fair share. On this point, students thought that their judgments of each other could be wildly inconsistent, and they believed that their assessment of the contributions of the other group members was more a reflection of their subjective judgments and biases. Additionally, in some groups, there was considerable tension resulting from the requirement that students assess one another. As evidence, one phenomenon noted was the tendency for particular students to dominate the group and manipulate tasks to their own advantage. It became apparent that by judiciously manipulating the allocation of tasks, dominant students could significantly enhance their own grades at the expense of their less aggressive peers. Thus, students thought that peer assessment could have an adverse impact on weaker students by limiting their opportunities to participate, resulting in significant personal conflict between group members, and finally reducing true group collaboration. Kennedy finally suggested that in order to improve the validity of the peer assessment, considerable time and effort

needed to be spent instructing students in assessment techniques and students needed to be provided with appropriate data on which to base their judgments. To reduce tension resulting from the use of peer assessment within groups, a more enlightened peer assessment approach would be to encourage students to invoke more constructive strategies that may help to motivate uncooperative peers and gain their collaboration.

Davies' (2000) study analyzed the effect of the introduction of a computerized peer assessment system as part of the assessment process of an undergraduate module in the field of computer studies. The results found that the students overall appreciated that it was not just a method of reducing teacher-marking, and that it has benefited them in their learning process. That is, the students felt that they had received a significant benefit from marking the work of their peers, with over 60% feeling that they had worked at a deeper level of understanding. Also the repetitive nature of the marking was reported as being of significant benefit and an aid to the learning process. In particular, the speed of the return of the marks and comments was highlighted as a great advantage of the computerized assessment system. Therefore, the vast majority of students were very favorable toward the computerized peer assessment. However, there was only one negative comment; namely, the students felt peer criticism was very difficult to accept, and they thought that teacher-provided feedback and marks were more acceptable due to the perceived experience and knowledge that he/she is assumed to possess.

In addition, Wen and Tsai's (2006) study investigated students' perceptions of and attitudes toward online peer assessment. The results found that university students generally held positive attitudes toward online peer assessment activities, although, they

seemed to consider the assessment as a technical tool to facilitate communications and information delivery rather than a process of learning and sharing experiences. Male students had more positive attitudes toward peer assessment than females did, and students with previous peer assessment experiences had less negative attitudes than those without. A majority of the students suggested that the peer assessment score should be counted as a small part of the total course grade.

**Limitations of Previous Studies**

As noted in previous sections, studies on students' perceptions of peer and self assessment reported mixed findings. Specifically, some students positively perceived peer and self assessment and acknowledged the value of the assessments while other students had concerns and negative perceptions of the use of the assessments. Among the studies, several have presented factors causing students' negative perceptions toward peer and self assessment: lack of ability to judge peers' works (Brindley & Scoffield, 1998; Cheng & Warren, 1997; Daniels & Magarey, 2000); lack of knowledge, content expertise, and experience (Daniels & Magarey, 2000; Rees et al., 2002); difficulty of being objective (Brindley & Scoffield, 1998; Cheng & Warren, 1997; Rees et al., 2002); personal bias (Brindley & Scoffield, 1998); limited and informal assessment training (Cheng & Warren, 1997); different interpretation of criteria (Brindley & Scoffield, 1998); peer pressure (Hanrahan & Isaacs, 2001; Sluijsmans et al., 2002); friendship and

relationships with peers (Lopez-Real & Chan, 1999); and the assessment being time-consuming (Hanrahan & Isaacs, 2001).

However, even though the factors influencing students' perceptions of peer and self assessment have been presented in a number of studies, these factors were sporadically found, meaning that there are very few studies which systematically investigate and describe the factors. That is, most of the previous studies tended to focus more on how students feel about and perceive peer and self assessment, rather than exploring closely why students are positive or negative and which factors influence their perceptions. Therefore, it can be assumed that if instructors or researchers consider how to reduce the critical factors causing students' concerns or how to amplify the factors affecting students' positive perceptions when applying the assessments in their courses, then students' positive perceptions can be enhanced to maximize the beneficial effects of peer and self assessment.

In addition, most of the previous studies investigated students' perceptions of traditional peer and self assessment which are paper-based systems, rather than online assessment systems. The studies have also been conducted across different domains in undergraduate programs such as medicine, nursing, biology and biological sciences, engineering, optometry, management, business, leisure studies, and languages. However, there are very few studies focusing on online graduate courses in the field of education. Therefore, a study focusing on students' perceptions of the online assessments in an online graduate-level education course would be valuable information and knowledge,

particularly for instructors or researchers in the education sector who are interested in such a learning context.

Thus, this study focused on an online graduate-level education course using an online peer and self assessment system. In particular, the purpose of this study was to investigate factors that affect students' perceptions of the use of online peer and self assessment in an online collaborative learning environment, and to explore how the assessments impact the online collaboration of the students. By finding and examining these factors, it is anticipated that instructors will be able to 1) better understand students' varied perceptions on online peer and self assessment, 2) encourage students to be involved actively in the assessment process, 3) enhance students' positive perceptions, and finally 4) increase students' favorable perceptions to maximize the benefits of peer and self assessment. In addition, by gaining a deeper level of understanding of students' perceptions of the assessments in this setting, instructors who are providing online courses to graduate students in education will be able to properly apply the online assessments.

**Students' Perceptions of Peer and Self Assessment Using Grounded Theory**

As addressed in previous sections, many of the studies on students' perceptions of peer and self assessment in group collaboration have used qualitative research as an effective way to examine individual subjects' motivations, feelings, and thoughts in a real-world context. Among various qualitative research approaches, grounded theory has

been often selected and used for studying individual perceptions because it uses a systematic set of procedures to develop an inductively derived 'grounded theory' about a phenomenon, involves careful attention to context and data collection in naturalistic settings, and requires close contact with participants over a period of time and examination of participants' perceptions of the phenomena under investigation (Strauss & Corbin, 1998). I would like to additionally present the following studies which examine students' perceptions of peer and self assessment using the grounded theory approach.

McConnell (2002) used grounded theory to examine students' perceptions on assessment and group work. The study investigated the various ways in which students talk about their experiences and perceptions of collaborative assessment, including peer and self assessment, as it occurs in e-learning environments. McConnell used three sources of research data on the course participants' experiences: face-to-face interviews with participants about their experience of the course; examination of e-learning transcripts in which participants discussed the collaborative learning and assessment process; and results of a questionnaire distributed to over 40 students, in which they responded to questions about their experience of collaborative assessment. From a grounded theory approach to the analysis of the data, three broad analytic categories with sub-divisions were developed: 1) the appropriateness of collaborative assessment, including the "role of the tutor" and "appropriateness of the medium;" 2) collaborative assessment as a learning event, comprising "from unilateral to collaborative assessment," "enjoyment, frankness, anxiety and tension," "responsibility to others and submission of assignments," "the development of collaborative assessment skills," "access to others'

learning," "motivation to learn," and "intrinsic versus extrinsic validation of learning;" and 3) the focus for assessment, including "Should participation be assessed?" and "assessing participation by sharing perceptions of participation." In summary, the outcomes of this study indicated that collaborative assessment, comprising peer and self assessment, helps students move away from dependence on lecturers as the only or major source of judgment about the quality of learning to a more autonomous and independent situation where each individual develops the experience, know-how and skill to assess their own learning. It is likely that this skill can be transferred to other lifelong learning situations and contexts.

Arnold et al. (2005) also conducted a qualitative study using grounded theory to identify factors that, according to students themselves, would encourage or discourage their participation in peer assessment. The study sites were two midwestern state-supported medical schools. One school used peer assessment in a pharmacology course and two clerkships; the other school only used it in a research study. A total of 61 students in Years 1, 3, and 4 of the medical schools participated in 16 focus groups. Data were collected through focus group discussions as this method allows for open-ended responses, the use of probes for further detail, and peer interaction to generate issues and provide an immediate check of validity. The focus groups discussed the factors that would promote or discourage peer assessment. Relying on grounded theory, three themes including the factors emerged: 1) personal struggles with peer assessment, 2) characteristics of the assessment system itself, and 3) the environment in which the system operates. First of all, in every focus group, regardless of school or year level,

students discussed how their struggles with peer assessment would impact their willingness to assess and report the professionalism of their peers. That is, it revealed that they struggled with reporting an unprofessional peer lest they bring harm to the peer, themselves, or their clinic team or work group. Secondly, students' preferences for characteristics of a peer assessment system also impact their willingness to participate in peer assessment. System characteristics that were discussed by all focus groups from both schools and at all year levels were: who is involved in the assessment, the use of the assessment, and its mechanics. All the groups but a Year 3 group at School A addressed the content of peer assessment, and all groups but a Year 3 and a Year 4 group at School B discussed anonymity. Lastly, every focus group in each school and at each year level considered environmental factors that would encourage students' participation in peer assessment, including the school's stance towards peer reports, relationships among students, faculty, and administrators, the school's evaluation philosophy and standards, and its educational program for peer assessment and professionalism.

# Chapter III. Method

The purpose of this study was to investigate factors that affect students' perceptions of the use of peer and self assessment in an online collaborative learning environment, and how the assessments impact the online collaboration of the students. This chapter presents the methodology employed in the study. It includes eight sections: 1) rationale behind the methodology selected, 2) rationale for the selection of the setting of the study, 3) description of the online course that was the setting of the study, 4) participants, 5) data collection, 6) data analysis, 7) the role of the researcher, and 8) methods for assuring quality of the analysis.

## SELECTION OF THE RESEARCH METHODOLOGY

As summarized by Bogdan and Biklen (1998), qualitative approaches can be characterized by five key features. Qualitative approaches: 1) are naturalistic, where the research is set in natural settings which serve as the direct source of data and where the researcher is the key data collection instrument; 2) are descriptive, with most analysis based on words and not on the quantification of data; 3) are concerned with process, with how things occur rather than what occurs; 4) require a focus on inductive analysis, begun through an exploration of open questions and based on immersion in the detail of data to discover interrelationships between categories; and 5) stress the centrality of meaning in attempting to make sense of how people in particular settings come to account for and understand their situations.

Among various qualitative research approaches, grounded theory has been often selected and used for studying individual perceptions because it uses a systematic set of procedures to develop an inductively derived 'grounded theory' about a phenomenon, involves careful attention to context and data collection in naturalistic settings, and requires close contact with participants over a period of time and examination of participants' perceptions of the phenomena under investigation (Strauss & Corbin, 1998). Since this study was concerned with how students perceive peer and self assessment in an online collaborative learning environment, and how students' perceptions of the peer and self assessment impact their group collaborations, grounded theory was determined to be an appropriate methodology to investigate the perceptions.

As presented in the previous chapter, there are examples in the literature of the use of grounded theory to study students' perceptions of the use of peer and self assessment. For instance, McConnell (2002) used grounded theory to examine students' perceptions of assessment and group work. McConnell used three sources of research data on the course participants' experiences: face-to-face interviews with participants; examination of e-learning transcripts in which participants discussed the collaborative learning and assessment process; and the results of a questionnaire, in which each student responded to questions about their experience of the assessments. Based on a grounded theory approach to the analysis of the data, three broad analytic categories were developed: the appropriateness of collaborative assessment; collaborative assessment as a learning event; and the focus for assessment. As another example, Arnold et al. (2005) also used grounded theory to identify factors that would encourage or discourage

students' participation in peer assessment. Data were collected through focus group discussions. The 61 medical school students who participated in the study were assembled into 16 focus groups. Each group's size ranged from 2 to 7. The focus groups discussed the factors that would promote or discourage peer assessment. Relying on grounded theory, three themes including the factors emerged: namely, personal struggles with peer assessment; characteristics of the assessment system itself; and the environment in which the system operates.

Grounded theory approach was originally developed by Barney Glaser and Anselm Strauss (Strauss & Corbin, 1998). The aim of grounded theory methodology is to develop a "theory that is grounded in data systematically gathered and analyzed. This theory evolves during actual research and it does this through continuous interplay between analysis and data collection" (Strauss & Corbin, 1998). Theory development is thus the overarching purpose of grounded theory research, and such a theory is closely related to the context of the phenomenon being studied. More detailed descriptions of the grounded theory procedures are provided in the following sections.

SITE SELECTION

The setting of this study was intended to be a purposive sample, which can increase the range of data and maximize the possibilities of uncovering multiple realities (Lincon & Guba, 1985). Therefore, I selected a university graduate-level online course in which all course activities were conducted collaboratively through online

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communications. The course, called Computer-Supported Collaborative Learning (CSCL), was offered in Fall 2006. There were three main reasons for choosing this course as the setting of the study

The first reason was because the course focused on collaborative learning activities in online learning environments. That is, students were required to work collaboratively in groups to complete learning tasks. Therefore, this course was particularly appropriate for the purpose of this study.

Secondly, to assess individual contributions to group tasks, this course included conducting an online peer and self assessment at the end of every group project. Therefore, since the course required students to conduct assessments, they could provide their perceptions based on their experiences with the assessments.

In addition, the researcher could have access to a wide range of the participants' activities. The researcher had an active role in revising the course at the end of the semester. Also, as a teaching assistant the researcher observed almost all of the participants' activities and helped students who had problems during the course. Therefore, the participants were able to feel comfortable with the presence of the researcher. This role in the course also helped the researcher to build trusting relationships with the participants in the study.

RESEARCH SETTING

In this section, a description of the online course in terms of its purpose and design is provided, followed by an explanation of the online peer and self assessment used in the course.

## CSCL 2006 Course

### *Course Purpose*

The setting of this study was a university graduate-level online credit course entitled Computer Supported Collaborative Learning (CSCL), taking place in the Fall semester of 2006. The CSCL course served on-campus students as well as off-campus students through the online learning center within a large southwestern public university system's fifteen component campuses. The CSCL course was designed to help students explore, use, and develop their knowledge and skills of computer-supported collaborative learning environments, tools, and research. Students were required to conduct all course activities collaboratively through online communications.

The course used two primary online communication systems: the course website and a computer conferencing system. The course website provided students with access to the course newsletters, syllabus, contents, and instructions for the assignments. The course was housed on the Blackboard system on a large southwestern public university's website (Figure 3.1).
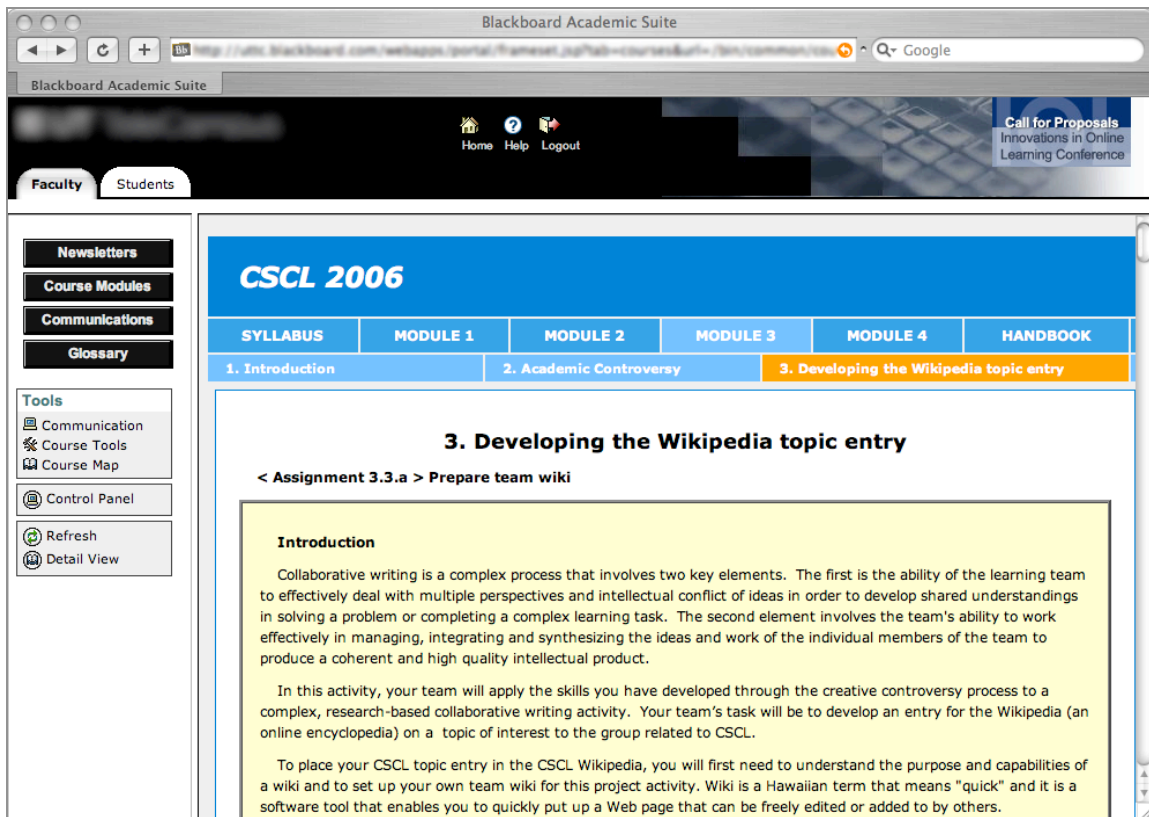
**Figure 3.1 Course Website on Blackboard**

The computer conferencing system provided a virtual workspace and communication tools that allowed the participants to send e-mail, post messages on each group's board, communicate in real time with online chats, edit the same documents online, submit the assignments, and see the instructor's announcements. The conferencing system used TeachNet which is based on The FirstClass groupware (Figure 3.2).
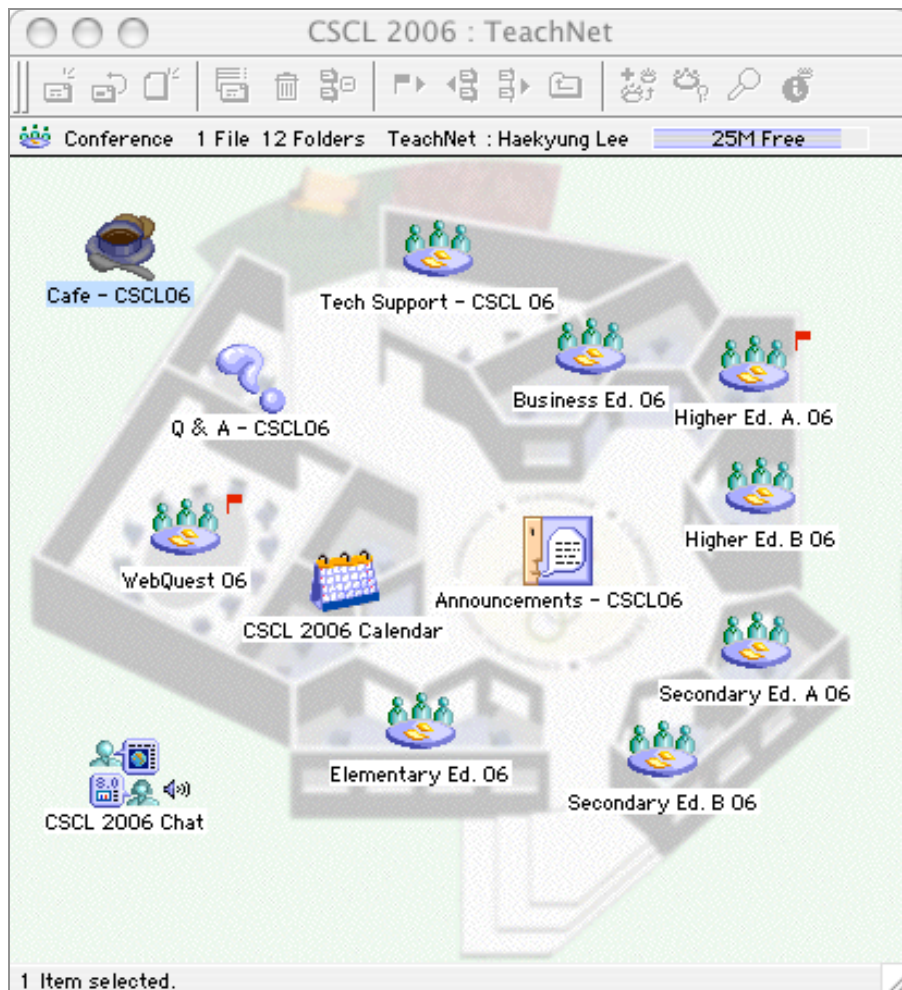
**Figure 3.2 Conferencing System on TeachNet**

There were six small groups in the online course: one elementary education group, two secondary education groups, two higher education groups, and one business education group. The students were grouped based on their areas of interest and backgrounds. Each group consisted of three to four members.

An instructor and a teaching assistant often monitored the virtual workspace (TeachNet), and answered the questions that students asked to them. Also, a technician helped students immediately when they had technical problems.

*Course Design*

The course consisted of four learning modules; each module included from two to six weeks of work (see Appendix A for the detailed course schedule and the list of all the assignments). Each module contained both individual and group assignments. The topics of each learning module were as follows:

- Module 1: Building a Learning Community
- Module 2: Understanding CSCL
- Module 3: Collaborative Controversy and Collaborative Writing
- Module 4: Strategies for Collaborative Online Inquiry and Problem Solving

In the first module, students began the process of online collaborative learning. Students took part in the team-building process by sharing information about their interests, background, expertise, and experience. To share the information, students were asked to set up a special Web space called a Web-log or Blog, and then to post information about themselves. Another team-building activity for this module was to establish norms for effective online collaboration as a group. This was to help students create a learning community that provided a safe, intimate, and cohesive space in which they can openly share their thoughts and feelings while learning from each other. Each

group shared and established their own norms or rules for effective online collaboration, and a whole group discussion on the norms was conducted in the second class session.

Throughout Module 2, students had opportunities to understand the concept and importance of the learning community, strategies and processes for building a virtual team, and basic roles and responsibilities of being a member of a virtual team. Students were also asked to install TeachNet, a network-based collaborative tool called FirstClass, on their own computer, and to use TeachNet for their virtual workspace and communication for the remaining course learning activities.

Module 3 provided opportunities not only to explore academic controversy as a strategy to help students develop a deep level of understanding of a complex issue, problem, or topic, but also to understand and engage in the collaborative writing process by developing an entry for a Web-based encyclopedia, called a Wikipedia. In particular, developing a Wikipedia topic entry was one of the biggest group projects. Each group was asked to select a topic related to computer-supported collaborative learning (CSCL) that was of interest to the group; they then synthesized and integrated the best ideas, concepts, rationales, and evidence into a Wikipedia topic entry. Table 3.1 displays the topics that each group selected.

**Table 3.1 Wikipedia Topics of CSCL Groups**

| Group | Wikipedia Topic |
|---|---|
| Elementary Education Group | CSCL and Creative Writing |
| Secondary Education Group A | Online Learning Teacher Tools |
| Secondary Education Group B | Benefits of CSCL Environment for Four Sub-populations of Learners |
| Higher Education Group A | Advantages of Online Learning |
| Higher Education Group B | Collaborative Authorship |
| Business Education Group | Online Training |

Module 4 was designed to help students understand strategies and techniques for collaborative online inquiry as well as the purpose and structure of WebQuest, which is an inquiry-oriented activity in which most or all of the information used by learners is drawn from the Web. Students first explored a WebQuest, and then they were required collaboratively to design and develop a web site for a WebQuest activity with their group members. Table 3.2 shows the WebQuest topics that each group developed.

**Table 3.2 WebQuest Topics of CSCL Groups**

| Group | WebQuest Topic |
|---|---|
| Elementary Education Group | Global Impact of China's Modernization |
| Secondary Education Group A | Online Gaming… Good or Bad? |
| Secondary Education Group B | The Mystery of the Texas Horned Lizard |
| Higher Education Group A | Intelligence Quest |
| Higher Education Group B | A Time of Change: The Biggest Event of the 1960's and 70's |
| Business Education Group | A Multicultural Training WebQuest |

There was an additional group assignment during the semester. Each group was required to evaluate and make a presentation of a computer-supported collaborative learning (CSCL) tool of their choice during one of the Webcast sessions held throughout the course. The presentation required that each group demonstrate the functionality and capabilities of the CSCL tool, the ways it might be used to support online collaborative learning, and their evaluation of the strengths and limitations of the tool. Table 3.3 shows the CSCL tools that each group evaluated and demonstrated.

**Table 3.3 CSCL Tools Evaluated and Demonstrated by CSCL Groups**

| Group | Computer-Supported Collaborative Learning Tool |
|---|---|
| Elementary Education Group | Knowledge Forum |
| Secondary Education Group A | Tapped-In |
| Secondary Education Group B | Whyville |
| Higher Education Group A | River City |
| Higher Education Group B | Second Life |
| Business Education Group | Wimba |

Between learning modules, students had a class session called Webcast, which is live video delivered through the Web. During Webcast, the instructor invited guest speakers, wrapped up the current learning module, introduced the next learning module, and answered student questions. Students could attend the Webcast sessions on-campus or off-campus. On-campus students came to class and met face-to-face with the instructor and other on-campus students. Off-campus students connected to the class using teleconferencing systems, and could see and hear the class through the Internet.

The CSCL course had an online peer and self assessment system developed by an instructional technology center in a large southwestern public university. After training on peer and self assessment at the end of the second learning module, students were required to use the online peer and self assessment form to evaluate their own efforts and

to anonymously assess the efforts of others in same group at the end of every group project: developing a Wikipedia topic entry (module 3), creating a WebQuest (module 4), and demonstrating a CSCL tool. More detailed descriptions of the online peer and self assessment are provided in the following section. Figure 3.3 shows the steps that students were required to fulfill in the CSCL course.
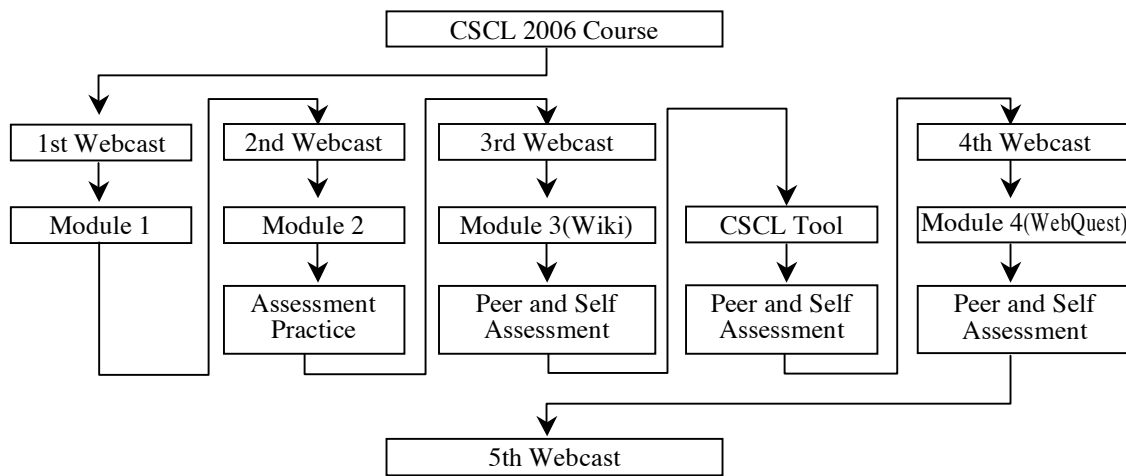


**Figure 3.3 CSCL 2006 Course Flow**

*Course Evaluation*

Each student's grading was based on individual contributions and collaborative group work. First of all, individual contributions accounted for 30 percent of the final grade. Individual contributions were comprised of items placed in each student's portfolio, their Webcast participation, and timely completion of module assignments.

In addition to the individual contributions, contributions for collaborative group work accounted for 70 percent of the final grade, which included 1) scores of the peer

assessment of the student's contributions to the group (30%), 2) scores of the product assessment of the CSCL tool demonstration (10%), 3) scores of the product assessment of the Wikipedia project (10%), and 4) scores of the product assessment of the WebQuest project (20%). In terms of the peer assessment score of the student's contributions to the group, each student's score was based on the average of the ratings by their group members. Product assessments of the group projects, including the CSCL tool demonstration, the Wikipedia project, and the WebQuest project, were based on the scores received from other groups. The scores of the self assessments were not included in the final grade.

At the end of the course semester, the instructor reviewed all of the peer assessments and was able to make changes to students' grades in instances where there was an apparent discrepancy between the peer assessment and the online evidence of a student's participation. In this instance, the group would be informed of the pending change and provided with the rationale for the change.

**Online Peer and Self Assessment**

*Online Assessment System*

With the advent of computer networking, online peer and self assessment systems have been developed and implemented increasingly in higher education collaborative learning environments (Kwok & Ma, 1999; Rada, 1998). Furthermore, a number of studies have investigated and proved the effectiveness of online peer and self assessment.

Davis and Berrow (1998), Kwok and Ma (1999), Lin, Liu, and Yuan (2001), and Rada (1998) indicated reasons in favor of using online assessments: 1) when students evaluate peers' work through the web (not face-to-face), anonymity is ensured and a willingness to critique is facilitated; 2) online peer and self assessment allows instructors to monitor students' progress at any period during the assessment process, so instructors can always determine how well an assessor or assessee performs by constantly monitoring the process; and 3) online peer and self assessment can decrease photocopying time and expense as assessees do not need to photocopy their assignments for their peer assessors. Other researchers (Downing & Brown, 1997; Davis & Berrow, 1998; Zhao, 1998) also explored the feasibility of Internet-supported peer and self assessment.

Based on the benefits and effectiveness of the online assessment system, the CSCL course was designed to provide the assessments at the end of every group project. The major reasons for using peer and self assessment in the course were to help students improve their performance on assessed work, understand the assessment process, and furthermore develop lifelong evaluation skills for both their own work and others'.

The online peer and self assessment used in the CSCL course was developed and validated by Resta (2005) (see Appendix B for peer and self assessment items). Item analysis, factor analysis, and path analysis were conducted to validate the scale. As a result of the analyses, 16 assessment items were retained, and the items were categorized into three dimensions: social interaction, task management, and trust. The items used a 5-point scale, between the two extremes of "Never" and "Always," to reflect personal efforts and group contributions. Responses ranged from 1 for "Never," 2 for "Seldom," 3

for "Sometimes," 4 for "Frequently," to 5 for "Always." An open-ended space for

comments was also provided. The assessment was anonymous, and only individual

students and the instructor were able to see the scores and comments. Figure 3.4 shows

the online peer and self assessment webpage where students rated themselves and their

group members.



**Figure 3.4 Peer and Self Assessment Webpage**

The assessment data each student input was automated and summarized, and then the results of the assessment were shown to each student based on the average of the ratings by the group members. The assessment system showed students various types of assessment results: 1) the overall average score received from peers, 2) each average score of the peer and self assessment items (Figure 3.5), 3) a comparison graph of the peer and self assessment scores (Figure 3.6), and 4) comments from peers.



| No. | Question | Peer Average |
|---|---|---|
| 1 | Takes active role on initiating ideas or actions. | 4.67 / 5 |
| 2 | Is willing to take on task responsibilities. | 4.67 / 5 |
| 3 | Is willing to frequently share ideas and resources. | 4.67 / 5 |
| 4 | Accepts responsibilities for tasks determined by the group. | 4.67 / 5 |
| 5 | Helps promote team esprit de corps. | 4 / 5 |
| 6 | Respects differences of opinions and backgrounds, and is willing to negotiate and make compromises. | 4.33 / 5 |
| 7 | Provides leadership and support whenever necessary. | 4.67 / 5 |
| 8 | Acknowledges good works of other members and provides positive feedback. | 4.67 / 5 |
| 9 | Is willing to work with others for the purpose of group success. | 4.67 / 5 |
| 10 | Communicates online in friendly tone. | 4.67 / 5 |
| 11 | Keeps in close contact with the rest of the team so that everyone knows how things are going. | 4.33 / 5 |
| 12 | Produces high quality work. | 5 / 5 |
| 13 | Meets the deadlines of our team. | 5 / 5 |
| 14 | Sensitive to the needs and feelings of other members of the team. | 5 / 5 |
| 15 | Understand problems and responds with helpful comments. | 5 / 5 |
| 16 | Openly shares needs and feelings with team members. | 5 / 5 |

**Figure 3.5 Average Score of Peer and Self Assessment Items**
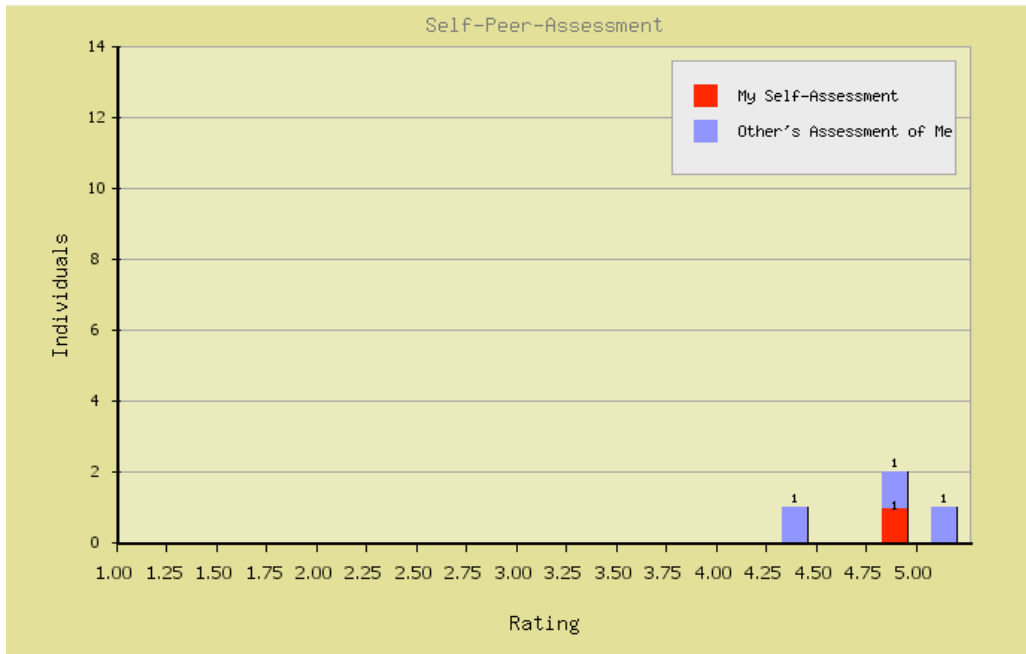
**Figure 3.6 Comparison Graph of Peer and Self Assessment Scores**

*Peer and Self Assessment Process*

Before the first peer and self assessment, the CSCL course provided an

assessment practice in order to help students feel comfortable with the process. During

the practice, students were instructed on the definition and purpose of the peer and self

assessment, the assessment items, and how to use the online peer and self assessment

system. The proper use and interpretation of the assessment scale was also included in the

practice. Students were encouraged to differentiate carefully between 16 assessment

items according to the standards and techniques that were presented. They were also

asked to provide honest and realistic assessments that would help identify strengths and weaknesses for each group member.

As an example for the assessment practice, students were provided a scenario describing the group collaboration of John and his fellow group members (see Appendix C for the scenario used in the peer and self assessment practice). Students were asked to read the scenario, to rate John using their judgment and the assessment items they had just been instructed on, and then to discuss the rationale for the rating they gave John with their group and as a whole class in the Webcast session.

After practicing the peer and self assessment process, students were allowed to use the online peer and self assessment form to evaluate themselves and their fellow group members anonymously at the end of group projects. Students received the results of the assessment in the form of the average of the ratings given by the group members (see Appendix D for the peer and self assessment results of the participants). The results of the peer assessment accounted for 30 percent of the final grade.

**PARTICIPANTS**

Of the 23 students who enrolled in the CSCL course, 22 students allowed me to use their information and data. Among the 22 students, 14 students were interviewed. In this section, procedures for the recruitment of the participants and the profiles of the 14 interviewed participants are provided.

**Procedures for the Recruitment of Participants**

The participants of this study consisted of graduate students who enrolled in a graduate online credit course on Computer-Supported Collaborative Learning (CSCL) in the Fall semester of 2006. There were 23 students enrolled in the course (12 males and 11 females). I briefly described the purpose of this study to the students at the beginning of semester.

For the recruitment of the participants, an e-mail message was sent to all 23 students inviting them to participate in the study before the first peer and self assessment was conducted. The invitation included information on the purpose of the study, what their participation would involve, and assurance that refusal to participate would not affect their relationship with the instructor, department, or university. Of the 23 students enrolled in the course, 22 students agreed via e-mail to allow me to use data such as their reflections, portfolios, electronic messages on TeachNet, and peer and self assessment scores and comments. I contacted the 22 students individually by e-mail or in person, showed them the consent form, and had them sign if they agreed to either allow me to use their data or conduct an interview. In particular, for the students who lived far from the home campus, I sent the consent form by mail, and included a self-addressed stamped return envelope. Of the 22 students, 15 agreed to take part in interviews for this study.

All 15 participants took part in the first round of the interviews. However, one participant could not be contacted for the second round of the interviews when the course ended. The participant did not respond despite many attempts to reach her by phone calls and e-mails. As a result, I decided to remove this participant's first interview data from

the study. Therefore, 14 participants (8 males and 6 females) took part in the first and second round interviews for the study. Brief information on participants and non-participants is shown in Table 3.4. More detailed profiles of the 14 participants are provided in the following section.

**Table 3.4 Brief Information on Participants and Non-Participants**

|  |  | Number of Participants | Number of Non-Participants |
|---|---|---|---|
| Gender | Male | 8 | 4 |
|  | Female | 6 | 5 |
| On-/Off-campus Student | On-campus Student | 13 | 8 |
|  | Off-campus Student | 1 | 1 |
| Experience with Technology-Related Course | Experienced | 9 | 4 |
|  | Non-Experienced | 5 | 5 |
| Computer Technology Skills | Beginner | 1 | 0 |
|  | Intermediate | 10 | 9 |
|  | Advanced | 3 | 0 |

**Profiles of Participants**

Fourteen participants completed a pre-interview survey (see Appendix E for the pre-interview survey) to help gather demographic information, academic backgrounds, and general knowledge about each person's learning experiences. Also, an online team

directory (see Appendix F for the questionnaire for the online team directory) was used to gather participants' initial information; students provided and shared their work and educational experiences, their purpose in taking the CSCL course, their expectations for the CSCL course, and their competency in using computer technologies at the beginning of the course semester.

The 14 participants who took part in the two interviews were diverse in terms of gender, ethnicity, institution they were attending, online learning experience, and computer technology skills. Table 3.5 provides demographic information, academic background, and learning experiences of each participant. All of the participants' names are pseudonyms.

**Table 3.5 Brief Descriptions of Participants**

| Group | Name | Demographic Information | | | Academic Background | | | Learning Experiences | | | | |
| | | Gender | Age | Ethnicity | Seeking Degree | Full / Part Student | On / Off Student | Computer Technology Skills | Online Course (# of Exp.) | Online CL (# of Exp.) | Self Ass. | Peer Ass. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Elementary Edu. Group** | Isaac | Male | 33 | Caucasian | Ph.D. | Full | On | Advanced | Yes (1) | Yes (1) | Yes | Yes |
| | Minjung | Female | 33 | Asian | Master | Full | On | Beginner | No | No | Yes | Yes |
| **Secondary Edu. Group A** | Jasmine | Female | 31 | Asian | Ph.D. | Full | On | Intermediate | Yes (1) | No | Yes | Yes |
| | Ava | Female | 30 | Caucasian | Master | Full | On | Intermediate | No | No | Yes | No |
| | Linda | Female | 44 | Caucasian | Master | Full | On | Intermediate | Yes (3) | Yes (2) | Yes | Yes |
| **Secondary Edu. Group B** | Luke | Male | 28 | Caucasian | Master | Full | On | Intermediate | No | No | Yes | Yes |
| | Ryan | Male | 27 | Caucasian | Master | Full | On | Intermediate | No | No | No | Yes |
| **Higher Edu. Group A** | An-Ni | Female | 26 | Asian | Ph.D. | Full | On | Intermediate | Yes (1) | Yes (1) | Yes | Yes |
| | Anthony | Male | 30 | Hispanic | Master | Part | Off | Intermediate | Yes (8) | Yes (2) | Yes | Yes |
| | Junghoon | Male | 34 | Asian | Ph.D. | Full | On | Intermediate | No | No | Yes | Yes |
| **Higher Edu. Group B** | Sangjun | Male | 28 | Asian | Master | Full | On | Advanced | Yes (1) | Yes (1) | Yes | Yes |
| **Business Edu. Group** | Yen-Ping | Male | 29 | Asian | Ph.D. | Full | On | Intermediate | No | No | Yes | Yes |
| | Allison | Female | 54 | Caucasian | Ph.D. | Part | On | Advanced | No | No | Yes | Yes |
| | Gabriel | Male | 38 | Caucasian | Ph.D. | Part | On | Intermediate | Yes (1) | Yes (1) | Yes | Yes |

Participants' demographic backgrounds varied. The 14 participants were 8 males and 6 females. Their ages were in the range of 26 to 54, with most falling between 25 and 35. In terms of ethnicity, there were 7 Caucasians, 6 Asians, and 1 Hispanic.

According to the academic background of the participants, 7 were seeking a doctoral degree, and 7 were in a master's degree program. Also, 11 participants were full-time students, while 3 were part-time students. Of the 14 participants, 13 were on-campus students, and one was an off-campus student.

In terms of the learning experiences, half of the 14 participants had taken online courses before, and of those 7 participants, 6 reported at least one experience with an online course applied to collaborative learning methods. Interestingly, 13 participants had already experienced the peer and self assessment before. Only one participant had not done the peer assessment before, and another participant had not experienced the self assessment until the CSCL course. Most of the participants also reported they had more than intermediate computer technology skills and felt comfortable using computer technologies in terms of word processing, spreadsheets, authoring tools, presentation tools, audio and video editing, graphic development tools, Internet, e-mail, and computer conferencing tools.

According to their demographic information, academic backgrounds, and learning experiences, all the students were assigned to one of six groups by the instructor. Additionally, at the beginning of the semester, students were asked to choose a primary educational interest -- elementary education, secondary education, higher education, or business education -- in which they would like to participate as a group. Therefore, based

on the participants' educational areas of interest and backgrounds, they were assembled

into six groups: one elementary education group, two secondary education groups (A and

B), two higher education groups (A and B), and one business education group. Each

group consisted of 3 to 4 members.

## DATA COLLECTION

Data sources included: 1) face-to-face or online video conferencing interviews

with the participants, 2) participants' written reflections, 3) their portfolios, 4) messages

that each participant posted to their group online discussion board, and 5) peers' and self

comments on the online peer and self assessment. Although the primary data of this study

came from interviews with each participant, other sources were included as additional

means of triangulation of the data.

The primary data of this study was from in-depth semi-structured interviews with

each participant. The interview itself must not be constructed as an objective tool for data

gathering. "Increasingly, qualitative researchers are realizing that interviews are not

neutral tools of data gathering but active interactions between two (or more) people

leading to negotiated, contextually based results" (Fontana & Frey, 2000, p. 646).

Schwandt (1996) supported this in describing an interview as "a linguistic event in which

the meanings of questions and responses are contextually grounded and jointly

constructed by interviewer and respondent" (p. 79). Thus an interview is an active tool of

data collection during which the researcher must pay attention to the process of the interview as much as the product.

Through the interviews, participants were asked to describe their experiences with and views of the online peer and self assessment in the CSCL course. Because quantitative approaches might have excluded important perspectives about how students individually perceive the peer and self assessment in the collaborative learning environment, it is important to conduct semi-structured interviews to uncover personal experiences, feelings, perspectives, or perceptions that might be significant to the central research questions.

In this study, two interviews with each participant were conducted, one at the end of the first peer and self assessment and one at the end of the last peer and self assessment (see Appendix G for the interview questions). Face-to-face interviews were conducted with on-campus participants, and one off-campus participant was interviewed via one of the online video conferencing systems, Skype. All interviews with participants were audiotaped with participants' consent, and then transcribed. Each interview took approximately 30 minutes.

To facilitate triangulation of the data, four other data sources were acquired, including: participants' written reflections, items that they placed in their course electronic portfolios, transcripts of their electronic messages in the course, and the comments that they entered in their peer and self assessments. The CSCL course was designed to ask students to reflect back on their learning at the end of each learning module. Participants posted their reflections on their own Blog, and they were also

required to comment on at least one other member's reflections. Participants were provided specific questions for their reflections on each module, such as "What were the most important things that you learned from the module?", "What questions do you have?", "What problems did you encounter?", and "How could these problems be overcome in the future?"

The portfolio was another type of reflection exercise. Like the written reflections, the portfolio was one of the required assignments included at the end of each learning module. In the portfolio, participants were to include three types of information: 1) excerpts from the individual's best contributions to the online discussions, 2) specific product contributions to each team project, and 3) reflections on their work and the project process. Since participants were asked to post their portfolio in their private area in the computer conferencing system (TeachNet), they were not shared with other members; that is, only the instructor and the individual participant were able to access to this private area and read the portfolio. Both the contents of the participants' reflections and the portfolios represented important data sources for this study, as they included the participants' thoughts and concerns about the online peer and self assessment and their group projects.

Transcripts of electronic messages posted by participants in the public area of the computer conferencing system (TeachNet) represented another data source for the study. Because the CSCL course was an online course, most of the communication among students and with the instructor occurred through the computer conferencing tool (TeachNet), which is a virtual learning environment and workplace where students can

communicate and collaborate. Using the electronic message transcripts as an additional data source was helpful in better understanding the group collaboration and what happened in the each of the groups.

Comments on the peer and self assessment form represented an additional data source. As mentioned earlier, since an open-ended space for comments was provided in the online peer and self assessment, participants were able to offer constructive comments to peers and to themselves.

## DATA ANALYSIS

To explore how students perceive the online peer and self assessment in an online collaborative learning environment, this study mainly used the techniques and procedures of the grounded theory approach originally developed by Barney Glaser and Anselm Strauss (Strauss & Corbin, 1998). The purpose of the grounded theory is to generate a theory of a phenomenon based on close analysis of the data through a method of constant comparison. The constant comparative method of data analysis is the process of taking information from the data collection and comparing it to emerging categories (Strauss & Corbin, 1998).

In a grounded theory analysis, the process of generating theory from data is delimited by a set of rigorous analytic procedures: open coding, axial coding, and selective coding. The aim of open coding is to discover, name, and categorize phenomena according to their properties and dimensions (Strauss & Corbin, 1998). Therefore, during

open coding in this study, data were broken down into discrete parts, closely examined, and compared for similarities and differences. Closely examining data for both differences and similarities allowed for finer discrimination and differentiation between categories. As a result of open coding, 50 categories were developed from the data (see Appendix H for the list of categories resulting from open coding).

Open coding led to axial coding. The aim of axial coding is to look for how categories relate to their subcategories, as well as to further develop categories in terms of their properties and dimensions. A category stands for a phenomenon -- a problem, an issue, an event, or a happening that is defined as being significant to participants. While a subcategory is also a category, subcategories answer questions about the phenomenon such as when, where, why, who, how, and with what consequences, thus giving the concept greater explanatory power (Strauss & Corbin, 1998). In this study, during the axial coding, data were reassembled and the relationships between categories related to participants' perceptions of the use of the assessments were verified. As a result of axial coding, 4 categories, each comprising of subcategories to form more precise and complete explanations about phenomenon, were developed: learning context as environmental conditions, individual differences as individual conditions, online learning community as community conditions, and consequences of the use of peer and self assessment (see Appendix I for the list of categories resulting from axial coding).

Selective coding is the process of integrating the categories along the dimensional level to form a theory, validating the statements of the relationships between the concepts, and filling in any categories in need of further refinement. In integration,

categories are organized around a central explanatory concept that can represent the main theme of the study. For the integration process I used diagrams, which is one of the techniques to aid integration. Using diagrams enabled me to gain distance from the data, forcing me to work with concepts rather than with the details of the data. As a result, the most prominent factors related to participants' perceptions of the use of peer and self assessment in an online collaborative learning environment emerged. Detailed descriptions of the factors and a diagram representing the findings of the study are presented in Chapter V.

## ROLE OF THE RESEARCHER

In qualitative research, the researcher is the "instrument of data collection" and is an integral part of the research process (Polkinghorne, 1991). The accuracy of empirical findings is dependent upon the researcher's skills, experience, and rigor. A skillful qualitative researcher is an expert on the topic of interest and can make quick decisions about what information to seek, what questions to ask, and what observations to make. The researcher possesses skills in listening, interviewing, observing, and writing. In addition to these skills, the researcher must have a keen understanding of human interactions as well as the ability to communicate effectively. Experiences with the phenomenon under study can serve to enlighten and sensitize the researcher to the complexity of the issues being explored. Creswell (2003) suggests it is important for

researchers to explicitly identify their personal interests and biases about a qualitative research topic.

I have experienced working with classmates collaboratively in various classes since elementary school, and have enjoyed those environments. However, I am not sure how my teachers assessed my performance in the group collaborations because there was not any kind of criteria for the evaluation of group collaboration. When I was a senior studying for my bachelor's degree, I had my first experience with peer assessment for a group project (self assessment was not provided). At that time, peer assessment was new to me as well as to my peers. Conducting the peer assessment made me more responsible, more sensitive towards my peers, and made me work harder. Taking a computer-supported collaborative learning (CSCL) course was my second experience with peer assessment in a group collaboration. This course included self assessment as well. In my case, the peer and self assessment influenced me in several ways. That is, the results of the assessments encouraged me to participate in group projects more actively and helped me realize which collaboration skills I needed to enhance for group work.

I have been a teaching assistant for online courses that include peer and self assessment for four years. As a teaching assistant, I have had an active role in supporting students' learning activities, helping students who had problems during the semester, and revising the courses with the instructor at the end of each semester. While supporting and monitoring students' activities, I noticed that many students were sensitive to and affected by conducting the peer and self assessment as well as receiving scores from peers. For example, if a student received a low score on a leadership item among the peer

and self assessment items, he or she attempted to play a leadership role in the next group activity and to communicate with their peers more actively. Through these observations, I became interested in how each student as a group member perceives peer and self assessment and how students think about the necessity of the peer and self assessment for a group activity.

I was also a teaching assistant for the CSCL course that was the setting in this study. Therefore, previous experiences helped me to examine the research questions. According to Strauss and Corbin (1998), one of the skills a researcher should have is "theoretical sensitivity." This refers to "having insight into, and being able to give meaning to, the events and happenings in data" (Strauss & Corbin, 1998, p. 46). Strauss and Corbin also believe that theoretical sensitivity comes from a number of sources, including professional literature, professional experiences, and personal experiences. I believe that my professional and personal experiences enable me to be more sensitive to the data and to make appropriate decisions in the field.

However, there can be a risk involved in occupying both the roles of teaching assistant and researcher. This risk is what can be called influence bias. As one of the staff members of the course, who is responsible for course management and who, to a limited extent, could influence the students' grades, it was important to be explicit and reflective of both the researcher role and that of the teaching assistant. I recognized that the power of the teaching assistant-student relationship could influence the results of the study. Particularly, when the researcher asked the students to participate in an interview, the researcher's position might affect the student's decision to participate. For example, the

students might have thought they could receive better grades for participating, or were afraid of negative consequences for not participating. Therefore, to protect the rights of the participants and to obtain more accurate responses, the study was grounded in three threshold standards: 1) definition of the researcher's and teaching assistant's roles and boundaries, 2) careful recruitment based on voluntary participants, and 3) use of techniques to ensure the integrity of the study results.

First, the researcher role should be differentiated from the teaching assistant's role. The researcher must hold an identity that is not fully conterminous with that of the teaching assistant. Therefore, in this study, the teaching assistant's role was defined with the following responsibilities: 1) monitoring all the interactions among students in the communication system of the course, 2) having regular meetings with the instructor to discuss the progress of the course every week, 3) answering the students' questions, 4) reading and checking assignments, and 5) securing students' information.

On the other hand, as a researcher, one is aware of the need to balance objectivity and sensitivity (Strauss & Corbin, 1998). According to Strauss and Corbin (1998),

Objectivity does not mean controlling the variables. Rather it means openness, a willingness to listen and to 'give voice' to respondents … hearing what others have to say, seeing what others do and representing these as accurately as possible. It means having an understanding, while recognizing that researchers' understandings often are based on the values, culture, training, and experiences that they bring to the research situations and that these might be quite different from those of their respondents (Strauss & Corbin, 1998, p. 43).

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As mentioned before, sensitivity involves giving meaning to data and having insight into the events being studied. Therefore, the researcher should be aware of the tension between objectivity and sensitivity.

Secondly, to minimize the risk, the researcher briefly described the purpose of study to the students enrolled in the course at the beginning of the semester in order to recruit participants. The invitation e-mail, which was sent to all students enrolled in the course, included information on the purpose of the study, what their participation would involve, and assurance that refusal to participate would not affect their grade or their relationship with the instructor, department, or university.

In addition, to reduce the potential bias due to my previous experiences and role in the course, triangulation (e.g., use of multiple sources) and peer debriefing were used. More detailed descriptions of the triangulation and peer debriefing are given in the following section.

## METHODS FOR ASSURING THE QUALITY OF ANALYSIS

In comparison with quantitative research criteria (internal validity, external validity, reliability, and objectivity), Lincoln and Guba (1985) suggested four criteria for judging the trustworthiness of qualitative research: credibility, transferability, dependability, and confirmability. In addition, they proposed various techniques to establish trustworthiness: prolonged engagement, persistent observation, triangulation,

peer debriefing, negative case analysis, referential adequacy, member checks, and keeping a reflexive journal. To assure the trustworthiness of the study, following techniques were used: prolonged engagement and persistent observation, triangulation, and peer debriefing.

**Prolonged Engagement and Persistent Observation**

Prolonged engagement is the investment of sufficient time to achieve the purposes of learning the setting, testing for misinformation, and building trust. To achieve prolonged engagement, I actively participated in the course throughout the whole semester. Persistent observation allows the researcher to "identify characteristics and elements in the setting that are most relevant to the question being pursued" (Lincoln & Guba, 1985, p. 304). In order to accomplish this, I observed all of the participants' communications and collaborations that took place in the computer conferencing system (TeachNet). During repeated observations, I could build trust with participants, establish rapport so that participants were comfortable disclosing information, and reciprocate by giving back to the people being studied.

**Triangulation**

Triangulation is one of the techniques to establish trustworthiness. Triangulation is the use of multiple sources of data, multiple settings, and multiple methods of data collection to support emerging research themes and to explain the research findings

(Lincoln & Guba, 1985). In this study I used not only multiple sources of data, including as many participants as possible, but also multiple methods of data collection, which were 1) face-to-face or online video conferencing interviews with the participants, 2) participants' written reflections, 3) their portfolios, 4) messages that each participant posted to their group online discussion board, and 5) peer and self comments on the online assessments.

**Peer Debriefing**

Peer debriefing is used as a means of testing the researcher's ideas against those of a peer or peers who have not been involved in the research project. The use of peer debriefers provides an opportunity to obtain alternative perspectives regarding the researcher's interpretation of the data. Peer debriefers also serve to diminish impact biases associated with the researcher's personal feelings. In other words, peer debriefers provide support, play devil's advocate, challenge the researchers' assumptions, push the researcher to the next step methodologically, and ask hard questions about methods and interpretations (Lincoln & Guba, 1985). Through all stages of this study, I regularly discussed the design of the study, possibilities for data collection and analysis, and my understanding of the data with my dissertation chair and another professor. In addition, I regularly engaged in an informal series of peer debriefing with two colleagues. These peer debriefing processes were helpful, in particular, in testing my interpretations of the data and identifying discrepancies in the themes that emerged.

# Chapter IV. Results

The purpose of this study was to examine factors that influence students' perceptions of the use of peer and self assessment in an online collaborative learning environment, and how peer and self assessment impacts the online collaboration of the students.

First, this chapter begins with a brief description and definition of the major themes that emerged in this study. Then, the factors that affect students' perceptions of the use of peer and self assessment in an online collaborative learning environment are discussed: learning context, individual differences, and online learning community. Finally, this chapter presents the impact of the use of peer and self assessment on the group collaboration. In discussing the factors and the impact, I have tried to select examples that best illustrate how these components and processes functioned with the participants.

## MAJOR EMERGENT THEMES

After open coding all of the participants' interviews, I organized the data into categories and sub-categories, looking for themes to emerge from the data. A number of conceptual themes and properties revealed themselves during constant comparisons among and within the different sources of data. As a result, three factors influencing participants' perceptions of the use of peer and self assessment in the CSCL online course emerged: learning context, individual differences, and online learning community. In

addition, the consequences that participants mentioned as relevant to the impact of the assessments on group collaboration were explored.

First of all, participants were heavily influenced by the **learning context** in which they were involved as they were conducting the peer and self assessment. Particularly, learning context in this study encompassed all parts of the CSCL online course strongly related to the peer and self assessment. Thereby, categories under the factor of learning context included *course elements*, *online assessment system*, *types of assessment feedback*, and *graduate school environment*.

**Individual differences** were also one of the dominant influences on participants' perceptions on the use of the peer and self assessment. Categories related to the factor of individual differences included *stringency-leniency in ratings*, *objectivity of ratings*, *previous assessment experience*, *purpose of the assessments*, and *degree of self-confidence in assessing their own contributions to the group activity*. That is, once assessing others and themselves, participants were affected not only by different individual characteristics but also by different backgrounds, experiences, and goals related to the peer and self assessment.

**Online learning community** referred to the group, where each participant was assigned during the course semester. Categories related to the online learning community included *group composition*, *engagement of group members*, and *sense of community*. In the CSCL course, based on the participants' areas of educational interest and backgrounds, participants were placed into six groups consisting 3 to 4 members, and worked with the same group members throughout the semester in order to complete

projects. As a result, each group came to develop their own learning community, and the characteristics of their community became one of the main factors to affect the participants' perceptions of the use of peer and self assessment.

Finally, the **impact of the use of peer and self assessment on the group collaboration** was found in terms of the following consequences: *understanding others' perspectives*, *reflections on themselves*, *awareness of the assessments*, *interpersonal skills for collaboration*, *accountability*, *participation*, *personal criteria for the assessments*, *level of confidence with the assessments*, and *group collaboration*.

The following sections contain detailed descriptions and evidence of the three factors influencing participants' perceptions on the use of the peer and self assessment in the online collaborative learning environment, and of the impact of the assessments on the group collaboration, which emerged in this study from interviews, reflections and portfolios of the participants, and other resources.

LEARNING CONTEXT

One of the factors related to the use of the peer and self assessment is the learning context, which particularly covers all of the parts of the CSCL online course in relation to the assessments. Categories related to the learning context included *course elements*, *online assessment system*, *types of assessment feedback*, and *graduate school environment*. The four categories influenced participants' feelings and perceptions in conducting the assessments. This section describes how the learning context influenced

participants' feelings and perceptions on the use of the peer and self assessment in the online collaborative learning environment.

**Course Elements**

Participants' feelings and perceptions of the use of the peer and self assessment were influenced by some of the CSCL course elements related to the assessments, such as providing assessment practice right before the first assessment, completing the assessments at the end of every group project, and setting up the assessments as a compulsory assignment at the end of each group task.

*Assessment Practice*

Right before starting the first group project, students were provided with an opportunity to practice in order to familiarize themselves with the peer and self assessment process. It was the goal of this practice to enhance students' problem-solving techniques with the complex skills of peer and self assessment, and to help them feel comfortable with and to apply standards to these assessment processes. Through this practice, students was asked to review the errors that could occur in conducting peer and self assessment, to read an article related to the collaborative assessment process, to familiarize themselves with the peer and self assessment rubric used in the CSCL course (see Appendix B for peer and self assessment items), to read a scenario about John's group work (see Appendix C for the scenario for peer and self assessment practice), and then to rate John using the assessment rubric. The rationale for rating John was discussed

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with their group members in the Webcast session. Through the assessment practice,

participants could reduce the gap between their different views of the assessment rubric,

and help them to conduct the assessments more comfortably.

Linda and Isaac recalled the practice positively and said that it enabled them to be

familiar and to feel comfortable with the assessment process and rubric. In addition, it

seemed to help them to know what they should think of and consider in conducting the

peer and self assessment, and how different their views and standards were in John's

case.

> John's scenario was great for our group because in our group there were three of us who saw him the same way as in an non-productive, non-value-added person and the other person thought of him as being okay, not great, but acceptable. Which, in our group, got us talking about well why do you think he's acceptable and then the other person said well, why don't you think his behavior is acceptable? So we had a really great discussion about what is acceptable and what's not and I really valued that in our group that we have one person who thinks differently. (Linda, 11/16/06, the first interview)

> I think the activity that we did that set us up to evaluate John, was the right thing to do to help us understand where we were going, what purpose we were on in terms of peer and self assessment. (Isaac, 11/8/06, the first interview)

Therefore, by doing the practice, even if each member had different views in seeing the

same scenario, they could compare and bring their views and standards into agreement to

deal with the assessment.

Additionally, unless the participants have enough understanding of each item in

the assessment rubric during the assessment practice, they could be confused in assessing

themselves during the self assessment. Jasmine revealed her trouble in assessing herself

with her misunderstanding of the assessment rubric by saying,

> The first time will be the hard one for me because I know that I tried to contribute even though I didn't participate much in the discussion but I just thought I contribute to the group work in another way but not in the discussion. So then I have to evaluate myself, I feel like hmm, I know that I didn't participate but I just feel like I did something else so I think I misunderstood that part. (Jasmine, 1/19/07, the second interview)

### *Repeated Assessment Process*

In the CSCL class, there were three main projects, including developing a

Wikipedia entry, demonstrating tools regarding computer-supported collaborative

learning, and creating a web site for a WebQuest activity. All of these projects required

students to work collaboratively as a group in order to complete. At the end of each group

project, students were asked to conduct the peer and self assessment. The first time they

conducted the assessments, participants seemed to feel it was a little difficult because

they did not know what they were supposed to see and do with the assessments.

However, as time went on and they did it throughout the semester, participants seemed to

feel more comfortable and at ease doing the assessments. Anthony and Gabriel stated,

> I think it is a little bit easier to conduct self evaluation maybe because you already know what you're looking for. You know, you've done these over and over again. … Myself, I was very comfortable doing the final peer evaluation. I knew what I was looking for. I knew what I wanted to do with it. (Anthony, 1/30/07, the second interview)

> I think since we've been through it several times either on this project or that project, the rest of the team, that I felt better about the self-assessment. I was more comfortable with it. … The first time I looked in the mirror, I didn't know exactly what I was going to be seeing and then I thought okay, well I can improve this

and this so I consciously tried to address those issues so I felt better by the time we got to the end that I had and I felt easier to say, I think I did well on these things because I was paying attention. (Gabriel, 2/1/07, the second interview)

Furthermore, participants seemed to feel more confident with the assessments because they gradually came to be more familiar with the process as well as the assessment rubric by doing them repetitively.

I was sort of familiar with the process so it wasn't quite so much like I don't, you know I'm not really sure what a four means you know like so I felt more confident with it you know evaluating what I really thought I'd done. (Ava, 1/22/07, the second interview)

### *Assessment as an Assignment*

Students in the CSCL course were required to conduct the peer and self assessment at the end of each group project; therefore some of the participants had a tendency to think of the assessments as a merely token step they must complete to wrap up their projects, or as an assignment to do in order to get to the next step without considering any other meaning and purpose of the assessments. This caused some of the participants to fail to rate peers prudently as well as to take scores and comments from peers seriously.

Sangjun described his thoughts about the assessment activity by stating, "It is necessary for me to finish evaluating someone. It is necessary step to finish that module." Junghoon also had the same thought about the assessment activity as Sangjun, in which since the assessment was considered only as a required assignment to go to the next step,

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it could make some students feel that conducting the assessments could not be more meaningful.

> I think, including me, many people can think it [peer and self assessment]'s kind of assignment. If they think it's one of the assignments, it is not so meaningful to make better the CSCL course but to get more meaningful data and more meaningful to student you must not perceive it as an assignment. .... But problem is every people including me, I mean not everybody, for me, it's kind of assignment. I did it because they should do it but it is not my own work. … If we think about evaluation is assignment, it's not meaningful. (Junghoon, 11/21/06, the first interview)

Isaac thought of the assessment process as an additional thing to do before going on to the next step as well. This attitude seemed to lead him to conduct the assessment in a routine and perfunctory manner and to just complete it without having any real interest in questions such as "Am I doing well based on the assessment rubric?" or "Are other members trying to contribute to the group project actively?"

> Peer and self-assessment suffered because it felt like at the time, it felt like just another thing you had to do. And so you just, we'd just finish an activity and then we'd get a message or it would be on the list, "say oh, by the way, by tomorrow morning at 8 o'clock, you have to assess. You have to assess your teammates." (Isaac, 1/11/07, the second interview)

**Online Assessment System**

The assessment system provided in the CSCL course was an online anonymous system with a rubric containing 16 items, in which students evaluated their own efforts and anonymously assessed those of others in the same group at the end of every group project. The characteristics and components of the assessment system, including

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guaranteed anonymity, computerized online system, and use of an assessment rubric, affected participants' feelings and perceptions conducting the online peer and self assessment. Some participants also indicated that several problems with the assessment system influenced their perceptions in conducting the assessment.

*Anonymous Assessment*

The assessment was anonymous; that is, when students rated their group members, the comments and scores based on the average of the ratings by the peers were presented to each student without identifying who gave which score and comment. The guaranteed anonymity made participants feel comfortable rating others, helped them to be honest and frank in assessing others, and prevented conflicts among members who might take the ratings from peers personally.

An-Ni expressed her positive opinion about the anonymous assessment system by saying, "They don't know how I grade them because it's anonymous so I feel comfortable to use this system to assess them." Junghoon also mentioned that, by using the anonymous assessment system, he could be more honest and frank in assessing others. Thus, the anonymity seemed to make participants not only feel comfortable and at ease but also allowed them to be more honest in assessing others.

Participants might be careful and concerned about giving fair assessments to their group members not only because the group size was so small that other members might be able to identify who gave which ratings, but also because they had to continuously work with the same group until the semester ended. However, the anonymity of the

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assessment system kept participants from being concerned if other members could

identify where the scores came from.

> I'm glad that it was anonymous because there's only like two or three other
> people you know and with the first peer self-assessment you're going to be
> working with those people on another project and so you know it's not like
> they're just going to go away. You're going to have to work with them again. So
> it was easy for me. It wasn't a problem. There was nothing I had to complain
> about with my teammates at all. But I could see how it might have been a little bit
> more uncomfortable if I was in a different situation. (Ava, 1/22/07, the second
> interview)

Moreover, Luke indicated that the anonymous assessment system prevented

conflict because some students might take the rating and feedback personally. Therefore,

unless the system was anonymous, there would be some conflicts among members.

Gabriel also added his thought about the benefit of the anonymity by stating,

> Some people take it [ratings received from others] very personal. Some people are
> vindictive. So people are difficult to assess others because they gonna affect
> somebody else. A good thing is the anonymity and the averaging works a little bit
> for that. (Gabriel, 11/20/06, the first interview)

*Computerized Online Assessment*

The online peer and self assessment used in the course was a computerized

system in which the scores that each student gave to others and themselves were

automatically gathered and summarized, and then the results of the assessments were

immediately shown to each student in various forms such as overall average score

received from peers, average score of each of the assessment items, and a comparison

graph of peer and self assessment scores. In addition, since the peer and self assessments

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were conducted via the Internet, it offered benefits to students in terms of increased freedom of time and location for the completion of the assessments and viewing the results. The computerized and online assessment system in the CSCL course seemed to affect participants' perception of the peer and self assessment in different ways. Some participants preferred rating their peers via the computerized online system because of feeling less like they were betraying their peers, whereas other participants thought that they would have preferred talking to their group members about their thoughts and ratings in person. There were also participants who viewed the computerized online assessment system as a more useful tool for the instructors to monitor and manage students' ratings.

First of all, Ryan said that he personally preferred to use the computerized online assessment system rather than to go to the instructor and talk about other members' contributions and needed improvements. That is, if he had to directly report his ratings and comments to the instructor, he seemed to consider it a betrayal of other group members in comparison to using the online assessment system.

> It's tougher in a classroom because your only recourse is really to go to a teacher and I think myself personally, you kind of feel like you're betraying your other students and it's not, I would personally just rather do more work myself and get it done rather than go to the teacher and say hey, this person isn't doing what they're supposed to be doing. … I just personally don't like doing that even though a lot of other people do that. (Ryan, 11/15/06, the first interview)

On the other hand, William revealed his uncomfortable feeling with the computerized online assessment system in his reflection paper by saying, "What was the

most difficult was the evaluation I performed on the other members. I would have

preferred to talk with and relay my thoughts to them in person."

Junghoon indicated another aspect of the computerized online assessment from

the instructor's angle. Namely, he considered that the online system allowed instructors

an easy and convenient way to analyze and manage students' ratings, to enable them to

use the assessment repeatedly in the same way, and to get students' feedback about the

course as well as each group member's efforts. Therefore, he asserted that the

computerized online assessment system could be an advantage even to the instructors.

> It [computerized online assessment system] is easy to analyze data and save the
> paper, and exactly, at the same, … online, it's a little easy to give a change to
> repeated measure in the same way and that is more easily can give feedback to the
> students. That is advantages, I think. (Junghoon, 2/2/07, the second interview)

### *Assessment Rubric*

The assessment system in the CSCL course had a rubric containing 16 items. The

items were categorized into three dimensions, which are social interaction, task

management, and trust, and used a 5-point scale ranging from 1 for "Never" to 5 for

"Always" (see Appendix B for online peer and self assessment items). The assessment

rubric affected participants' feelings and perceptions differently. That is, many

participants held the view that the assessment rubric not only played a role in guiding

them to work well together, but also led them to give fair evaluations. However, some of

the participants perceived several assessment items as vague. In addition, others felt that

the scales of the rubric were not intuitive and were difficult to use in assessing their

peers.

First of all, participants conveyed positive perceptions about the 16-item assessment rubric. Yen-Ping stated, "I think we have very systematic rubrics, the format is very well designed." Anthony, as an instructor in a community college as well as a student enrolled in CSCL course, had considered how the rubric could be integrated with his class, and he reinforced his positive attitude toward the rubric by saying,

> I think it's a very good rubric. I've looked at it and I try to see how I can incorporate that type of rubric in some of my classes but I haven't figured that out yet. I like the way it's set up. I really do. It gives you a very fair evaluation in my opinion. (Anthony, 11/17/06, the first interview)

In addition, some of the participants mentioned that, due to the assessment rubric, they could pay more attention to what they should do while working on the group projects; specifically, the rubric seemed to play the role of a guide in working together.

> Because you know the rubrics beforehand, so you will kind of pay attention to the different aspects in the teamwork. Then you will try to make sure you have done all the parts so you can get good scores. (Yen-Ping, 1/29/06, the second interview)

On the other hand, there were some aspects that led to negative feelings about the rubric (see Appendix B for online peer and self assessment items). First, Minjung indicated that the rubric included too many items, and Junghoon commented on the scale of the rubric, which used a 5-point scale ranging from 1 for "Never," 2 for "Seldom," 3 for "Sometimes," 4 for "Frequently," to 5 for "Always." He stated that it was neither intuitive nor distinguishable between the scales so he could not judge quickly what he should rate to others.

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Scale is a little different, little hard to discriminate between the scales, for example, always and frequently. So I think it's not so intuitive to me. (Junghoon, 11/21/06, the first interview)

Additionally, Linda, Luke and Yen-Ping thought of the rubric items as vague: items were not well-defined, some of items looked similar, and two of the criteria seemed to belong to one item. Thus, unclear items of the rubric seemed to cause them to feel confused and have a hard time conducting the assessments.

I found the self-evaluation to be really difficult this time and I'm not sure why. But I really, I struggled with it perhaps thinking the parameters were not well defined to say, did you do this? Did you do this? I thought it was much more open-ended like okay, reflect on your participation and so where do you take that? (Linda, 11/16/06, the first interview)

Sometimes I would like to know the validity of this kind of assessment because sometimes many items look very similar to me. Yeah, and hard to evaluate. (Yen-Ping, 1/29/07, the second interview)

I think on this particular assessment, it was hard because it wasn't always so clear like maybe on some of the ratings, some of the descriptions, I did good on part of the description but not good on the other, like there was maybe two qualifiers or two things that we were rating with one remark and so it was saying well, he did good on this part but not so good on this part and then what do I pick? (Luke, 11/9/06, the first interview)

In particular, some participants revealed their troubles in rating one of the rubric items, which was related to leadership: "Provides leadership and support whenever necessary." Since most of the groups commonly assigned a different member as leader on every project, there could be only one leader. In that case, the participants seemed to have difficulty in rating other members on the leadership item; that is, they were concerned how they should rate the other members who were not the leader in the project.

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In my case, in my team, actually, they are very good person and I think every time when I do peer assessment evaluation, I will check every item very closely and think about if this person within these items yea and give them appropriate point but I think most of them I give them five but some items, it's very difficult to evaluate like in some items like about the leadership. But every time we have only one leader so I just don't know how to evaluate others about the leadership. (An-Ni, 1/29/07, the second interview)

And, Yen-Ping was concerned if members might be able to seek to be a leader in order to get a high score on the leadership item, and that it could cause some disorder among the group members. He described his concern by saying,

But some are not easy to tell because like leadership, I think in a team, there should only be one leader or it will be very confusing. If everybody wants to be the leaders, I don't think it's possible or there will be some chaos. (Yen-Ping, 1/29/07, the second interview)

### *Problems with the Assessment System*

Participants indicated several problems with the assessment system, which led them to feel embarrassed and concerned. The assessment system in the CSCL course was designed to immediately show the ratings to the assessees right after assessors submitted their scores. This way of displaying the assessment results made participants, who were members in a small group or who already shared and knew each other's daily schedules, feel embarrassed because they could guess where the ratings came from. An additional problem with the assessment system was that participants might be prejudiced based on their peers' scores because participants could see the scores they received themselves before rating the other group members. Therefore, some of the participants were concerned it could affect their judgment in assessing others. Additionally, some

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participants felt that the assessment system would be more meaningful if it provided

feedback and an action plan on how to overcome and improve each participant's

weaknesses based on the assessment results.

Minjung, as one of the smallest group's members, first indicated concerns with

the way results were displayed in the assessment system, which is designed to

immediately show the scores rated by peers to each of the students. Minjung mentioned

that if students knew their group members' working schedules or if their group was a

small group, students might be able to identify who had submitted the peer evaluation. It

thereby could cause students to experience difficulty or to feel embarrassed conducting

the assessment. Minjung said,

> After one person graded other members, the members can know immediately. So
> I think the technology can change the system. After all of the members finish their
> rating, the rating can be shown to them. But now in this group, after one people
> rate other members, the point was immediately shown to them, so they could
> know and I could know. … I really embarrass to the system. The system shows
> immediately my rating. Maybe, I think it's not a big problem in other groups.
> They have more members, and they don't know like others' schedule but we
> know Judy's schedule. Judy is working from 9 to 5. So during the day, Judy
> cannot access Internet. (Minjung, 11/7/06, the first interview)

Other participants pointed out another problem of the assessment system, which

was that they were often able to see the evaluations made by their peers prior to

submitting their own evaluations. In that case, as Sangjun and Isaac articulate below, the

student might be able to rate others based on the scores received from their peers.

> I'm positive on peer and self evaluation except some specific criteria to be
> necessary to change. We usually could see our evaluation results before we

evaluated someone and ourselves. I think that could influence others' judgment when they gave their ratings, and that could make them have prejudice to evaluate someone and someone's product, I think. (Sangjun, 11/28/06, the first interview)

When you're assessing your team members, you first hope that they've already assessed you and you can look at what they gave you, and then kind of get a feel of what I guess, I felt like I could have done a better job and I felt like they did at least as good a job as I did if not better. And so I never gave them lower scores than I gave myself. (Isaac, 1/11/07, the second interview)

In order to minimize prejudice, Sangjun suggested that the assessment should be changed to enable students to see the results only after all members have finished rating each other as well as themselves.

Linda also pointed that she was uncomfortable in completing the self assessment and that it should provide feedback on areas requiring improvement.

I felt uncomfortable assessing myself because I thought it was a little too generic and assessing myself didn't provide me the kind of feedback so that I could not change those things. And I guess getting that full loop of I think for example, I tend to talk more than others. Okay so listening to others would be a weakness and yet I'd like to have input into, okay, what can I do? What kind of strategies can I do to change that or is that a weakness? (Linda, 1/22/07, the second interview)

That is, once she had assessed herself in terms of the self assessment, Linda wanted to get feedback and strategies on how to overcome and improve her weaknesses. However, the assessment system did not provide any strategies; it just showed the score she gave herself. She recommended that the system should not only identify areas requiring improvement but also provide strategies in an action plan for improvement. She also recommended that students should first finish evaluating themselves based on the

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assessment rubric and then post the self assessment results to their own blog, which students used to share their reflection papers and class articles with other members. After visiting the blog and viewing the self assessment results, other members could validate or contradict the results in terms of the peer assessment. Linda, therefore, thought that this process she suggested, namely self assessment first then peer assessment, could be more useful and meaningful for students to figure out what their strengths and weaknesses are and how those things could be improved.

> It [assessment system] probably needs a little bit more follow through. The first part is identifying. Okay, I don't share as much. I don't praise as much. But then what do you do about that? You know sort of an action plan. Okay, now I identify this. These are my shortcomings. How do I fix that? What are the strategies for fixing those things or altering those behaviors? … I think what might be more useful is that we do the self-evaluations, to say okay, these are the criteria of being a good team member. This is where I think I have a shortcoming or I'm not comfortable with how I do this. And then posting it on a blog and having the team members come in and either validate or contradict those feelings and say yea, you know maybe you do talk too much or, no, you know you're more talkative than other but it's not distractive, for example. (Linda, 1/22/07, the second interview)

**Types of Assessment Feedback**

The assessment system in the CSCL course showed students various types of assessment results: 1) the overall average score received from peers, 2) each average score of the peer and self assessment items, 3) a comparison graph of peer and self assessment scores, and 4) comments from peers. The first three result types were based on the numerical scores from peers, and the last result type, comments, was textual feedback from others. When interviewed, participants seemed to have different

perceptions of the numerical and textual results. Some of the participants took the view that numerical results tended to be inflated because they commonly rated their peers more generously. They saw the inflated numerical results as being produced by a cycle in which, for instance, if they received higher numerical scores from peers than they actually gave the peers, they felt guilty about getting the higher scores, and as a result, became generous in scoring peers. In terms of the textual results, many of the participants thought of the textual comments as more meaningful, powerful, and reflective than numerical results because they could get specific feedback from the comments. However, since assessees might be able to identify their assessors' written style, one of the participants, as an assessor, was concerned if anonymity could be guaranteed when giving comments and feedback to their peers.

*Numerical Results*

Some of the participants perceived that the numerical results in the assessment such as average scores tended to be inflated. These participants said that they always received higher scores from peers than they deserved and what they rated peers, which caused them to think and feel that their peers were more generous to them. Therefore they came to feel guilty, and it caused them to be more generous in scoring others as noted in the following comments by Isaac.

> I wish I'd been more generous with my other team members in terms of the peer assessment. Not that I felt like I didn't score them highly but I felt like they scored me more high, I think, I felt like they scored me higher than what I would have scored had I been them, and so in terms of that I felt slightly guilty for not scoring them, even higher than I did. … I felt each time, well the first time I

assessed them, I assessed them what I thought was accurate and still higher than what, how I assess myself, but when I look at how they assessed me, they assessed me really high, much higher than I thought I deserved and so I felt guilty about giving them the assessments that I gave them. (Isaac, 1/11/07, the second interview)

This points to a possible situation in peer assessment in which receiving what is perceived as undeserved high ratings from peers may result in giving the other group members undeserved high ratings, thus leading to the general inflation of evaluation scores. Additionally, Isaac revealed his cynical opinion about scoring. He insisted that giving and getting scores was the reverse of the foundational educational notions that the learners' journey should be the focus rather than an arbitrary number.

I think one of the things that were jarring to me is that, when I looked at how my peers scored me, there was actually a number there. I was given a number and that felt like it kind of ran contrary to a lot of foundational educational notions that it's about the learner and their journey not some arbitrary number where there is. If you're using numbers and that's sort of an evaluation, then it's probably not about the journey. It's about how you could compare to someone else and as soon as you do that, you're back to educational sorting. Who are the top ten percent? Well they can go to college. Or the top one percent are going to go to college? Who are the top one percent from them? Are they going to go to graduate school? If our society is about sorting, then we haven't come very far. And, to the extent, the self-assessment and the peer assessment seem to resonate with that. (Isaac, 11/8/06, the first interview)

### Textual Comments

Most of the participants had positive perceptions of the textual results, and seemed to want to see and hear more textual comments from peers. An-Ni mentioned her positive feeling about the textual comments by saying, "It is useful because I love to read

the feedback from others." Junghoon and Anthony also expressed their optimistic

thoughts about the textual comments by stating,

> I think more written feedback is more meaningful to students. And the scores just gave me bad or happy feeling, but did not give any suggestion or objective criteria or what I should do for better. … I think the peer evaluation needs to be more written comments not numerical results. (Junghoon, 12/10/06, in his reflection)

> I was hoping to see more. I was to see a little bit more. I've been an instructor for over five years at a community college so I depend on these comments so that I can make reasonable adjustments to what I do and how I teach. And when I saw my comments there I saw you know maybe one line, one sentence. I was really expecting to hear or read a lot, longer paragraphs or you know specific things but I didn't see that. I was hoping for more. (Anthony, 11/17/06, the first interview)

As noted by Junghoon and Anthony, since they, as assessees, could know more specific

things about what they should do by the feedback from peers, they wished to receive

more textual comments. Junghoon, for example, mentioned that the comments were more

meaningful and powerful to himself than the numerical results.

> When I first had the peer assessment some people said, "I suggest you to become more active in our communication" so it will force me to be more active, but number is not important to me but written statement is more better to me because I could understand what they exactly wanted from me. And, for example, if they just give a three points in the active points and it can be hurt to me. "I did my best but why you rate me three. This is different criteria and you and I have different criteria and a different process and you are kind of person who are more active and more like communicative but I am kind of person more observant." But when they give a written comment, it is meaningful to me and powerful. They just dislike some part of my work and my attitude so I think I must change this part. So it is meaningful. (Junghoon, 2/2/07, the second interview)

Ava stressed that the textual comments were critical and valuable to the assessors as well

as to the assessees. That is, since she could say something to her peers in her own words

by writing comments, it could be a good way of communicating and a valuable chance to enable her to give more detailed and specific feedback to her peers.

> I was glad for that kind of comment box because that was the only way that I could say specifically what their contribution was. I mean you know out of all the sixteen things, they did everything great but to actually give my own words, I think that was what actually I was able to differentiate. So I like the comments. … It's kind of like a good idea you know like because people just kind of like go through it and, but if they are forced to say something in their own words [in comment box], I think that's much more helpful to people than numbers sometimes you know especially if it's like I got a 4.7. Great. (Ava, 11/13/06, the first interview)

As many of the participants said, they emphasized the value of the textual comments. However, in the assessment system, giving scores to their peers in the 16 items was compulsory, whereas providing the textual comments was not. As a result, Junghoon regarded giving textual comments as an additional thing to do, and so used to skip it.

> If the peer evaluation and blank form for the comments are preferred, then I can try to give a critical and more cheer up feedback. … But at the latter part means it is additional one. So I skip that part but I think it's better to give more direct written feedback, and it is more meaningful to peer. (Junghoon, 2/2/07, the second interview)

Thus, most of the participants wished that the assessment system could be designed to include more qualitative methods, and they believed that qualitative feedback such as the textual comments would be more useful and encouraging to students as well as more reflective for them.

I felt it [assessment system] could have been more qualitative and I'm not sure what supports are needed in there to support assessment as a journey. … And it seems that the one with just the comments, seems to be the most productive. (Isaac, 11/8/06, the first interview)

In terms of the assessment, so you could give a score one through five. Sort of like your scale. So it was very tempting to go very quickly and just five, five, five, five, four, you didn't like something. Five, five, five, five, four but I just, I think that if there were, if instead of numbers, if there was some sort of qualitative note that was left, it would not only have encouraged, it would have been more constructive for the people receiving it, and it would have been more kind of reflective for the person giving the score. (Isaac, 1/11/07, the second interview)

Even though most of the participants considered the textual comments to be useful and valuable to the assessors as well as to the assessees, Linda revealed she was uncomfortable with giving the textual comments to her peers. That is, she seemed reluctant to write and give the textual comments to peers because she thought it could be possible for them to identify where the comments came from based on the writer's manner of speaking and literary style.

I didn't give the comments. You know what? I saw the comment line and I just thought, the comments I think you can figure out who said that. And even though I would have said something positive, I just felt like I should have been in hidden sight. I wish I had said something because I think comments make the reader feel good so in that self-efficacy issue of, oh good, the peers thought I did a good job. … Anyway, that was just sort of an initial reaction. (Linda, 11/16/06, the first interview)

**Graduate School Environment**

The CSCL course that participants were involved in was a university graduate-level online credit course, and all participants were graduate students in the process of

earning a doctoral or master's degree at the university. Since graduate school was the setting for all of the participants' academic endeavors, the graduate school atmosphere as a learning context played an important part in shaping how the participants perceived the use of the peer and self assessment. Participants indicated two aspects of the graduate school setting that affected their perceptions and feelings about conducting the assessments: *academic context* and *equality with peers*.

### *Academic Context*

Many participants thought of graduate school as a purely academic context in which learning what they did not know and researching what they would like to study more in-depth were the main purposes for them to enroll, rather than competing with each other for better grades. For instance, as a graduate student, Ryan thought that grades were not important because they had entered graduate school in order to learn: "Because this is graduate school you know I'm really in this for learning more than the grade." Allison and Isaac both had the same thought as Ryan.

> I think in education everybody is here because they want to develop their skills. They're still learning but they're also, basically if you're a student, you're saying, "I want to grow, I want the feedback, I want to learn how to do this." (Allison, 11/10/06, the first interview)

> At a graduate level, grades are kind of a joke. I mean grades are, it's not about the grade, and so at a certain level, I feel like a level of anxiety about the assessment because we're here to learn and do a good job. … Grades are going to be high because all the graduate students know that this is the game called graduate school. This is the game called give everyone a higher score and believe that they're giving you a higher score, And so again I'm not, not up at night worrying about my grade in the course. (Isaac, 11/8/06, the first interview)

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That is, they wanted to grow by getting feedback whether it was negative or positive, they considered grades at the graduate level as almost a non-issue, and they believed everyone would get high grades anyway. Due to those reasons, these participants, as assessors, tended to be generous, and as assessees, they seemed not to care much about the scores they received from others.

In addition, participants said that they were all adults and mature enough to be able to accept any type of feedback as well as to know and judge themselves better than anyone else. It, therefore, seemed to cause them to feel less threatened by the grades given by others in the graduate school environment.

> I give a very good peer assessment to them because I think they are more doctoral students and just depend on their own judgment. They're adults and if they think they did well, I think it's okay. (Junghoon, 2/2/07, the second interview)

> They [peers] know themselves well better than me because we are all adult and we are not kids. So they know themselves whether they did well or they did their best or not. They know themselves. (Minjung, 12/18/06, the second interview)

### *Equality with Peers*

Some participants, as graduate students, thought that they were all in an equal position and that nobody could be superior among them in the graduate school context. This perception affected the participants' evaluation of their peers. For example, Linda felt uncomfortable rating her peers because she considered the group members to be equal with her; they were all students and none of them had more expertise than any other person in the group. Linda expressed her feelings by saying, "I still found the peer assessment to be also difficult to do. I think I don't have the expertise if you will to say to

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somebody well you could have listened." Ryan also confessed that evaluating peers was

neither easy nor his role.

> I don't like being put in a position to mark down other people. Even if they didn't do the best job that they could, I don't like being put in that position because I'm not their superior, I'm their fellow student you know. If someone in the group really did not do what they were supposed to do and they were a big problem then I would probably mark them down badly and I have before. But you know if someone was really nice and they tried hard and I didn't feel maybe middle of the road, I really would feel bad and I don't like to do that you know. And I just kind of, I would feel like that's not my place, my choice to do. (Ryan, 11/15/06, the first interview)

Additionally, since they were all on the same level as students in a school setting,

a number of participants thought that their peers could be defensive and displeased with

the ratings. Therefore, when conducting the peer assessment, especially when rating their

peers negatively, the participants seemed to be concerned about their peers taking the

ratings personally and causing conflict.

> This situation is a school situation. If a group member says hard things about another group member whether or not it's deserved, it's going to be taken personally and I think that in an ideal world, the person can say hey, you're right. I need to step it up. You know I think that's ideal but I think because it's a student, an equal, it's not a superior, it's an equal, the same as another equal, the tendency is a little bit more, could be defensive and to take it personally and that will cause conflict. … Any kind of authority structure in your group is artificial, you don't have a project manager that's truly in charge of the project who can come down on other people. Thus, if I came down on other people on my team, there would be hurt feelings, there would be upset you know. They would take it personally, so that's tough. (Ryan, 11/15/06, the first interview)

> I just think it has potential for being uncomfortable but so does any evaluation. I think the only thing with peer evaluation is you're on equal level. Like you're a supervisor and you give a bad evaluation to a worker, it's different than if you're

a peer and you're equal and it's sort of uncomfortable because they can be like, what are you talking about? (Ava, 1/22/07, the second interview)

Individual differences were a powerful influence on participants' perceptions of the use of the peer and self assessment. Categories related to the factor of the individual differences included *stringency-leniency in ratings*, *objectivity of ratings*, *previous assessment experience*, *purpose of the assessments*, and the *degree of self-confidence in assessing their own contributions to the group activity*. This section describes how participants' individual differences impacted their attitudes and perceptions on the use of the assessments.

**Stringency-Leniency in Ratings**

Many of participants in this study agreed that a tendency to be generous to others or to be harsh on themselves was heavily related to how they rated peers and themselves. First of all, when rating their peers, most of the participants said that they were usually generous to others. Yen-Ping, Linda, Minjung, and Sangjun described how their personal traits, such as being generous to others, influenced their ratings:

> I think [when we evaluate others,] the person's personality also come, like me I don't dare to give very bad feedback to people. (Yen-Ping, 11/7/06, the first interview)

> In classes, we've done peer evaluations. My thought on them always is to be very generous, very understanding unless somebody just really falls downs constantly

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and gets in the way actually. So when I do the peer evaluations, I tend to be fairly generous. … It's that sort of the personal philosophy of I tend to be generous because being on the other end of getting, being brutally honest you know is not good when people are trying their hardest. And I got the sense in my group that everybody was really trying their hardest. (Linda, 11/16/06, the first interview)

Actually, I think I'm kind of a person more generous to others and stricter to me, so I gave five points, all five points to others but I gave me only one, two points. (Minjung, 12/18/06, the first interview)

In evaluating something or someone, it is likely I usually give high score to others. (Sangjun, 1/30/07, the second interview)

Minjung also mentioned her difficulty in evaluating others because she was not accustomed to analyzing people and did not feel comfortable doing so. She said, "I think generally it [assessing others] is a good method but personally I don't feel comfortable. … Actually I don't want to evaluate any person."

In terms of self assessment, the stringency-leniency tendency, including being generous, critical, objective, harsh, hard, or tough on themselves, also impacted participants' feelings about the assessment. As an example, Ryan described himself as a person who thought well of himself, so he usually rated himself high even if he noticed he needed improvement in some areas. On the other hand, contrary to Ryan, many of the participants tended to be harsher and tougher on themselves. Junghoon, Luke, Allison, Gabriel, and Isaac were typically hard on themselves. Specifically, Junghoon was very hard on himself, judging himself more strictly than the others.

When I evaluate my work or my activities, still I think my product was not so good and my participation was not so active and I more think about more bad side of myself so I give me average or good but I can not give a very good scale to myself. (Junghoon, 11/21/06, the first interview)

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Luke was also harder on himself because of his constant drive to challenge himself.

> I think I generally scored myself lower than my peers scored me. I guess I was harder on myself. … And I guess I always want to challenge myself, so I don't want to give myself a perfect score because that means it will help me get better. And yea, I think that's my thought. I mean I know that there are some areas that I had weaknesses in that I would like to improve so I just scored myself a little bit lower on that. (Luke, 11/9/06, the first interview)

Allison was always critical of her own work, was never satisfied with herself, and always saw room for improvement.

> I think that I am personally more critical, and I'm much more critical on work. Yea. It's not hard but I think just because professionally I did this [self assessment] a lot. I just am personally kind of never satisfied with anything that I ever do so it's harder for me to acknowledge that something is okay. But, so it's fine. It didn't, it isn't a dramatic insight or anything like that for me. I think it's worth doing. … If you're never satisfied, that's not really a healthy thing. You know at some point you have to be satisfied about it but I always see room for improvement. (Allison, 1/12/06, the second interview)

She also tried to be as objective as possible, believing it would best enable her to learn from the experience.

> I tried to be objective about it [assessing myself]. Just because of what the questions were I think that there were some other questions that I've asked myself where I graded myself more harshly. That weren't necessarily included there, does that make sense? And that's okay I mean it's like okay, you know this is my first semester back at school and I'm still kind of getting used to it and I need to do some things differently. It's okay. I've learned from it. (Allison, 11/10/06, the first interview)

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Gabriel was harsh on himself as well, and attempted to be objective and honest. He explained how he assessed himself by saying,

> I'm generally harsh on myself. But I think it causes me to sit down and think about it but I was trying to imagine, when I did myself, I pretended I was another person grading me but it was me grading me but I was like okay, be honest. Are you doing this? Yes, I think I am. No, I could work on this. So I try to do it that way. And set a standard. I look at all the questions first and said all right, if I'm going to call myself a five on this, am I also a five on this or am I a little, you know pick my strongest thing, call that five and then figure it out from there. (Gabriel, 11/20/06, the first interview)

Isaac was also one of the participants who were harder on themselves. When conducting the self assessment, Isaac mentioned that he scored himself based on what he actually did rather than on his potential.

> I remember feeling like I could have done better and I just scored myself lower than I felt I could. I didn't score myself on my potential. I think I scored myself more on what I actually did. (Isaac, 11/8/06, the first interview)

**Objectivity of Ratings**

Some participants were concerned about whether their ratings of their peers and themselves were objective and honest. They also asserted that the ratings might be inaccurate because participants could dishonestly assess their peers in order to devalue their peers' efforts while rating themselves highly in order to get better grades. Therefore, it seemed to be hard for the participants to evaluate objectively without any bias.

Sangjun mentioned his difficulty in terms of the peer assessment. Because he had

to judge and score peers based on his own standard, Sangjun felt uncertain as to whether

his ratings were objective and correct.

> I am having really difficult to evaluate others because I feel it is not right to assess others based on my criteria. It's always tough work to measure others based on my standard. … I'm afraid if I can't evaluate others objectively based on my standard and criteria. … But in evaluating others, I try to evaluate the peer honestly as possible as I can. (Sangjun, 1/30/07, the second interview)

As noted by Sangjun, each student could evaluate others subjectively with their

own standard, and rely heavily on his or her personal judgment. This point raises the

issue of accuracy in the peer assessment. Ryan pointed out that the scores students rated

could be inaccurate because they may be trying to devalue others' efforts.

> I think what's bad about it [peer assessment] is you know you [instructor]'re hoping that you [instructor] get an idea from the student in the project accurately who did the most work, who did the best job than you did. I think what happens is the students that didn't do a good job will often evaluate the students who did do a good job dishonestly and they'll kind of bring them down in hopes that that will help their grade because it is kind of like if there's a certain number of points assigned to the whole team because sometimes that's the way it works and so you're going to try to choose like you know who on the team gets the most points, who gets the second most points and it's an advantage for the people who didn't try as hard. It advantages them to try to make the top players look bad and so there's that incentive in there you know it's kind of negative or cynical way to look at it but you know when talking about students who have decided not to put the effort in the first place, they're much more likely to do stuff like that. (Ryan, 11/15/06, the first interview)

Ryan also felt skeptical about the accuracy of the self assessment. He insisted that

students could be dishonestly rating themselves higher than they deserved in order to get

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a better grade. Therefore, it seemed it would be hard for participants to evaluate

themselves very accurately.

> I really, I really, really question how valuable self-evaluation is. I just don't know how accurate it is. I don't have very much experience with it and I'm sort of suspicious of it, of its accuracy. … Again the problem with self-evaluation is honesty. I think, I mean what kind of people really don't evaluate themselves well. You know, people that didn't do a good job in the group but still want a good grade, they're going to say that they did a good job. They're going to evaluate themselves high. People that did a good job you know are probably going to evaluate themselves pretty high too and people in the middle are probably going to evaluate themselves pretty high. So like I don't know how, I think if you're a very honest person, you can say hey, there were some things that I really could have did, that I could have done better but overall, as far as it being a really good solid accurate way to evaluate people, I don't think, I don't think people typically will evaluate themselves very accurately if they know it's going to affect their grade. If they knew, if it had zero attachment to their grade then maybe you'd get some more honest responses, I don't know but if you know hey, if I evaluate myself poorly and it's going to bring my grade down, it's tough to get you know under that situation, you need to be very accurate. (Ryan, 11/15/06, the first interview)

Sangjun described his difficulty with conducting the self assessment by stating, "I

think self evaluation is more difficult than peer evaluation because it's very difficult to

give me low points." Additionally, many of the participants expressed concerns about self

assessment, and felt it was strange to rate themselves because they could not evaluate

themselves without bias. Even though they tried to evaluate themselves neutrally, they

did not seem assured of fairness of their own ratings.

> Sometimes it's hard to score myself because I cannot totally evaluate myself without any part of this or any personal thought. I cannot remove my personal prejudice or personality thinking. Yea, it's very hard to be objective with myself. (Minjung, 11/7/06, the first interview)

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I did feel a little worried I wasn't going to evaluate myself right and I also felt that I might not be evaluating myself correctly. (Anthony, 1/30/07, the second interview)

As for me, it is strange to evaluate myself because I think I could not evaluate myself objectively. (Sangjun, 1/30/07, the second interview)

**Previous Assessment Experience**

As for the participants who partook in this study, the most distinguishing characteristic was that 13 of the 14 participants had already experienced peer assessment as well as self assessment (Table 3.5). Only one participant had not done the peer assessment before, and another participant had not experienced the self assessment until the CSCL course. Therefore, according to the information, it could be assumed that participants' previous experiences with the peer and self assessment influenced their feelings and perceptions as they conducted the assessments in the CSCL course. And as assumed, a number of participants did state that their previous experience was a powerful influence on various aspects of the use of the peer and self assessment: their feelings about the assessments, the way they evaluated their peers and themselves, and their perceptions about conducting the assessments.

First, most participants who had experienced the peer and self assessment before seemed to feel more comfortable, more confident, and had an easier time conducting the assessments. For example, Linda mentioned, "You know it [peer assessment] wasn't difficult for me because I come with a lot of history." When interviewed, Ava also shared her previous experience of self assessment at her undergraduate college. She related how

even if it was hard for her to evaluate herself then, she gradually came to enjoy it as well as finally recognize the value of self assessment. Due to her experience, she felt comfortable conducting the self assessment during the CSCL course.

> I was comfortable with [self assessment]. I mean in my last college we did self-evaluation. We didn't have grades. We had self-evaluation. … We had to do [self assessment] every semester so I felt very comfortable doing that. … When I was a freshman, I think that was because you're like 18 you know and you've never been asked to do that before. And it's a long time ago. Just like twelve years ago. But I think it was, it was harder to get used to but it also was your chance you know when you're in a large class to be like this is what I did and this is you know like show the teacher. You know show what parts you had played in different projects. So that was really nice because sometimes the teacher just won't you know the classes you never know. They never know about you except what you did on your test. So I always really enjoyed doing that because it gave you that opportunity to do it but it was I think hard at first when you don't do that in high school. You know you don't so but I'm just glad, it was fun. I was like sure I'd write myself out. I mean my grades were good in high school but it was just such a completely different world. (Ava, 11/13/06, the first interview)

On the other hand, Ava was the only person who had never experienced the peer assessment before. As a non-experienced assessor in terms of the peer assessment, she had trouble with conducting the peer assessment, such as being unsure of how to use the rubric scale or how to rate others.

> Well I mean I would still do it but I felt like it's not, are we supposed to be more critical you know are we supposed to you know like am I, you know I mean that's how I actually felt but I felt that I also was thinking in my head am I supposed to you know not, am I supposed to give a 4 at some point you know like thinking about what you're supposed to do. I think it was, and maybe that's just because I hadn't done peer evaluations before and so I think that's the first thing you do is when you don't know how to do something you think about how you're supposed to do it. (Ava, 11/13/06, the first interview)

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Secondly, some participants seemed to have already developed their own way of evaluating themselves and others through their previous assessment experiences. Allison, as an employer in a company, had long-time experience in evaluating others. At that time, she had tried to be impartial and objective as she assessed others instead of sugarcoating her comments.

> I probably am a little different from some of the other students because I've been doing this for a long time. I mean I've had employees and I give them feedback and I give feedback to people all the time and I try to be fair. I don't, but I don't gloss it over I mean I don't try to make it more, puff it up. I don't want to hurt anybody's feelings but I don't think I'm doing them any favor if I don't tell them what I really think so. (Allison, 11/10/06, the first interview)

Gabriel also mentioned that he had tended to be honest, objective, and even critical when assessing peers before. These evaluation tendencies seemed to carry through to the CSCL course.

> After working many years and doing them [peer assessments], I'm pretty well warned to criticism that I think for the most people are pretty honest with those. Not over blowing it or setting the criteria too high or too low. (Gabriel, 2/1/07, the second interview)

Finally, participants' perceptions and attitudes toward the assessments seemed to be also based on their previous experiences with the assessments. Linda recalled a past experience with the self assessment while working for a prior employer. She said that her positive perception came from that experience, which is that self assessment provided an opportunity for reflection and a chance to fix unwanted behavior.

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I used to work at a company and we used to do self-performance reviews, the annual report. Well with self-evaluation, I always find that, or the feedback I've gotten is that I'm much more critical because I see the process. That I've seen okay here I could have done better. Here I made the wrong choice and while the end product is still okay but in the self-review process, I always look at you know sort of the minor things. In being aware of where I could have improved I think is very important to me personally so that in the future when I'm faced with that situation, I can think it through it and say hey, last time this came up, I wasn't comfortable with the choice I made. What other choices are there? So I find self-review to be extremely helpful in the long term of developing. (Linda, 11/16/06, the first interview)

Ryan was the only person who had never done the self assessment before. Thus, in contrast to Linda, Ryan seemed to be unfamiliar with self assessment, and finally this unfamiliarity seemed to lead him to view it negatively and skeptically.

I just don't know how accurate it [self assessment] is. I mean that's you know, I haven't done it [self assessment]. … I'm not all that familiar with it [self assessment] so … I'm sort of suspicious of it [self assessment], of its accuracy. (Ryan, 11/15/06, the first interview)

**Purpose of Assessments**

Many participants considered the peer assessment as a tool not only for cheering up, motivating, encouraging, and inspiring their peers, but also for reinforcing peers' strengths and contributions. First of all, a number of participants used the peer assessment as a means to encourage peers by giving positive scores and comments. For instance, An-Ni was a student who used peer assessment as a tool for boosting her peers' self esteem, even if they did not do a great job.

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It [peer assessment]'s easy for me. Always give very positive feedback. I always give them [peers] four or five. … I just want to cheer them up. I want to tell them they did a great job. Actually I want to be fair and make good comments. … Even though they don't do really good stuff, I think I will still give positive feedback to most of them. (An-Ni, 11/7/06, the first interview)

Linda also gave positive feedback to her peers for the purpose of cheering them up.

I mainly put positive comments because I really wanted to make sure that all the comments were positive. Because the comments made me feel good, I decided that you know that would, also make the other people feel good and hopefully I wrote them in a way that they were good comments. They were real comments, genuine comments. … And I tend not to praise too much. (Linda, 1/22/07, the second interview)

However, not all of the participants gave positive feedback in order to cheer up and encourage their peers. Some of them tried to give not only positive feedback but also constructive and honest feedback. For example, Luke gave honest feedback to his group members who did not work as hard, simply in order to motivate them.

With one of our group members that I felt was you know not doing as much work as she should, I kind of was hoping that by giving honest feedback that it would motivate them a little bit. (Luke, 1/25/07, the first interview)

Peer assessment was used to reinforce peers' strengths and contributions as well. Ava said,

I think when, especially since they [comments] were positive, I mean it was reinforcement you know like one of our team members, English isn't her first language and she, I know she felt a little intimidated by the chat because she didn't feel like she could write as fast and I was trying to get positive feedback like.. she's put in just as much feedback as everybody else and has worked you know and it's not a weakness at all you know what I mean. I think it's just, I

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would feel the same way if I was chatting in Spanish I mean you know it's just like but she, I mean it was in her hat you know and she was actually so I wanted to give her positive feedback as far as like you are a contributing member and you put in just as much work and do just as well as everybody else. Do you know what I mean? So that kind of opportunity to give out to her or to just show what people's strengths are I think. (Ava, 11/13/06, the first interview)

Allison also wanted to reinforce her group members' strengths and contributions with the peer assessments. However, she tried to be honest with her group members rather than unconditionally complimentary.

I think that probably trying to understand where that person started and how that person grew on that project. That would be kind of the thing that I would look at and maybe that's really looking at that person as if I'm more an instructor and not as a peer but I think I would do the same for anybody. So I mean I think that I'm probably tougher on myself than I would be on a peer but you know I think it's more looking for, I see my role as a peer as finding ways to reinforce what that person, what the person's strengths were and contributions they acknowledged, the contributions they made but not to be dishonest. (Allison, 1/12/07, the second interview)

**Degree of Self-Confidence in Assessing Their Own Contributions to the Group Activity**

Participants' self-confidence on their own contributions to the group activities seemed to impact their feelings about conducting the self assessment. Many participants who had a high degree of self-confidence in their own contributions to the group activities tended to feel comfortable conducting the self assessment, and tended not to hesitate in giving high ratings to themselves. However, those who had low or weak

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confidence in their own contributions had a tendency to experience trouble with assessing themselves because of the uncertainty of their contributions.

An-Ni and Ava seemed to have a high degree of self-confidence with respect to their contributions to the group activities. An-Ni explained her comfortable feeling with the self assessment by saying, "I give myself always five because I think I work hard and I did everything, I try my best to do everything and I think I deserve it." For Ava, her good performance was a factor in her high level of comfort as well. She stated, "I feel comfortable with it [self assessment]. Yeah, it was just like sort of like feeling of like I really feel like I did do a good job."

In contrast, some participants, who had low confidence on their own contributions to the group activities, tended to have trouble with assessing themselves. Jasmine described the difficulty of evaluating herself:

> I think it's harder to evaluate myself because I feel that you know because I realize you know when I look at the transcript [of online group discussion] and I see how bad I contribute to the group discussion. So I feel bad and then I just am okay you know like okay, I'm going to evaluate myself on what I did. (Jasmine, 11/7/06, the first interview)

Linda also expressed doubts about her own contribution to the group activity. Even though she thought she worked well in groups, she seemed to be uncertain if she really did well. She thought that since the outcomes of the activities resulted from all group members' interactions and efforts, it made it difficult to determine which parts were her contributions. Therefore, it led her to experience difficulty in conducting the self assessment.

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I also always question my ability to work in-groups. I mean because I may think I work well in groups but it's not what the other three people think. And depending on which three people they may or may not like my style. So there's also that element of it and then as I read through the transcripts with the online chat, that's the way we normally, I just was thinking, "wow, everybody contributed so much." How can I say well this was my significant contribution when I really valued the other people's contribution. … So for me to say in a self-evaluation oh, this is my idea. Well it's not my idea. That yea, I verbalized that idea or I expressed it but that idea was formed by interacting with the other people. So I found self-evaluation to be fairly difficult. (Linda, 11/16/06, the first interview)

## ONLINE LEARNING COMMUNITY

Participants were assigned to six groups in the CSCL class, according to their area of interest, such as elementary education, secondary education, higher education, and business education, and considering variables such as gender, ethnicity, previous online learning experience, major, seeking degree, and level of computer skill. Therefore, each group consisted of diverse members and developed their own learning community; thus the characteristics of their community became one of the dominant factors to impact participants' feelings and perceptions in conducting the peer and self assessment. Categories related to the online learning community included *group composition*, *engagement of group members*, and *sense of community*. This section describes how participants' online learning community impacts their attitude and perception on the use of the peer and self assessment.

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**Group Composition**

In the CSCL course, participants were required to collaboratively complete most of the course activities as a group. At the beginning of the course, the instructor sorted participants into six groups consisting of 3 to 4 members, based on their educational interests, demographic information, academic progress, and learning experiences. As a result, each group came to consist of diverse members even though the group size was not large. Participants indicated that their feelings and perceptions in conducting the peer and self assessment were influenced by group members who had different perspectives and backgrounds, as well as by group size.

*Diversity of Group Members*

Each group consisted of 3 to 4 members, and was diverse in terms of communication, participation, culture, and language. Participants viewed their group members' diversity in different ways, and it led them to have different feelings about assessing and receiving scores and comments from others.

Linda, a member of the secondary education group A, described her group members as all different, which allowed them to have diversity. She considered the diversity to be a benefit for the group in terms of being able to see different views and perspectives from their members. She also added that the diversity of group members enabled each person to listen to different and valuable ideas from their peers, and to become more involved in their group activities. Therefore, within the group, the diversity helped her to evaluate others more easily and positively.

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Our group just worked superbly well together even though we all have different styles. And one of the persons in our class really sees things very differently than I do and I just always looked forward to hearing okay, how do you see it because it's so different than mine. And so, I think some people would say oh, that's a negative you know. That person doesn't see things the same way as I do so that's wrong. Well I look at it and say, hmm, I don't see it that way but that person is obviously intelligent, smart and they thought about it and they came to a very different conclusion. So I love hearing the diversity of ideas. So when I was doing the peer evaluation for my group, I just, you know all fives, it was easy. … they did things differently than I would but that's not a shortcoming perhaps for our team it was a benefit. (Linda, 11/16/06, the first interview)

In contrast, Gabriel, a member of the business education group, indicated his trouble with assessing others due to each member's differences. His group had four people: two of them came from Taiwan and they were full-time students, while two of them were Americans who, in particular, worked in a business setting. Gabriel indicated that there were some differences between the two sub-groups such as different levels of thoughtfulness, different communication styles, different encouragement techniques, and different methods of participation. He thought these came from their different cultural backgrounds. It, therefore, seemed to be difficult and challenging for him to assess others who had different styles based on their own cultures.

One of the things I noticed, my team is made up of myself and another older professional. She's American and I have two people that are from Taiwan and as we went through the criteria, it was interesting to me trying to determine whether this was, what the rating might be and why they might fall into that. If I was using, trying to compare myself and my other American business person, I might say that the people from Taiwan were acting differently and whether that be high or low I don't know. And same thing, for example, not call it aggressiveness but it was a different style. It was a different amount of thoughtfulness. A different technique in how you present your ideas, a different amount of encouragement. Things were just different and I found myself, it was interesting to try and compare them and at one point I started doing ratings and I stepped back and said

well, let's try and peel away whatever cultural part but then it was difficult somewhat so that was an interesting thing just to find how to select a rating that wasn't, that was purely based on the course and not based on "this person didn't contribute their ideas a lot. Well it's because they were being thoughtful and quiet." I contributed a lot but I wouldn't say I contributed always helpful content because my technique is just to blurt out things and others would go, let's not do that. Let's do that. It's different. Not worse or better so was I a five or was I a three. Were they a five or were they a three. I don't know. So it was interesting to try and do that and that was a little bit of a challenge. (Gabriel, 11/20/06, the first interview)

When receiving scores and comments from others, some participants also seemed to be influenced by the group members' different views, in which group members regarded their peers' efforts differently based on their own perspectives. As an example, Sangjun, as an international student, said that he got low scores in several of the peer assessment items related to participation. He asserted that even if he did not speak much because of the language barrier, he tried to participate and involve himself in group activities in different ways. However, other group members rated him low in the participation items. That is, other members seemed to think Sangjun did not participate well in the group activity only because he did not speak often. Sangjun, therefore, came to think that each member interpreted and judged the same situation differently, based on his or her own culturally-based perspectives and views. Sangjun described his uncomfortable feeling after getting low scores from the other group members by saying,

When I saw my evaluation point and comments from others, I felt uncomfortable because the evaluation was not good. Maybe the comment was about my language skill. … but as an international student, I like to listen rather than speak about some issues but that makes me get low points in the evaluation, in participation. But, maybe this is not true. (Sangjun, 11/28/06, the first interview)

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*Small Group Size*

Some participants thought that their group size, four or three members, was small enough to identify who gave which evaluation, even though the assessment system was anonymous. Since the online assessment system is designed to immediately show the ratings to the assessees right after the assessors submit their scores, the participants held the view that it could allow students, who already knew the other group members' work and class schedules, to identify where the scores come from. It thereby made them not only feel guilty when receiving higher scores than what they gave to others but also made them more generous when rating others because they did not want to hurt anyone's feelings. In addition, several participants indicated that, as a small group, a minority could be negatively affected by the majority's scoring; therefore, the participants wanted the instructor to be careful when interpreting the assessment results.

Minjung first mentioned that she felt uncomfortable assessing her group members because their size was small. As a small group, the members shared and knew each other's schedules for both work and school, so Minjung thought that it could be possible to deduce where the scores came from based on the time when they were posted on the assessment system. Minjung described her worry by stating,

> I can notice who gave me. We are only three, at the time, Judy didn't log in to TeachNet yet, but I found who someone rated me, and then I found the comments so I felt "oh Isaac". I think Judy is working for Monday through Friday so she cannot usually log in TeachNet during the day. We know our life schedule. Isaac has a rating so he knows Minjung rated me in during the day. So Judy usually logs in TeachNet at night during the week. (Minjung, 11/7/06, the first interview)

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Our situation is unique because Judy can not access Internet because we know her job and her situation, but if we don't know about our situation very well, whether they can not access Internet during the day or not, but it doesn't effect, but we already know one of them, one of the three can not access Internet. Only two are remaining. But one, I find, I found my evaluation, one evaluated me during the day, so "oh, it's him". So I just worry. (Minjung, 12/18/06, the second interview)

In this situation, where each group member could guess where the scores came from, individuals came to be more conscious of the other members. Participants felt guilty specifically when they received higher scores and good comments than what they gave to others, and in turn they tended to be generous when rating others in order to not hurt them or make them uncomfortable.

I felt a little bit guilty. Oh they gave me higher points, but I gave four points. I didn't want them to know my rating points, but anyway they know. So I think in a small group, be careful to evaluate each other. (Minjung, 11/7/06, the first interview)

I felt "oh, maybe Isaac can notice I gave him four, four points". So a little bit sorry. I worry he may not agree with my evaluation because maybe he may think, "I did my best, but Minjung gave me four, four points." Because it's not final evaluation, we have more work together, so I don't want to disappoint any other and I don't want to hurt any other. (Minjung, 12/18/06, the second interview)

I think I'm more lenient so I will usually give people higher than three. Because I think if I give them very bad grade, we only have four people and they will not comfortable with or not satisfied with me. … But because we only have four people so we can still know probably guess yea. (Yen-Ping, 11/7/06, the first interview)

Meanwhile, Linda and Ryan raised another issue that could happen in a small group. They indicated that a minority of the group could be affected by a majority's scoring and judgment, which may or may not be honest by stating,

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I also think, we were thinking as a group, if you were the odd man out in your team, would that affect your grade and how much would it, you know we were just thinking sort of if in a college situation, your ultimate product is your grade. How is, or maybe you're doing a really good job and the other three people aren't and so there's that conflict where the minority whether it's good or bad is going to be judged by the majority who may be good or bad. (Linda, 1/22/07, the second interview)

I'd say peer assessment is a little bit better [than self assessment] but the problem is you have to have a big enough group. If the group is too small, it doesn't work. If it's big enough then if someone doesn't do their work then the majority of the group will probably assess them down and so you know that's probably legitimate because you have enough people saying hey, this person didn't do their work. So you know I think four people is kind of on an edge where I think three people is maybe a little bit too small to do peer assessment. And four people, you know I think five is enough and four people are kind of on an edge. I think, again with a smaller group, you're really just depending on other people to be honest and if you have honest group members that don't dislike you then it probably works out okay. … Yea. I think it's the bigger the group is, probably the more accurate it is. (Ryan, 2/7/07, the second interview)

Linda and Ryan, therefore, insisted that if the group was big enough, the results of the peer assessment could be valid regardless of any kind of judgments by the majority. Additionally, Ryan suggested that the instructor, should examine the whole of what the group members said in assessing an individual, rather than focusing on what a particular member said, in order to fairly interpret the assessment results.

With group evaluation, I think instructors have to look at what they entire group says about someone rather than just what one other person says about them. And that's kind of, I mean with a small group like four you know that's kind of tricky. (Ryan, 2/7/07, the second interview)

**Engagement of Group Members**

Participants conducted all course activities collaboratively with their group members over the course of a semester. Therefore, they thought of the involvement of group members in the activities as one of the important factors to be considered in conducting the peer assessment. That is, many participants tended to feel at ease and comfortable evaluating their fellow group members if they were well involved in the group projects. For instance, Junghoon, Ava, and Yen-Ping mentioned that they did not have any problems in conducting the peer assessments since their group members were very motivated, engaged, and worked well together:

> When I conduct a peer and self evaluation, I was very comfortable because I think our group works very well. I think sometimes the product is not, reach my criteria but I think our group did well compared to other groups I think. (Junghoon, 11/21/06, the first interview)

> I felt comfortable with it [peer assessment] and it was sort of the same thing that I felt when I do self assessment is that it's like I think honestly, and I think honestly all my team members are very, very good and very involved and very motivated. (Ava, 11/13/06, the first interview)

> [To conduct peer assessment is] very comfortable. Seems they have all done very well so it's easy. When things went well, it's really easy. Yea, but if some trouble occur then it would be hard. (Yen-Ping, 1/29/07, the second interview)

In addition, as members of an actively engaged group, some participants thought all their peers worked hard, and that they already knew each other's contribution to the group activities. Therefore, they saw no need to be troubled with which member made the most or the least contribution when conducting the peer assessment. Jasmine, Linda, and Ava described their positive feelings by saying,

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I don't have any problem because I think our group worked well together. Even though we have a timekeeper you know we have rules when we have group discussions, but we kind of help each other. So I think it's kind of good because you don't have to take like a responsible for something that you don't think that you can contribute. (Jasmine, 11/7/06, the first interview)

In our CSCL group specifically, we have probably one of the best working groups I've ever worked on. So when I was doing the peer evaluation for my group, I just, you know all fives, it was easy. I mean I just, thought if we just keep doing what we've been doing if we're going to continue to work a lot. (Linda, 11/16/06, the first interview)

It's easy when they're doing a good job. I mean it's easy to give everybody an A if they're, you know when they're doing a good job. … We're the only ones I think that really know how we're all doing in the class. I mean I could see the others' projects. because of all the chats and all the meetings we had, we know how, what everybody does in the group. So I think it's effective. (Ava, 1/22/07, the second interview)

As Ava said, it did not seem difficult for the participants who worked with actively engaged members to rate their peers high. Jasmine also described how easy it was to give high scores to her members by saying, "It's not, it's not very hard for me because I feel like they contribute to the group very much so I just don't feel difficult to give them like a good grade, a good score." An-Ni had the same thought as Jasmine, saying,

Actually my team members, I think they are quite good members. They are very responsible and most of them can hand out product on time with quality so I think yea, every module, I give them pretty high points in each item. (An-Ni, 1/29/07, the second interview)

Therefore, it could be assumed that if every member was fully-involved in their group activities, participants would evaluate their group members generously or positively, and give a higher number of points. However, participants were not always

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comfortable with conducting the peer assessment even if their group members worked

hard. Linda described her dilemma when she needed to give her group members

constructive comments or rate them a little low. Since Linda already knew that they tried

to do a great job and did their best, she experienced difficulty in pointing out what her

peers should improve on.

> I really felt like everybody was already doing the best that they could. So on the
> peer assessment, if somebody wasn't, I don't think anybody could change based
> on that. Again I think everybody did the best that they could do, it was their best
> effort. I think it was also a good effort. I think the performance was right there,
> already was there. So when it came to the peer performance I just sort of looked at
> it and thought, well first of all, I don't know, I don't know how to tell somebody
> you could have done better. And second of all, in our group, I think they all did a
> great job. And third of all, I think they were all trying to do a great job. So you
> have all those components together and it becomes very difficult to say well, you
> could have improved in such an area when I don't know what to put. (Linda,
> 1/22/07, the second interview)

**Sense of Community**

Participants worked with the same group over the course of a semester (16

weeks). This helped them develop a sense of community with their group members, in

particular by becoming familiar with each other, being conscious of how peers took the

ratings, and encouraging team building. Having the sense of community made some

participants feel comfortable with the peer and self assessment, but caused others to

experience difficulty.

*Familiarity with Group Members*

When the first peer assessment was conducted in the middle of the semester, some participants still seemed to feel uneasy about evaluating peers. They did not know each other and so were uncertain about how their peers responded to their ratings. However, toward the end of the semester, they came to be familiar with each other, and it led some participants to feel comfortable assessing peers because they had come to consider their group members as close friends. Gabriel said,

> At the beginning of the semester, we didn't know each other at all but even by the middle, the first peer assessment, I still wasn't sure how they would respond to that. What I meant to say is while we may be learning about each other, I wasn't sure how they would respond to an assessment. … I was more comfortable with it [peer assessment] as we moved on. … It might be familiar with the team member. I could kind of agree that evaluating other people is harder than myself because I'm the only one who's got to you know there's a social factor to the deal. So it may be harder but I think as we got through, toward the end, it was a little easier to say about them. (Gabriel, 2/1/07, the second interview)

In contrast, some participants felt even more uncomfortable evaluating others after becoming closer with each other. That is, they had developed personal relationships with their group members by collaborating on the projects as well as by sharing their experiences, troubles, and personal lives. Due to the personal relationship, they had a hard time in evaluating their group members. Minjung described her distress by saying,

> As for me, it's also hard to evaluate others. Because I know them personally, so actually I don't want to evaluate others and myself. So I just want professor to evaluate us. … Yea, I think the professor doesn't know my group members and me personally, so it is better to be objective. (Minjung, 12/18/06, the second interview)

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Luke also indicated that it was hard for him to choose between being nice or honest in assessing other members. Since his group members were now his friends as well as his peers, Luke wanted to be nice. However, as an assessor, he knew that he should be honest in conducting the peer assessment. Therefore, Luke seemed to have dilemma in evaluating his peers.

> Well I think it [peer assessment]' hard because you always, the one hand you want to be nice to everybody you know that the things that are obvious that come up like you want to be nice to everybody but you want to be honest and you want to be constructive. You don't want to you know it's a struggle. (Luke, 1/25/07, the second interview)

### *Conscious of Other Group Members*

As they developed stronger ties with each other, participants came to be more conscious of how their peers took the ratings. As a member of a group, participants did not want their peers to be upset and vindictive because of the ratings they gave. It, therefore, made the participants feel difficulty in giving constructive feedback as well as in giving peers low ratings. Luke described how it was not easy to conduct the peer assessment because he was conscious of how others might take his ratings and feedback.

> I don't know how they're going to react. Some people, it's not like, I scored everybody fine and I didn't score anybody too low but I don't want, some people get upset with that kind of thing. I don't want to make a big deal out of it. (Luke, 11/9/06, the first interview)

> If there's any peers like the one peer who I had that I didn't feel like was involved in the group enough, it was kind of hard to give, even though I felt like it was constructive feedback, it was kind of hard to give that feedback because I didn't know how that person would take it and I of course wanted everybody to get a good grade and to do well in the course and be happy but at the same time I wanted to be honest so that was difficult. (Luke, 1/25/07, the second interview)

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Gabriel also mentioned his difficulty with evaluating others. Since his ratings and

feedback could affect others in any number of ways, Gabriel was usually concerned about

how they would take it when he evaluated his peers.

> It has to do with the consideration of the other person and what message am I trying to send. Sometimes people are exemplary and that's easy. Just across, great. Maybe this is the one we'll call it a four just to give you something to do. But other times you maybe find a person that's, and it's a hard message sometimes to say you know you really need to work, in this case my team didn't have that person. I'm just saying in a peer evaluation sometimes it's difficult to go and do that so those are difficult and also consider different people, are they going to sit there and think about it and say that I'm trying to deliver the message. Are they going to receive the same message? Some people take it very personal. Some people are vindictive. … you gonna affects somebody else. … I think you do or at least you can be concerned with how the other person is going to receive this information. (Gabriel, 11/20/06, the first interview)

On the same line with Gabriel, Ava and An-Ni also described their struggle with the peer

assessment by stating,

> Peer [assessment] is a little bit harder. A little bit, not much harder but it's a little bit just because you know someone else is going to be affected by what you are doing. It's not just me. I mean if I didn't do a good job and I gave myself a 3, well you know it's me. But if give somebody else a score like that because of something they did, they're affected. … I mean even if they don't know it's me, the fact that they're affected by that. It just makes it a little bit harder when you're deciding which score. I mean I didn't have to deal with that but if I did, I think that would make me a little, a little bit more, I'd still do it but you know when other people get affected by your actions. (Ava, 11/13/06, the first interview)

> If I had some member who is not very responsible, then I give him feedback. I am kind of afraid to hurt his heart, but he is not very responsible so that I have to give him bad grade. I think it kind of struggling for me if I need to do that. (An-Ni, 11/7/06, the first interview)

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That is, Ava and An-Ni seemed to think that the ratings they gave could affect and even hurt their peers. They finally took the view that their consciousness of other group members caused them to feel distress in deciding which scores would be given to their peers.

*Consideration of Team Building*

Many of the participants seemed to be careful not to disappoint any other member with their ratings because they thought that their group members could negatively affect the group work process, relationships among the members, and team building which had been developing well. Since participants had to work together continuously until the semester ended, they were concerned about other members' responses to the ratings and the effect it could have on team building.

Minjung thought that if any of her group members were affected by her assessment, they could negatively affect the group's work process or the relationships among all the group members. Therefore, she tended to be careful in assessing others. Minjung said,

> He may not agree with my evaluation because maybe he may think, "I did my best, but Minjung gave me four, four points." Because it's not final evaluation, we have to, we have more work to work with, so I don't want to disappoint any other and I don't want to hurt any other. (Minjung, 12/18/06, the first interview)

Isaac also revealed his worry that his ratings could negatively affect the relationship among the group members as well as their team building:

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You had to continue to work with people and so the more negative you might be toward them in the mid-term might actually damage the relation the team you were trying to build and so I think there was also a tension between trying to build team chemistry and trying to assess on a good level. (Isaac, 1/11/07, the second interview)

Furthermore, Ryan and Gabriel brought up an issue about trust and team building in terms of the peer assessment. They explained that better trust and team building among group members could help them to feel more comfortable in evaluating other members. To elaborate, if there were strong trust and team building among their group members, it could be easier for them not only to give more constructive and honest feedback to their peers, but also to evaluate others without any concern that they would take the ratings personally.

I think it [peer assessment] can work in a group where maybe there's a lot of trust built up and where at least you know, in a group where you know everybody is someone that's trustworthy, then it [peer assessment] could work. (Ryan, 11/15/06, the first interview)

Try to be conscious of how it [results of peer assessment] was received and then once the team builds a little bit better, I think it was easier to say you know hey, maybe you really should have, it's easier, once you were more comfortable and I wasn't going to be depending on somebody. (Gabriel, 2/1/07, the second interview)

**IMPACT OF THE USE OF PEER AND SELF ASSESSMENT ON THE GROUP COLLABORATION**

Based on the participants' interviews and other resources, it was found that the peer and self assessment could help the participants *understand others' perspectives*,

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*reflect on themselves*, *be aware of being assessed by their peers and by themselves*, *improve interpersonal skills for collaboration*, *take more accountability*, *actively participate in the group activities*, *have personal criteria for the assessments*, and *be confident with peer and self assessment*. Furthermore, participants viewed the peer and self assessment as *strengthening the group collaboration*. This section describes how using the peer and self assessment impacts the group collaboration.

**Understanding Others' Perspectives**

Peer assessment provided a chance for each member to know what other group members thought of his or her group contribution, what others were expecting from him or her, and what the others' true mind was, i.e., they did not tell each other in the face-to-face and online group discussions.

First of all, many participants seemed to want to know how other group members thought about them, their performances, and what needed to improve. Since they were involved in a collaborative learning environment where all tasks had to be completed with their group, most of the participants were curious and concerned about how other members saw them. It could be said that peer assessments enabled participants to see what other group members were thinking.

> You can know how others think about you by reading the results [of the peer assessment]. Yea, maybe sometimes we just work very hard but others don't think so but you don't know. But after reading the assessment results, you understand how others think about you. … If we don't have any peer or self evaluation I will never know how others think what kind of people I am and how I can improve myself because they wrote details in the comments they gave me. (An-Ni, 1/29/07, the second interview)

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I think it's good to know like how other people think about my performance and it's just a good and interesting feedback even though it's a negative but it's good to know that so that you can improve yourself. (Jasmine, 11/7/06, the first interview)

By seeing the results of the peer assessment and then comparing the scores with those of the self assessment, each participant could discover other group members' expectations of him or her. Yen-Ping said,

I can see the gap between the peer assessment and self-assessment so I probably can tell what my team members were expecting from me. Yea, maybe I think I have done well in this part but they think maybe I should do more. So I think it has an indirect influence on me when I compare my [self assessment] results with the peer assessment. (Yen-Ping, 1/29/07, the second interview)

In addition, Luke related an anecdote. He described himself as the kind of a person who prefers listening to others rather than talking and actively leading the group. However, after getting the results of the peer assessment Luke could recognize that he, as a listener rather than a talker, was seen by his peers as not caring for and not participating in their group activities. After that, Luke tried to be more actively involved in the group activities by expressing himself. He thereby stressed that the peer assessment was helpful to see how other members were thinking of him and what they were expecting from him.

One thing specifically I was reminded of is that I am very quiet in groups and I don't participate well I participate but I'm more of a listener than a talker and sometimes people see that as me not caring or not being involved but that's not how I feel. So I was reminded that I need to express myself a little bit more in group work and that's something that I'll carry on to a work environment. So it's helpful to reflect and to see what your peers think of you. (Luke, 11/9/06, the first interview)

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Minjung mentioned that group members tended to express their minds more honestly regardless of whether it was positive or negative when they conducted the peer assessment, whereas in the online group discussion and in the face-to-face group meeting they only talked to others positively and politely. Therefore, Minjung said that she benefited from the peer assessment results because she could know other group members' true and frank opinions.

> The peer evaluation makes us know other group member's true mind. Usually in [online group] conference [area], they usually say, "good job, don't worry, it's okay" but in the peer evaluation, we can know their true evaluation. In personally, when we meet face to face, we rarely say negative words... "good, wonderful, good job, thank you, sorry, you're okay." We can know the their frank evaluations on my project. (Minjung, 11/7/06, the first interview)

**Reflections on Themselves**

In the CSCL course, participants had an opportunity to reflect on what they had done by receiving feedback from others in the form of the peer assessment, as well as by assessing themselves in conducting the self assessment. Furthermore, reflecting on themselves encouraged them to identify their strengths and weaknesses in the group collaboration. How participants reflected on themselves in both the peer and self assessment is presented below.

*Reflection via Peer Assessment*

Not only could participants look back at what they had done by getting feedback from others, but they could also have their behaviors validated by the peer assessment.

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Above all, Gabriel and Luke mentioned that the peer assessment, particularly in terms of

getting scores and comments from other members, forced them to stop and take a look at

what they were doing and how they were behaving.

> It's always important to step back and reflect on their impression of you. Once again I can do things in my own head and occasionally it helps if someone else comes and tells you, you know, I'm a great presenter. They come back and go, "not so good". It at least makes you think for a second now why would they say that and how would I do that? So depending on the team I think it's great for peer review and it causes you to stop at different periods and think about what you're doing. Are you acting a certain way? Are you contributing enough? (Gabriel, 11/20/06, the first interview)

> It [results of the peer assessment] kind of forced me to take a look at how I was behaving in the group atmosphere and try to improve. And I tried to improve a little bit on that so that was a positive effect of peer assessment. (Luke, 1/25/07, the second interview)

Linda thought that her behaviors for the group activities could be validated by the

peer assessment. Namely, if the results of the peer assessments were positive, her

behaviors and approach to the group activities would be validated, so she would try to

continue doing things in the same way. Linda described this point by stating,

> I think if the peer evaluation was positive, then your behavior is validated so you say okay, that's the right to behave in that group. And so you continue to do more of the same. (Linda, 11/16/06, the first interview)

Thus, participants seemed to reflect on their participation and contribution to the group

activities, as well as to believe that their behaviors could be validated through the peer

assessment process. As an example, Luke told me his experience, in which through the

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peer assessment process he reflected on how he was participating in the group and then tried to change the aspects of his behavior that had been regarded negatively by others.

> I think going through that [peer assessment] process, you do a lot of reflection about how you are participating in the group and you learn also how your group perceives you participating so I think it causes you to adjust a little bit. … I remember one of the questions was like, is willing to share ideas and knowledge, something like that and because I'm a little bit more quiet, don't talk a lot, I got a lower mark on that and so I was trying to, so I did try to improve and it was interesting that it did reflect some things that I already knew about myself. (Luke, 1/25/07, the second interview)

As mentioned by Luke, the results of the peer assessment could play a role in leading the participants to try to improve their participation and behavior for better outcomes in future group activities. On the same line with Luke, An-Ni stated,

> I will view it as a reminder for me to work better next time … I think it can serve as a reminder to remind us which aspect you don't work well, yea something like that. … And I think it serves as a function to push ourselves to work better and to collaborate more active with our members. (An-Ni, 1/29/07, the second interview)

### *Reflection via Self Assessment*

Many participants also mentioned that the self assessment helped them by forcing them to take a critical look at themselves, their participation, and their contribution to the group activities. In particular, the rubric of the self assessment seemed to become a guide and a reference for them to perform better in collaborative group activities.

Allison, Jasmine, and Luke said that by conducting the self assessment, they could have an opportunity to pause and reflect on themselves as a group member.

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I think it [self assessment] helps you because it forces you to pause and reflect and normally we don't take any time to reflect. We just move on. I know what happened there. But if you're forced to assess, you're forced to really kind of consider, "Well what happened?" "What can I do differently," and "What did I learn." So I think it's a valuable thing to do. Really for all the work that we do you know it's very valuable. Just take a minute to be kind of conscious about what we did and what we could do differently. (Allison, 1/12/07, the second interview)

I think it [self assessment] helps us, I mean actually personally I think it helped me look back at my performance. It's more like a reflective thinking like we have to look back at what you have done and how much you contributed to the group and how hard you worked on the project and then we can see like which part you can work more. (Jasmine, 1/19/07, the second interview)

I thought, one thing I liked about it [self assessment] is it did force me to take a look at myself in regards to those [self assessment rubrics] questions and think about how I was performing otherwise I might not have because you know sometimes you have to think about those things. So that was good. (Luke, 1/25/07, the second interview)

Therefore, in terms of being able to reflect on their own performances, the self assessment made the participants analyze themselves, learn to be honest about themselves and their contributions to the group activities, and try to do better work on the next group activity. On this point, many participants thought of the self assessment as valuable.

I think that you're knowing that there is an assessment and that there's self-assessment and it just makes you analyze what you've been doing and then what you can do you know your things that I may be analyzing myself on next. So I think it helps. I think it maybe clarifies what you're doing as opposed to just doing homework all the time. (Ava, 11/13/06, the first interview)

You really have to learn to become pretty honest with yourself, which to me is a very good growth experience. So anyway I think that is a great thing. I mean to me I think we should we do it in all the courses. Especially in graduate school, you need to be clear about what you're doing. I think it helps you be a better learner and a better practitioner. (Allison, 11/10/06, the first interview)

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> I think it [self assessment] gives us a time to reflect and time to rethink about process and what's the problem and about what we should do in the future. (Junghoon, 2/2/07, the second interview)

Linda stressed that the self assessment made her take an in-depth look at her own performance, and then critically identify her strengths and weaknesses. In particular, by being able to identify the weaknesses, she came to think about what she could do differently to improve. Linda described her case in which, since she tended to talk a lot in her group meetings, other members used to listen to her and not say anything. After conducting the self assessment, she came to consider if talking so much during the group meetings and discussions was good for her and her group members. Linda finally realized that she needed to focus more on listening to others. Therefore, by looking at herself critically throughout the self assessment process, Linda could figure out what and how she can accomplish the goals of better collaboration and group work.

> Well in, and I think it should, I think if it's done correctly self-evaluation hopefully will identify strengths that you continue to okay, I'm going to continue to do that and you identify areas that are weaknesses or that you perceive are weaknesses and you can work on them, you can choose to change them or you can just say no, that's one of my weaknesses. So like one of my weaknesses is that I tend to talk a lot. So I am constantly fighting internally to say, "just don't say anything" because I talk a lot and I share ideas and I have lots of ideas but sometimes I feel like in the process of talking, other people won't say anything. So I've noticed and I've sort of have had fun with this is that in some group meetings, I will just really focus on listening. And it's interesting because it almost forces the other people to pick up the share of talking. So that is sort of one of my ideas that constantly comes up in the self-evaluation. … You know I haven't had any of my group mates say you talk too much. So I think that peer evaluation is one level but really I think the self-evaluation is the time when an individual can look at her own performance or his performance and say, "what can I do different", if anything, "that will make it work better for me and for

others?" And it's that in-depth look that I see this really critical. (Linda, 11/16/06, the first interview)

In addition, some participants thought of the self assessment as a guidance tool and a reference to lead them to perform better collaborative group activity. Gabriel stated that the rubric of the self assessment was always in the back of his mind, as he tried to follow it whenever he was working on the group activities.

> I kept it [self assessment] in the back of my mind what we were being assessed on and tried to make sure that I would do the best I could in each of those [self assessment rubrics] categories and it was always in the back of mind. I did revise e-mails and I made sure that if it was going to be tough that I can, I tried to do the things and so it helped guide me and I think made the team look better and I think the other team members did the same thing. (Gabriel, 2/1/07, the second interview)

Linda also considered the self assessment as a guide; she often went back to the self assessment rubric and constantly checked if she was doing well based on it.

> I think the self-assessment does add value to the teamwork because it makes you stop and think about those criteria. Am I listening, am I participating, am I meeting my responsibilities to the team. So those ideas are articulated in advance so that as you're working you have a reference point of constantly going back and saying, these are the expectations, not just of myself but also my team members have these expectations of me because they've also seen the self-assessment. So we're all talking in the same language and the components of what makes a good group member has been defined. (Linda, 1/22/07, the second interview)

**Awareness of the Assessments**

Since they were conducting the peer and self assessment at the end of every group project, participants came to be cognizant of the assessments while working on the

projects. Participants came to be aware that other members were observing them, their

performances were being measured by others, and they were going to evaluate

themselves via the self assessment. In particular, by recognizing that their fellow group

members had the power to assess, Ava thought that the peer assessment might affect each

member's activity. She said,

> I guess I didn't know that I was going to do self assessment before like when we were actually doing the projects. I wasn't, I just didn't look ahead. I didn't know that we were going to do it so it didn't affect my first project. I mean in our second project, we knew that we were going to be assessed and do self assessment because we had done it before and so I think in some ways that when you realize you're going to have to assess yourself, it does make you work harder too, do you know what I mean? You're not just going to like you're done. You have to actually look at what you've done and evaluate it and that other people are going to be evaluating you too. So yea, I definitely think it makes a difference. … I think because once you knew that your team members had the power to evaluate you and that it was going to be seen by the teacher, I think it definitely affects your own work for sure. (Ava, 1/22/07, the second interview)

Ryan and Linda brought up a similar thought. They indicated that, by realizing they were

to be assessed by peers, they were more eager to participate and felt more pressure and

accountability on the group activities.

> I think when you know that you're going to be assessed by your peers that you are more eager to appear that you're going to be doing what you're supposed to be doing. So I think it does affect that. (Ryan, 2/7/07, the second interview)

> Somebody, these people who I like and who I think like me are going to spend time thinking about what did I do. So there was a certain amount of accountability that maybe that brought for us. I don't know that it changed my behavior. If anything, it put a certain amount of stress and perhaps self-criticism. (Linda, 1/22/07, the second interview)

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**Interpersonal Skills for Collaboration**

If the participants came to recognize that they needed to improve or change their interpersonal skills based on the feedback from peers, they definitely tried to improve them, including communication styles. Each participant was sensitive about how their peers saw them and thought of them since they had to work with their peers in order to complete the group projects.

As an example, Gabriel revealed that he got the lowest scores in the communication style item: "communicates online in friendly tone." Since he has worked as a supervisor for a long time, his communication style was more directive and official rather than chatty and friendly. It therefore caused his peers to think that Gabriel might need to have a more friendly tone. Gabriel thought that his peers' feedbacks on this assessment item were reasonable, and tried to communicate with his peers in a more friendly style.

> I thought that [feedback from the peers in the peer assessment] was reasonable and there was one section that I knew I had been, I could agree. It was the lowest one which is the one I always look for and I thought well, if there's anything on here, this is probably where I could probably do some work and it had to do with my communication style. It's a little bit, I've been a supervisor for a long time. I'm a little more directive and that comes off sometimes a little bit harsh. Also if I have a very little amount of time, I'll just say what I mean and that's my e-mail, short, two sentences like "I don't like that. Let's do this." And it's not chatty. It's not communicative. I'm being more directive and that was the one that was the lowest and I could use that the most. That's good. It seemed very reasonable and so that is the thing I'm trying to do more, fix it. (Gabriel, 11/20/06, the first interview)

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Luke also revealed that his communication and participation style, which was to be quiet and to listen to others rather than to talk, had changed over the semester. After seeing the scores and feedback from other group members in the peer assessment, he realized that they wanted him to share his opinion more often. He subsequently tried to express his thoughts and opinions more vocally with the group.

> I think because one thing specifically I was reminded of is that I am very quiet in groups and I don't participate, well I participate but I'm more of a listener than a talker and sometimes people see that as me not caring or not, not being involved but that's not how I feel. So I have to, I was reminded that I need to express myself a little bit more in group work and that's something that I'll carry on to a work environment. (Luke, 11/9/06, the first interview)

> I try to make an effort to like, to be a little bit more vocal in the group because sometimes people I think mistake my I guess quietness or reservedness and being more of a listener as not being involved or not caring so I understand that so I try to be a little bit more vocal in the group. (Luke, 1/25/07, the second interview)

In addition, when interviewed, Linda said that she changed the way she expressed her feelings about the peers. She usually did not give praise or speak positively of others; namely, she rarely expressed her positive feelings about her peers to them. However, she started to change her communication style after getting low scores on an assessment item: "acknowledges other members' good work and provides positive feedback." Linda, therefore, came to realize that her peers thought she was not encouraging them as much as they encouraged her. She then tried to verbalize her positive feelings about her peers to them.

> I spent more time I think praising and giving positive talk and verbalizing those feelings namely because I realized after I got those, that, those inputs from my

peers and they were writing those things down that I thought okay, that made me feel good and I'm not doing that. Even though I'm thinking that, I'm not expressing that positive phase so I think I spent more time probably not as much time as I could have again going out of my, so I moved myself out of my comfort zone and really tried to verbalize those positive feelings. (Linda, 1/22/07, the second interview)

**Accountability**

Many participants thought that the peer assessment affected their accountability for the group activities. That is, as a group member, just by being aware of the existence of the peer assessment and by receiving feedback from their peers, the participants felt pressure, came to think about their accountability for the group activity, and then made efforts to work on improving their performance in the group activities.

Ryan thought that the peer assessment could put pressure on the group members to involve themselves more actively because the members might think there was competitiveness in the group. He thereby saw the peer assessment as serving as a reminder to the members to think about their accountability in the group activities.

> People are very sensitive to accountability and if they think they want to appear to be valuable and they really want to appear that they're making good contributions to the group, so I think it does put pressure when you have peer evaluation. I think it does put a lot more pressure on the people in the group to at least appear, feels or they appear that they're doing their job or that they could back that up, some of the things that they want. So I think it does see the group dynamic. I think, if you're evaluating the group and you only have a certain number of points to give out, then you actually can even have like competitiveness among the group where if some people are trying to appear as though they're doing more just, just for the sake of appearance because they know that there's not enough points to go around. Someone is going to lose. Someone is going to win. … If there was no peer evaluation, I think the group members are more likely, if someone really didn't want to do their part, they're more likely not to care enough to worry about

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it. Not to worry about how they appear to the other group members than with peer evaluation. I think they feel a lot more pressured to at least appear like they're doing what they're supposed to be doing. … If you know that you're not going to be assessed by your peers then you're more apt to be, if you're a bad team member, you're more apt to be lazy because there's not as much accountability. There is, with peer assessment, it does have some accountability. (Ryan, 11/15/06, the first interview)

Junghoon said that when he realized his peers wanted him to work more on the group activities based on the results of the peer assessment, he had to try to show them his increased participation and contribution because it was related to the issue of ethics.

When people mentioned you are better to participate, I thought there must be more activity in the future because it's kind of ethical issue. I think, in the group work, it is natural they expect me something more because as a group and I am a student and I must do my responsibilities. So I decide to do more after that. … I think my group does not complain my work via the peer assessment but they complain on communication and more active involvement. And so I think it's kind of, learning is kind of fun but if I did not fully involved, then the other people will not enjoy it. So I think it's kind of ethical issue to me. So I think I should be more active in the after middle of semester. So when I have a chance to discuss, I am more involved and I'm more active. (Junghoon, 11/21/06, the first interview)

**Participation**

A number of the participants took the perspective that the peer assessment was a necessary mechanism, used to enable every member to participate more equally in and contribute to the group activities in the collaborative learning environment. That is, by seeing the results of the peer assessment, participants seemed to reflect on what they should do more for the group, and then tend to engage more in the group activities.

For example, when recalling another course in which students were required to work together without the peer assessment process, Jasmine emphasized that the peer assessment could play an important role in encouraging equal participation in and contribution to the group activities.

I think it [peer assessment]'s important. I don't know if I can say that. Another class that I have in this semester, we don't have any kind of evaluation like this. We have to work in groups like the first half of the semester and I feel like some member, he just tried not to participate into the group. He just mentioned "oh, I got to work", or maybe "oh, I have no idea about this topic." I just feel I have no idea either (hahaha). That's why we have to work together. So I feel like maybe if we have peer evaluation in this course, it would make everything better. … Well can I say something like if we don't have the peer assessment [in the CSCL course], how our group is going to work together. In that way, I think our group may work well together still but we might not you know participate to the project equally, as equally as we did when we have the peer assessment. … I think it [peer assessment]'s important. … Sometimes each member just expects that other people have to work as hard as he or she works. As a matter of fact sometimes people, they just have to do something else as well, so they might not be able to contribute to the group work. So the peer assessment is going to be very helpful in that place just to make sure that everybody contributes. (Jasmine, 11/7/06, the first interview)

As another example, Junghoon said that he received some low scores and constructive comments from his peers in terms of sharing his thoughts and actively participating. After seeing the peer assessment results, he could finally realize that not only were other group members expecting him to be more involved in the group activities, but also that he should be a more active participant in order to contribute to the group's understanding. Junghoon described his situation as follows:

Honestly, I was not so active in participation until now although I completed all the responsibilities I should do for our team projects. In my peer evaluation, team

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members wanted me to be more active not just following the group decisions. …
At the beginning of the semester, I thought that most of students were majoring in
instructional technology program and they would have more advanced skills and
knowledge than me. Therefore, I thought that it would be reasonable for them to
take a major role in team project. I just thought that I would follow their
decisions. However, I realized that this thought was wrong. I could realize,
through the peer assessment results, they wanted me to share my own thoughts
and ideas to expand their understandings. In summary, I should be more active
participant in our team project from now on. (Junghoon, 11/2/06, in his first
portfolio)

Junghoon tried to participate more after getting the results of the peer assessment, and he

came to believe that it forced him to take more active roles in the group activities over the

course of the semester. He stated, "I was more active in participation in this [the last]

project compared than previous projects. My previous peer evaluation made me to take

more active roles."

In case of Yen-Ping, he received a low score in the leadership item because he

tended to follow other members rather than initiate an idea and then lead others.

However, after getting feedback from peers, he tried to show more active participation

and engagement.

It [score of each peer assessment item]'s almost above four except for one item,
"Does this person show leadership" or something. I think because I'm more a
follower in the group so I didn't initiate a lot of ideas but when they propose
something, I will try to catch up and give other feedback. But I seldom say okay,
we should do something right now at the beginning, very beginning. … After that
results, I tried to initiate at the very beginning. I said, "okay we should move to
the next module now." … I did learn something from that [results of the peer
assessment]. I need to be more active in terms of the leadership. (Yen-Ping,
11/7/06, the first interview)

Sangjun also viewed getting scores and feedbacks from other members through the peer assessment as useful because it made him participate more in the group activities. He stated, "I think it [results of the peer assessment]'s very informative because, next time, I would like to participate more and more. Yeah, for the better evaluation."

**Personal Criteria for Assessments**

In the assessment system, the rubric of peer and self assessment contains 16 items categorized into three dimensions -- social interaction, task management, and trust (see Appendix B for peer and self assessment items). Based on the rubric, participants evaluated peers as well as themselves. While they followed the rubric as they conducted the peer assessment, many participants came to have their own criteria for reviewing and judging other members' efforts for their group activities, such as active participation, responsibility, punctuality, communication, understanding others, involvement, respect for others, and sharing thoughts and ideas with members.

In particular, when evaluating peers, Gabriel and Ryan considered making effort in the collaboration as the most important criteria for the peer assessment, rather than doing the best work, producing high quality work, or having good knowledge and skills.

> I think everybody's willingness to communicate, responsibility and I mean, well we were graded on the quality of work but I think the team work was a little bit more important than whether I agreed with your opinion or not so I wasn't grading someone else on their knowledge. It was more of their effort because this

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was a team. To me that was the ultimate goal. Not did they write a wonderful paper. That's somewhere else. (Gabriel, 2/1/07, the second interview)

If I felt, even if someone doesn't do the best work, if I feel they're putting forth effort, that's important to me. And also just responding to communication, being there, and accepting responsibility. So if you accept responsibility and you respond to your communication and you do the best you can, that's what I care about. Even if your best isn't as good as other people's, if you try very hard and I get the sense then I'll probably evaluate you high. (Ryan, 2/7/07, the second interview)

On the same line with Gabriel and Ryan, Ava emphasized the willingness to contribute to the group project as the most important criteria for assessing peers, saying,

It was definitely responsibility, productivity, involvement and respect for others and really what they brought, if they brought something to the table. Like what they, what new ideas and what they were able to you know because we have just limited time but you, you need effective and productive team members. So I would have given a bad evaluation if there were a team member that just wasn't producing you know ideas or actual parts of the project. (Ava, 1/22/07, the second interview)

According to the interviews with participants, there seemed to be no significant difference between the criteria for peer assessment and self assessment. Similar to the criteria for the peer assessment, many participants thought the most important criteria for the self assessment were communication, participation, responsibility, and willingness to work as a group member. Gabriel explained his criteria for the self assessment by saying,

Well I like the ones [items on the rubric] that were listed out. From what I remember what we had to do but I think availability for me was tough but communicating as much as I could and participating as much as I could and kind of the responsibility in doing what I said I would do and if that to me meant I was reliable and I am providing my agreed to part to the team so, and then trying to be

as I don't know, work as a team, team work kind of evaluation. (Gabriel, 2/1/07, the second interview)

As mentioned in the peer assessment criteria, Ava stressed contribution to their group work as one of the important self assessment criteria.

> We were given you know sort of the criteria so we had to work within what was there but I, for me, I had to look at what I had actually produced for the group. What I had, what I had given to the group you know either in the assignments or in ideas or that kind of thing. (Ava, 1/22/07, the second interview)

**Level of Confidence with Peer and Self Assessment**

Throughout the semester, most participants gradually came to be comfortable with how to assess others as well as themselves, and learned a way to tell others what they thought by using the peer assessment in the online collaborative learning environment. Allison said,

> I think it [peer assessment]'s very worthwhile and I definitely learned something by doing it [peer assessment] in this course … I think having the assessment is good because you get more comfortable with it and you get better at a way to tell someone what you thought. (Allison, 1/12/07, the second interview)

It finally seemed to make the participants feel confident in conducting the peer and self assessment. Anthony described his feeling on the assessments by stating,

> I felt good about it [assessment]. I felt confident going into it. I had a very good understanding of what I was looking for when we were grading, when we were evaluating each other. (Anthony, 11/17/06, the first interview)

Gaining confidence in conducting the assessments made him not only view them

positively, but also gave him self-confidence so he could ask his peers to review his

output without fear of taking the criticism too personally. Additionally, Anthony, who

has been currently teaching in a college, stressed that the experience of the peer and self

assessment in the CSCL course was very useful, and that the assessments should be

diffused at least in the courses in the higher education environment.

> It [peer assessment]'s very useful. If we're willing to learn and to take as much as we can out of this class then it'll help us a great deal preparing for future classes and preparing documents and assignments in the future where we won't be afraid of asking other people to review our stuff or asking maybe some fellow faculty members to check something before we actually use it in the classroom. So I like that. It's something that most of us as faculty should be able to do but we don't. (Anthony, 11/17/06, the first interview)

**Group Collaboration**

Many participants thought of the peer assessment as a useful means of not only

motivating their peers but also communicating with each other. Therefore, they held the

view that their group collaboration could be reinforced and strengthened through the

assessment process.

Isaac and Gabriel saw that peer assessment was useful particularly in the

collaborative learning environment, where success depended on efforts made as a group.

In other words, since each participant was in a learning community where individuals had

to learn how to work together within a group, in order for success it was critical for the

group members to work well with each other.

I think it [peer assessment] can be useful and helpful in lots of different courses outside of the CSCL but I understand that with computer-supported collaborative learning, that inside of this, it's necessary in the sense that we're only working with our team, and they're long periods of time where we, well maybe not so long, but a month or three weeks go by before we meet as a group again face to face, and so understanding that we really are a learning community for, where the course is really only our team, mostly our team. I mean that's our community and it's a small community and we need to learn how to work together and be productive within that group in order to move forward. (Isaac, 1/8/06, the first interview)

I think it's good to have the peer assessment in a class especially in this kind of situation where it's all about teamwork where you succeed or you failed based on your group. (Gabriel, 2/1/07, the second interview)

In addition, Luke thought of the peer assessment as a useful means of communication in which group members could express feelings and thoughts that may be uneasy to tell others. He took the view that, by functioning as a communication channel, peer assessment could help a group to work together better. Luke said,

I think it's a good tool to have in a CSCL course because there is so much collaboration. It's so much working together and these [peer and self] assessments help each of the members communicate with other members kind of how they feel about them and so it helps, it helps a group work together better. It improves communication. I think it's harder to, for a lot of people to say, to sit down, have a conversation and say this is how I feel you're doing in the group and this is how I feel I'm doing but if you can do it through a tool that kind of takes a way the, a little bit of the conflict of that uneasy feeling of it then you do have that communication. So I think that's part of the role. (Luke, 11/9/06, the first interview)

Allison brought up a similar thought with Luke. She considered the peer and self assessment to be a built-in opportunity for the group members to reflect on themselves as well as to provide their frank thoughts to their peers. As a result, she held the view that

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the collaboration and relationship among the group members could be reinforced and strengthened through the assessment process.

> It [peer and self assessment] is a built in opportunity to acknowledge what people have done and to make a suggestion where it's appropriate and so it's like a built in time for reflection you know that I think it's actually something that even strengthens the relationship more. … I really think it [peer and self assessment] helps strengthen collaborative work. First of all, it makes you better at appreciating yourself and your role in the group and the people in the group and I think it strengthens relationships so I think it makes it more collaborative. I think it's a very useful tool. (Allison, 1/12/07, the second interview)

## SUMMARY

Results of the data analysis based on grounded theory showed that many factors allowed students to have varied perceptions, attitudes, and feelings in conducting the online peer and self assessment. The factors were grouped into three: learning context, individual differences, and online learning community. In addition, the consequences that participants mentioned as relevant to the impact of the assessments on group collaboration were explored.

*Learning context* encompassed all parts of the CSCL online course strongly related to the peer and self assessment, including course elements (assessment practice, repeated assessment process, and assessment as an assignment), online assessment system (anonymous assessment, computerized online assessment, assessment rubric, problems with the assessment system), types of assessment feedback (numerical results

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and textual comments), and graduate school environment (academic context and equality with peers).

*Individual differences* were a dominant influence on participants' perceptions of the use of the peer and self assessment. Categories related to the factor of the individual differences included stringency-leniency in ratings, objectivity of ratings, previous assessment experience, purpose of the assessments, and the degree of self-confidence in assessing their own contributions to the group activity.

*Online learning community* referred to the group, where each participant was assigned during the course semester. Each group consisted of diverse members and developed their own learning community; therefore, the characteristics of their community became one of the dominant factors to impact participants' feelings and perceptions in conducting the peer and self assessment. Categories related to the online learning community included group composition (diversity of group members and small group size), engagement of group members, and sense of community (familiarity with group members, conscious of other group members, and consideration of team building).

Additionally, the results revealed the *impact of the use of peer and self assessment on the group collaboration* in terms of understanding others' perspectives, reflections on themselves, awareness of the assessments, interpersonal skills for collaboration, accountability, participation, personal criteria for the assessments, level of confidence with the assessments, and group collaboration.

# Chapter V. Discussion

The main purpose of this study was to examine 1) factors that influence students' perceptions of the use of peer and self assessment in an online collaborative learning environment, and 2) how the peer and self assessment impacts the online collaboration of the students. In this chapter, I will first summarize the findings that emerged from participants' responses, relating the findings to previous theories and research on peer and self assessment in the online collaborative learning environment. I will then explore possible implications for educational practice. Finally, I will discuss limitations of the study and offer suggestions for future research.

## SUMMARY OF FINDINGS

All 23 students who enrolled in the CSCL course were invited to participate in this study. Fourteen agreed to join the investigation. Data collection began with a pre-interview survey that allowed the researcher to effectively collect information on each person's prior experience with peer and self assessment and online courses. The first interview was conducted at the end of the first peer and self assessment. The second interview was conducted at the end of the last peer and self assessment. In the interviews, participants were asked to describe their experiences and views of the peer and self assessment in the CSCL course.

To explore how students perceive the peer and self assessment in an online collaborative learning environment, this study mainly used the techniques and procedures

of the grounded theory approach. As a result, the most prominent factors related to participants' perceptions of the use of peer and self assessment emerged from the collected data. The overarching concepts that influenced participants' perceptions were grounded in three: learning context, individual differences, and online learning community. In addition, information emerged on the consequences relevant to the impact of peer and self assessment on group collaboration. Figure 5.1, "Factors Related to the Use of Peer and Self Assessment," provides brief descriptions of the findings of this study.

**Factors Influencing Students' Perceptions of the Peer and Self Assessment**

### Learning Context

- Course elements
  - Assessment practice
  - Repeated assessment process
  - Assessment as an assignment

- Online assessment system
  - Anonymous assessment
  - Computerized online assessment
  - Assessment rubric
  - Problems with the assessment system

- Types of assessment feedback
  - Numerical results
  - Textual comments

- Graduate school environment
  - Academic context
  - Equality with peers

### Individual Differences

- Stringency-leniency in ratings

- Objectivity of ratings

- Previous assessment experience

- Purpose of assessments
  - Encouraging peers
  - Reinforcing peers' strengths

- Degree of self-confidence in assessing their own contributions to the group activity

### Online Learning Community

- Group composition
  - Diversity of group members
  - Small group size

- Engagement of group members

- Sense of community
  - Familiarity with group members
  - Conscious of other group members
  - Consideration of team building

**Use of Peer and Self Assessment**

**Impact of the Use of Peer and Self Assessment on Group Collaboration**

- Understanding others' perspectives
- Reflections on themselves
- Awareness of the assessment

- Interpersonal skills for collaboration
- Accountability
- Participation

- Personal criteria for assessments
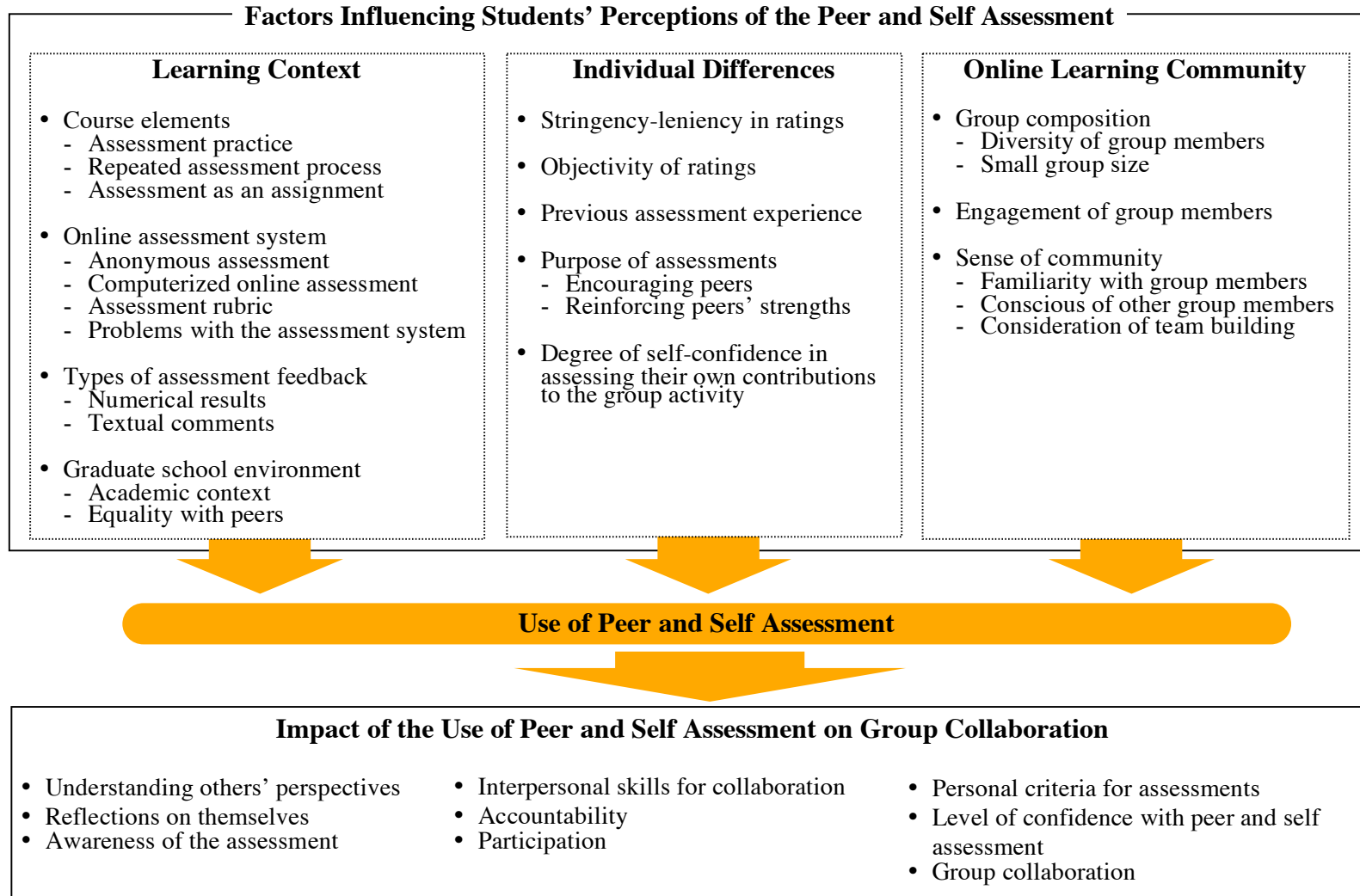- Level of confidence with peer and self assessment
- Group collaboration

**Figure 5.1 Factors Related to the Use of Peer and Self Assessment**

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This study was intended to investigate 1) factors that influence students' perceptions of the use of peer and self assessment in an online collaborative learning environment, and 2) how the peer and self assessment impacts the online collaboration of the students. As a result of analyzing the data, the study explored factors influencing students' perceptions of the use of peer and self assessment. However, the study failed to reveal significant relationships between the factors. Therefore, in this section, the emergent three factors that influence students' perceptions of the peer and self assessment and the impacts of the assessment on group collaboration will be discussed. Associations with previous theories and research on peer and self assessment in online collaborative learning will also be discussed.

**Factor 1: Learning Context**

One of the factors that affect students' perceptions of the assessments is the learning context. When conducting the peer and self assessment in the CSCL course, participants were heavily influenced by the learning context they were involved in. In this study, the learning context particularly included the course components related to the assessments, such as assessment practice and the repeated assessment process, the online assessment system itself, and the characteristics of the graduate school program. Thereby, the categories under the factor of the learning context consist of the course elements, the online assessment system, types of assessment feedback, and graduate school environment.

*Course Elements*

Participants' feelings and perceptions while conducting the peer and self assessment were influenced by the CSCL course elements strongly related to the assessments, such as providing an assessment practice right before conducting the first assessment, completing peer and self assessment at the end of every group project, and setting up the assessment as a required assignment to go on to the next activity.

A practice activity to familiarize the students with the assessment process and procedure was provided shortly before the first group project in the CSCL course. Through the assessment practice, participants could share and finally close the gap between their individual views and standards in assessing the contributions of the individual in the practice case. This led them to be more at ease in conducting the assessments and to become more familiar with the process when they assessed and received feedback from their peers in the actual assessment phases. This approach is consistent with previous studies (Dana & Tippins, 1993; Orsmond et al., 1996), which found that prior understanding of the assessment process and criteria increases students' comfort and confidence in carrying out the actual assessments. Similarly, Cheng and Warren (1997, 2000) suggested in their study that all students should understand and acknowledge the purpose, importance, and usefulness of the assessment procedure throughout the practice so that they know the expectations of them as members participating in group work, and how they should contribute towards collaborative group work. In addition, Cheng and Warren insisted that the reason why the assessment practice is essential is in order for the assessment procedure to be fairly, objectively, and usefully

implemented. Daniels and Magarey (2000) and Hanrahan and Isaacs (2001) also mentioned the importance of the assessment practice to help students feel more confident and comfortable in judging their peers and themselves.

In the present study, repeating assessments at the end of every group project also seemed to help increase participants' sense of comfort and confidence in conducting the peer and self assessments. Repeated assessments caused students to gradually become more familiar with the assessment process and the assessment rubric. This finding confirms the suggestion that the most effective way to provide the peer and self assessment involves completing the assessments at multiple points during longer projects (Brooks & Ammons, 2003), and that providing assessment at multiple points allows students to be more involved in the assessment process (Fiechtner & Davis, 1992).

However, some of the participants had a tendency to think of the assessments simply as an assignment to do in order to move on to the next step, without considering any other meaning and purpose for them. It, therefore, prevented these participants from rating others prudently as well as acquiring honest scores and assessments. This indicates that some participants had a less positive view of the peer and self assessment, seeing it as tokenistic rather than a process of learning and sharing experiences. Along the same lines, students in Wen and Tsai's (2006) study also perceived peer assessment only as an environment for information delivery and communication. Therefore, when implementing the peer and self assessment, instructors need to design appropriate strategies to help students focus more on engaging in the assessment activities as a learning process, not simply on carrying out the assessments as an assignment.

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*Online Assessment System*

The assessment system provided in the CSCL course was a computerized online anonymous system. Its features and components, such as guaranteed anonymity, computerized online system, and use of an assessment rubric, affected participants' feelings and perceptions in conducting the peer and self assessment.

The guaranteed anonymity and confidentiality of the assessment results made many participants feel more comfortable rating others than if they had to identify themselves. This finding complies with previous studies (Arnold et al., 2005; Li & Steckelberg, 2006; Zhao, 1998), which found that an assessment system guaranteeing confidentiality and anonymity not only eased students' personal struggles with peer assessment but also minimized the impact of peer pressure. Participants also said that they felt more willing to express their true feelings and thoughts about their peers' work when using an anonymous assessment system, as noted in Lejk and Wyvill's (2001) and Wen and Tsai's (2006) studies. In addition, participants believed that anonymity could ease potential tension and minimize conflicts among members who might take the ratings from others personally. Therefore, anonymous assessment could provide more positive, truthful, and appropriate attitudes toward the assessment process.

In addition, the assessment in the CSCL course was a computerized online system in which data was automated and summarized, and students and instructors had instant access to data any time they wanted. Furthermore, the whole process was conducted anonymously via the Internet. Freeman (1995) and Liu et al. (1999) have shown the benefits of the computerized online assessment system: enhancing assessment and

learning processes, higher assurance of anonymity than traditional assessment, facilitating willingness to critique, increased freedom of time and location for learners, and increased student-instructor and student-student interaction and feedback. Similarly, the findings of this study, due to the greater privacy and time afforded to students, indicated that most participants had positive perceptions of the assessment system and felt comfortable rating their peers, even though there were very few participants who preferred going and talking to their peers about their thoughts and ratings in person. One of the participants also indicated that the computerized online assessment could be an advantage even to the instructors in terms of increased efficiency in the use of instructor time and convenience of monitoring students' progress during any period of the assessment process (Davies, 2000; Hanrahan & Isaacs, 2001; Lin et al., 2001; McConnell, 2002).

This study also found that participants viewed the assessment rubric (containing 16 items categorized along the dimensions of social interaction, task management, and trust) as well-designed and clear. Moreover, participants mentioned that the rubric played a role not only as a guide to enable them to work together better but also to lead them to give fair evaluations. Those findings are not surprising because studies (Bloxham & West, 2004; Evans et al., 2005; Prins et al., 2005) have often stated that a clearly expressed rubric made students aware of what is expected during the course, forced students to orient themselves on course demands, and promoted fair assessments. Therefore, a good rubric can be informative as well as evaluative. However, prior research also notes that unclear questions in the rubric can compound students'

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uneasiness and uncertainty about the standards required (Arnold et al., 2005; Hanrahan & Isaacs, 2001).

Participants did not always express positive opinions of the online assessment system in the CSCL course. Some of the participants pointed out problems in the assessment system process. For example, the system was designed to immediately show the ratings to the assessees after the assessors submitted their scores. Participants thereby felt embarrassed because as members of a small group, or because they had already shared and knew each other's daily schedules, they could guess where the ratings came from. Moreover, participants thought that the assessment design could produce another major problem, which is that students might be prejudiced in conducting the peer assessments by the scores they received, since it was possible to see how their peers had rated them beforehand. Therefore, it seems necessary that in designing an assessment system, a way to guarantee more anonymity should be considered in order to prevent individuals from identifying others so easily.

### *Types of Assessment Feedback*

In the assessment system, results were shown to students in various forms; the overall average score received from peers, each average score of the peer and self assessment items, a comparison graph of peer and self assessment scores, and comments from peers. Those results could be distinguished into two types, numerical scores and textual comments, and this study found that participants had different perceptions and preferences on both of the assessment result types.

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First of all, several participants regarded that numerical results tended to be inflated because they commonly rated their peers more generously. That is, they thought that inflated numerical results were produced by a cycle in which participants who got higher numerical scores than what they gave to their peers felt guilty, and thus became generous in scoring others. Also, particularly in terms of simple scoring, one of the participants even expressed concerns that numerical scores might be inadequate to support real learning as well as running contrary to foundational educational notions where students' progress and learning journeys are more variable, as noted in Evans' study (2005).

In contrast, some participants indicated the value of textual results rather than numerical results. Since participants could get more specific feedback and listen to their peers' voices via the textual comments, they thought of the textual comments as more meaningful, helpful, powerful, and reflective. Those findings agree with previous studies (Daniels & Magarey, 2000; Lin et al., 2001; Liu & Carless, 2006; Stevens, 2007), which indicated that specific textual feedback has greater potential for learning than a numerical one. However, as a concerned participant pointed out, it should be taken into consideration that anonymity might not be guaranteed because students could identify where the textual feedback came from by the writer's manner of speaking and literacy style.

*Graduate School Environment*

This study found that the graduate school atmosphere also affected participants' perceptions and feelings about conducting the peer and self assessment. Participants indicated two aspects of the graduate school atmosphere that influenced their perceptions: academic context and equality with peers.

Participants thought of graduate school as a purely academic context in which learning and research were the major purposes for them to enroll, rather than getting better grades than their peers. They also believed that graduate students were mature enough to accept any type of feedback, as reported in Bloxham and West's research (2004). Therefore, most of the participants tended not to care and worry much about the ratings, and based on their comments, they did not appear threatened by the peer assessment results.

In addition, participants perceived that they all were in an equal position and they lacked the expertise to be able to evaluate peers particularly in the graduate school context. Therefore, with these perceptions, participants experienced discomfort conducting peer evaluations and felt that rating their peers was not their role. Those findings are consistent with the results of previous studies (Daniels & Magarey, 2000; Davies, 2000; Rees et al., 2002; Williams, 1992), which found that, in assessing their peers, students felt that they did not have enough content expertise, they were not well-qualified to judge the work of other students, and they had difficulty in assessing their friends.

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**Factor 2: Individual Differences**

Individual differences are one of the dominant influences on participants' perceptions in regards to peer and self assessment. That is, in assessing others and themselves, participants were affected not only by different individual characteristics but also by different backgrounds, experiences, and goals related to the peer and self assessment. Categories related to the factor of individual differences included stringency-leniency in ratings, objectivity of the ratings, previous assessment experience, the purpose of the assessments, and the degree of self-confidence in assessing their own contributions to the group activity.

*Stringency-Leniency in Ratings*

Some participants indicated a tendency to be generous to others or to be harsh to themselves in conducting the peer assessment as well as the self assessment. This finding is consistent with Swanson et al.'s (1991) study, which indicated that students vary so much in terms of stringency or leniency that variation in ratings across students may simply reflect differences in their standards.

In terms of peer assessment, most of the participants tended to be generous and lenient to others. That is, they avoided harshly critiquing their peers' contributions and performance. On the other hand, many of the participants were harsher and more critical toward themselves in conducting the self assessment, and under-marked themselves, believing it would best enable them to learn from it. Similarly, prior studies have also

shown that young or highly capable students are more likely to under-mark their work

(Edwards et al., 2003; Fitzgerald et al., 2003; Rudy et al., 2001; Stefani, 1992).

### *Objectivity of Ratings*

Some participants were concerned if their ratings of their peers and themselves

were objective and honest. That is, they seemed to doubt their own objectivity, to worry

about their uncertainty on their ability to rate, and to feel challenged in being honest

when conducting the peer and self assessment (Cheng & Warren, 1997; Hanrahan &

Isaacs, 2001; Marienau, 1999). These findings are consistent with Li's assertion (2001)

that, consciously and unconsciously, students are inevitably subjective during the

assessments; she calls this a bias factor. Additionally, several researchers found that it

was difficult to avoid personal bias for students conducting the peer and self assessment

(Brindly & Scoffield, 1998; Fox et al., 1989; Haas et al., 1998; Saavedra & Kwun, 1993).

Therefore, potential personal bias effects could cause students to rate good performance

down or poor performance up, thus invalidating the peer and self assessment's accuracy

(Li & Steckelberg, 2006), as some participants mentioned in this study.

### *Previous Assessment Experience*

Participants' previous experiences with the peer and self assessment seemed to

influence their feelings about the assessments, the way they evaluated their peers and

themselves, and their perceptions while conducting the assessments. That is, while

participants who had already experienced the assessments seemed to feel comfortable and

confident conducting them, those who had never experienced the assessments seemed to have trouble evaluating others as well as themselves. These inexperienced participants initially viewed the assessments more negatively and skeptically because they did not know exactly what they were supposed to do. This finding is consistent with a previous study (Wen & Tsai, 2006), which found that students with past experience showed more positive attitude toward peer and self assessment than students with no experience. This implies that the actual implementation of the assessment activities can not only improve students' reluctance to participate in similar activities, but also give students more positive perceptions and attitudes toward the peer and self assessment.

### *Purpose of Assessments*

The attitude and styles of evaluating others, such as being positive, honest, and constructive, were also influenced by each participant's intention in conducting the assessment. In order to motivate their peers, some of the participants tended to give positive scores and comments to their peers regardless of performance or contributions, while others provided constructive feedbacks to their peers. In addition, peer assessment was used to reinforce peers' strengths by giving honest feedback or by citing peers' contributions to the group project. Therefore, participants considered the peer assessment a tool for cheering up, motivating, encouraging, inspiring, and reinforcing peers.

*Degree of Self-Confidence in Assessing Their Own Contributions to the Group Activity*

Self-confidence is being certain and trusting about yourself in regard to addressing certain tasks or all tasks (Bandura, 1986). In this study, participants' self-confidence in their own contributions to the group activities impacted their feelings in conducting the self assessment. Participants who had a high degree of self-confidence in their own contributions tended to feel comfortable conducting the self assessment, and did not hesitate to give high ratings to themselves. However, those with low self-confidence about their own contributions had difficulty assessing themselves because of the uncertainty of their contributions. Even though this finding is not consistent with previous studies (Krause & Popovich, 1996; Lejk & Wyvill, 2001), which found that it is the stronger students who under-rate themselves while weaker students have a tendency to over-rate themselves as a survival strategy, it can be concluded that the degree of self-confidence is one of the factors that affect students' feelings and perceptions in conducting the self assessment.

**Factor 3: Online Learning Community**

The online learning community refers to the group to which each participant was assigned during the course. Each group came to develop their own learning community in the virtual environment, and the characteristics of their community became one of the main factors affecting the participants' perceptions of the use of peer and self assessment.

Categories related to the online learning community included group composition, engagement of group members, and a sense of community.

### *Group Composition*

At the beginning of the course, the instructor grouped students into six groups consisting of 3 - 4 members. As the result of the group composition, each group came to consist of diverse members even if the group size was not large. The group's diversity seemed to impact the participants' feelings in different ways when conducting the peer assessment. That is, some participants found it a challenge evaluating peers with different styles and cultures from their own. On the other hand, others considered the diversity within the group as a benefit for the whole group in terms of being able to see different views and perspectives. Thus, in evaluating peers, others' diversity and differences did not prove divisive. Rather, these differences caused the participants to evaluate their peers in a more positive manner.

In addition, when composing each group in the CSCL course, the instructor made each one a small group consisting of 3 to 4 students. This was based on many other research studies which assert that peer assessment is useful and highly effective in small group settings (Ferris & Hess, 1985; Lopez-Real & Chan, 1999; Melograno, 1996; Persons, 1998). However, due to the small group size, some participants in this study had trouble assessing their peers. That is, since it could be possible to identify where the scores came from in such a small group, the participants came to be more conscious of their peers. This awareness caused them to feel guilty for receiving higher scores than

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what they gave to their peers, and finally made them rate their peers more generously.

Moreover, some participants were concerned about the distorting effect by the majority in

a small group, as noted in Lejk and Wyvill's (2001) study. That is, participants thought

that since students strongly depended on other group members to be honest particularly in

a small group, the scoring of the minority of the group could be sensitively affected by

the majority who may or may not have judged the minority prejudicially.

### Engagement of Group Members

Participants conducted all course activities collaboratively with their group

members over the course of a semester. Therefore, some of the participants perceived that

the involvement of group members in the group activities could be one of the important

factors to be considered in conducting the peer assessment. That is, some participants

tended to feel at ease and comfortable evaluating their group members if the members

were actively engaged in projects. However, other participants were not always

comfortable conducting the peer assessment even though their group members had

worked hard. Since they knew that the group member exerted effort, it was difficult for

participants to tell their members in the ratings and comments of the peer assessment

what they should do to improve.

### Sense of Community

Participants worked with the same group over the course of the semester (16

weeks), helping them develop a sense of community, which affected students' feelings in

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assessing their peers. It is also consistent with prior studies by Borman et al. (1995), Brindly and Scoffield (1998), and Kirshiner et al. (1978), which found that peer assessment, particularly in small group members involved in social interaction over a period time, is influenced by relationships which exist between students which can be attributed simply to friendships. For instance, as they grew more familiar and comfortable with each other, some of the participants felt it was easy to evaluate their peers because they knew each other well enough to predict how their peers might respond to their ratings. On the other hand, others mentioned different feelings: having personal relationships with their group members led them to feel uncomfortable and to have a hard time in not only giving constructive and critical feedback to peers but also rating them honestly. The findings confirm previous research that revealed students' ratings could be influenced by friendship patterns and relationships, thereby threatening the integrity and fairness of the peer assessment process (Falchikov, 2001; Hanrahan & Isaacs, 2001; Lopez-Real & Chan, 1999; Papinczak et al., 2007, Rees et al., 2002; Sluijsmans et al., 2002).

In addition, many participants were concerned and worried if their ratings could negatively affect the relationships among their group members, group work process, and team building which had been developing well. Previous studies have also reported that many students hesitate to assess their peers, out of fear that they will harm and even destroy the group's social working climate or their relations with their teammates (Brown et al., 1997; Drexler et al., 2001; Kane & Lawler, 1978; Lopez-Real & Chan, 1999; Mitchell & Liden, 1982; Napier & Latham, 1986). At this point, some participants

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mentioned that better trust and team building among group members could help them to feel more comfortable in conducting the peer assessment. On the same line, Brown et al. (1997) also indicated that the level of trust and team building established with the group might be necessary to lessen the students' concerns and worry. That is, as students tend to be hesitant to assess their peers, better trust and stronger team building within the community of peers could be an important prerequisite for successful peer assessment (Davies, 2006; Liu & Carless, 2006; Sambell et al., 1997; Sluijsmans, 2002).

## Impact of the Use of Peer and Self Assessment on the Group Collaboration

In addition to the factors that affect students' perceptions of peer and self assessment, this study identified several consequences of using the assessments that impacted group collaboration. The impact of the assessments on the group collaboration was found in terms of understanding others' perspectives, reflecting on themselves, the awareness of the assessment, interpersonal skills, accountability, participation, personal criteria for the assessments, level of confidence with the assessments, and group collaboration.

### *Understanding Others' Perspectives*

Participants held the view that the peer assessment enabled them to know other members' true and frank minds. That is, participants tended to express more honestly their own thoughts about peers through the online peer assessment. This finding is

consistent with Dommeyer's study (2006), which found that when evaluating peers online, students felt more willing to express their true feelings and were more likely to provide ratings or comments that are critical rather than supportive of their group members. Therefore, participants perceived that the peer assessment provided a chance for them to know how other group members were thinking of their group contributions and what others were expecting from them.

### *Reflections on Themselves*

Peer assessment provided opportunities for participants to look back at what they had done, as well as to validate their behaviors toward the group activities, as noted by Brooks and Ammons (2003), Dominick et al. (1997), and Evans et al. (2005). Furthermore, according to the results of the peer assessment, participants tried to improve their participation and behavior for the group activities. Thereby, participants considered that the peer assessment had a function to not only remind each member to work better in the group activities, but also to encourage himself or herself to collaborate more actively with other group members. Many participants also mentioned that the self assessment helped and forced them to critically reflect and audit themselves, their participation, and their contribution to the group activities, as noted in Marienau's (1999), Schon's (1983), and Sheckley et al.'s (1993) studies.

*Awareness of the Assessment*

As they repetitively conducted the peer and self assessment at the end of every group project, participants came to be cognizant of the existence of the assessments while working on the group projects. It means that participants came to be aware that other members were observing their performances and that their peers' perceptions of their contributions would be reflected in the peer assessments. Therefore, participants finally recognized that their peers had the power to assess their contributions. In addition, the participants came to realize that they were going to evaluate themselves via the self assessment. As a result, participants' increased sense of awareness of the assessments enabled them to work harder and to avoid becoming free-riders, as noted by Bamberger (2007), Cheng and Warren (1997), and Falchikov and Goldfinch (2000).

*Interpersonal Skills for Collaboration*

The peer assessments helped participants to improve their interpersonal skills toward what their peers expected and toward a more appropriate manner for collaboration. In this study, it was found that, if participants came to realize that they needed to change their interpersonal skills based on the feedback from their peers, they definitely made an effort to change those skills, particularly in terms of communicating with others and expressing their own opinions. Melograno's (1997) and Druskat and Wolff's (1999) research also reported that using peer assessment improves students' perceptions of interpersonal communication skills.

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*Accountability*

Participants thought that the peer and self assessments affected their accountability, referring to the extent to which group members are held individually accountable for the group activities and projects (Prins et al., 2005). This impact of the assessments on students' accountability is widely supported in many studies (Boud, 1989a; Cyboran, 2006; Falchikov & Goldfinch, 2000; Fox, 1989; Fry, 1990; Melograno, 1997; Oldfield & MacAlpine, 1995; Williams, 1992). That is, as a group member, just by being aware of the existence of the peer assessment and by getting constructive feedback or low scores from their peers, participants felt pressured, regarded it as an ethical issue, came to think about their accountability for the group activity, and then finally made efforts to work more on the group activities. Therefore, this finding confirms that both the peer and self assessment play a role in promoting students' accountability.

*Participation*

Peer and self assessment increased participants' involvement in the group activities. After seeing the results of the peer assessment, participants reflected on how they could do more for the group, and then tended to participate more in the group activities. Furthermore, many participants regarded the peer assessment as a necessary mechanism to enable every member to more equally participate in and contribute to the group activity in the collaborative learning environment (Lopez-Real & Chan, 1999; Melograno, 1997).

*Personal Criteria for Assessments*

By referring to the assessment rubric provided in the CSCL course and by conducting the peer and self assessment, participants could develop their own criteria which they considered a higher priority in evaluating peers' and their own collaborations (Nicol & MacFarlane-Dick, 2006). As an example, many participants thought the most important criteria for the assessments were active participation, responsibility, punctuality, communication, understanding others, involvement, respect for others, sharing thoughts and ideas with members, and willingness to work as a group member.

*Level of Confidence with Peer and Self Assessment*

Through using the peer and self assessment over course of the semester, most participants felt that they gained in confidence in terms of requesting, giving, and receiving feedback (Daniels & Magarey, 2000). Moreover, having confidence made them not only regard the assessments positively, but also become more open to learning from mistakes and unafraid to be attacked in a public way (Ellis, 2000; Kline & Saunders, 1993; Marienau, 1999).

*Group Collaboration*

Participants believed that conducting the peer and self assessment strengthened group collaboration in terms of enhancing relationships, fostering group cohesion, working together better, and supporting collaborative learning. This finding confirms the suggestions that using the peer and self assessment can affect students' perceptions about

group cohesiveness, and can have a positive influence on a group's ability to work well together and on group members' satisfaction with the group (Cheng & Warren, 2000; Druskat & Wolff, 1999).

## IMPLICATIONS FOR EDUCATIONAL PRACTICE

The findings are particularly interesting because they reflect the perceptions of the students themselves and their perceived feelings about the peer and self assessment in the online collaborative learning environment. Knowing students' perceived attitudes and feelings about it may help instructors to more effectively use the assessments in their classes. Based on the findings of this study, this section provides suggestions for future educational practice. The primary aspects of the study that suggest implications for educational practice are 1) guidance to promote effective peer and self assessment, 2) the impact of group size, 3) the accuracy problem and personal bias effect, 4) strongly guaranteed anonymity, 5) authentic and situated assessment practice, 6) peer and self assessment as a formative assessment, and 7) the need to re-design the current online peer and self assessment system.

### Guidance to Promote Effective Peer and Self assessment

As shown in this study, we know that many of the factors influenced the participants to have positive or negative perceptions and feelings when they conducted the peer and self assessment. The majority of participants felt comfortable, at ease, and

even confident with evaluating peers and themselves via the online assessment system because 1) the assessment system provided a detailed assessment rubric that played a significant role in enabling them to do fair evaluations, 2) the course offered a practice session allowing the students to familiarize themselves with the process before conducting the first assessment, 3) the assessments were repeatedly required for students at the end of every group project, 4) the assessment system offered a guarantee of anonymity, so it could lessen conflict among group members, and 5) participants had active group members engaged in the group activities. On the other hand, some participants had negative feelings and concerns related to assessing their peers and themselves due to 1) there being too many items and less intuitive scales of the assessment rubric, 2) the numerical assessment results, 3) the idea of equality with their peers, 4) the uncertainty of their ability to rate, 5) small group size, and 6) the sense of community. Therefore, if instructors consider these factors that influence students' feelings and perceptions when applying the peer and self assessment into practice in their courses, and if instructors try to create a more appropriate atmosphere for the assessments, it can be expected that students can conduct the assessments more comfortably, and their collaboration can be more effectively promoted by using the assessments.

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**Impact of Group Size**

Many studies assert that peer assessment is useful and highly effective in small group settings (Ferris & Hess, 1985; Lopez-Real & Chan, 1999; Melograno, 1996; Persons, 1998). However, in this study, small group size was discussed as an issue of concern when students conducted the peer and self assessments. Some participants mentioned that, as a member of a small group consisting of three to four students, they could identify who gave which scores and comments even though the online assessment system provided anonymity. As a result, they tended to rate their peers more generously because of the concern that their peers could guess who gave each rating. This caused the assessment scores to be inflated. Moreover, participants indicated that as a small group, minority members of the group could be sensitively affected by the majority members who may not have judged the minority honestly. Due to this concern with the small group size, some participants speculated that if a group was larger, the results of the peer assessment could be more valid regardless of the judgments of the majority. Therefore, instructors who plan to apply and manage the peer and self assessment with collaborative activities in their course should consider the group size issue, carefully monitor the performance of individual members rather than relying heavily on the individual ratings, and be careful when interpreting the assessment results.

**Accuracy Problem and Potential Bias Effects**

Some participants in this study raised the issue of accuracy in the peer and self assessment. That is, some participants expressed that in rating peers and themselves, they relied heavily on their own personal judgment, and they felt that it was difficult for them to be objective while conducting the assessments. In addition, some participants perceived that since the results of the peer and self assessment accounted for a large part of their final grades, it may lead to a greater tendency to conduct the assessments dishonestly. For instance, some students might be dishonest in assessing others in order to devalue their peers' efforts, while rating themselves higher to receive a better grade. As a consequence, participants of this study expressed concerns related to how personal bias could cause the assessment results to be inaccurate. Therefore, to prevent the assessment results from being inaccurate, the instructor should consider how to make students be more objective in assessing others, and how to develop ways to reduce the personal bias effects.

First of all, to help students assess their peers more accurately, setting and providing clear assessment criteria is recommended (Hanrahan & Isaacs, 2001; Li, 2001; Smith et al., 2002; Taras, 2002). For instance, one of the participants mentioned his struggle with an unclear assessment item as he was conducting the assessments: "Respects differences of opinions and backgrounds, and is willing to negotiate and make compromises." Since the assessment item contained two criteria, it was hard for him to judge peers on it because they performed differently on each of the two criteria.

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It wasn't always so clear like maybe on some of the descriptions [of assessment items]. … There was maybe two qualifiers or two things that we were rating with one remark and so it was saying well, he did good on this part but not so good on this part and then what do I pick? And then, I struggled with it. (Luke, 11/9/06, the first interview)

Additionally, to overcome the problem of personal bias and prejudice in the assessments, it is suggested that instructors provide sufficient assessment practice to students before conducting the actual assessments, and to guarantee the anonymity in the assessment system (AlFallay, 2004; Falchikov & Magin, 1997; Fallows & Balasubramanyan, 2001; Li & Steckelberg, 2006). Therefore, if they consider those points, instructors could provide a more effective atmosphere in which students could conduct the peer and self assessment without being heavily influenced by their personal bias and judgment.

**Strongly Guaranteed Anonymity**

Anonymity is an important and frequently mentioned way to encourage genuine participation in peer assessment. In particular, whilst anonymity is one of the major concerns of conducting peer assessments in paper-based systems, online peer assessment has been proposed as a solution. In the online assessment system, data can be automated and summarized, and students and instructors have instant access to data once they are generated. Moreover, the whole process can be conducted in an anonymous way via the Internet. Therefore, the majority of participants in this study believed that the anonymity offered in the online peer assessment helped protect both the assessor and the peer who was evaluated, and provided them with a more comfortable environment and less

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pressure from peers. Davies (2002) also suggests that not guaranteeing anonymity contributes directly to students' negative feelings about peer assessment, such as being uncomfortable with rating/critiquing peers' work, feeling obligated to assign friends a higher score, etc. Based on the literature and the participants' perceptions, it could be strongly expected that anonymity would minimize students' concerns about the confidentiality of their ratings and peer pressure. Therefore, instructors should remind themselves of the importance of maintaining the anonymity of peer assessment when implementing it, and guaranteeing the assessment's anonymity to students.

**Situated Assessment Practice**

Working together over the course of a semester as a small group, many participants in this study were reluctant to damage personal relationships among group members by hurting their peers' feelings or incurring a peer's anger due to their ratings. In addition, several participants revealed their concerns about the uncertainty of their ability to rate others, and about the distortion of assessment results by the majority in a small group. This is because the students did not completely understand the purpose of the assessments, how to fairly evaluate others, and how to give and receive constructive feedback.

Therefore, to enable students to have a better understanding of the assessments and have more confidence conducting peer and self assessment without reference to the consideration of personal relationships, the uncertainty of their rating ability, and the

distorting effect by other members, it is suggested that instructors provide students with more situated assessment practice, which uses real-world problems and situations and allows students to explore and discuss these problems in ways that are relevant to them (Carlson, 2002). As an example, topics for the assessment practice would include more situated conflict resolution that might be used in the real assessment moment. While providing situated topics, at the same time it would also be necessary to offer more time to enable students to discuss the topics with their group members. It can therefore give students the opportunity to share their opinion with each other, and develop a similar standard for assessing others fairly.

Additionally, to give students more confidence in giving constructive feedback to their peers, instructors need to provide information on feedback rules during the assessment practice session. Students could benefit by having a guide on how to give constructive and specific feedback to their peers. Below is the list of the feedback rules presented by Bergquist & Phillips (1975).

- Promotes reflection as part of a dialogue between the giver and receiver of feedback. Both parties are involved in observing, thinking, reporting, and responding.
- Focuses on observed behavior rather than on the person. Refers to what an individual does rather than to what we think s/he is.
- Is descriptive rather than judgmental. Avoiding judgmental language reduces the need for an individual to respond defensively.
- Is specific rather than general.

- Promotes reflection about strategies and the students' or observer's responses to a specific strategy.

- Is directed toward behavior that the receiver can change.

- Considers the needs of both the receiver and giver of feedback.

- Is solicited rather than imposed. Feedback is most useful when the receiver actively seeks feedback and is able to discuss it in a supportive environment.

- Is well timed. In general, feedback is most useful at the earliest opportunity after the given behavior.

- Involves sharing information rather than giving advice, leaving the individual free to change in accordance with personal goals and needs.

- Considers the amount of information the receiver can use rather than the amount the observer would like to give. Overloading an individual with feedback reduces the likelihood that the information will be used effectively.

- Requires a supportive, confidential relationship built on trust, honesty and genuine concern.

**Peer and Self Assessment as a Formative Assessment**

Most participants greatly valued the peer and self assessment as a formative assessment where students receive encouragement, response, and feedback on what they do, with a perspective allowing them to learn more effectively (Boud, 1990). The primary goal of the formative assessment is to facilitate change toward personal growth and

development. Therefore, peer and self assessment that provides feedback at multiple

points during the collaborative group learning projects can enable students to reflect on

their own learning process and results, to identify areas for improvement, to have a

chance to improve their performance, and to become more involved in group activities

and learning. Ava and Gabriel indicated these values of the peer and self assessment as a

formative assessment by saying,

> It makes sense to have that kind of [peer and self] assessment [during the course semester] as opposed to the end of the semester.. you know. At the end of the semester someone comes in and it's like an A and then you' may like it but I never had any sort of meaningful feedback, so I think it's helpful. (Ava, 11/13/06, the first interview)

> At some point, [by doing self assessment] you kind of learn the skill and the ability to step back and say all right, I'm watching me do my work. And it, it makes you very aware and I like the fact that we didn't just wait to the end because it makes you stop at some point and go, could I make this better while I still have a chance to fix it. Many times at the end, it's okay, I guess I was pushy but we're done so I can't fix it. (Gabriel, 2/1/07, the second interview)

Furthermore, peer and self assessment as formative assessment can potentially

reduce the free-rider problem (Brooks & Ammons, 2003). That is, if the results of the

peer and self assessment indicate that a group has some members who are hitchhiking or

doing most of the work, the instructor can meet with those groups or with each member

to explore better ways to distribute the workload and leadership within the group

(Ohland, Layton, Loughry, & Yuhasz, 2005). Therefore, in order to make use of the

formative assessment in a collaborative learning environment, it is recommended that

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peer and self assessment be provided at multiple points during the group activities rather than only at the end of the activity.

**Critical Design Elements for an Online Peer and Self Assessment System**

On the whole, the current online peer and self assessment system provided in the CSCL course is designed well, as indicated by most participants in this study. However, several participants pointed out issues with the online assessment system design that needed to be improved and modified. The issues are as follows:

- *Lack of guarantee of confidentiality.* The online assessment system is designed to immediately show the ratings to the assessees right after the assessors submit their scores, so it seems to allow students who already know the other members' working and class schedules to identify where the scores come from. In addition, it was pointed out that if an individual first sees the ratings from their peers and then assesses those peers, the ratings they give may be biased because of prejudice based on the scores they had received. Therefore, participants wanted a more confidential online assessment system, one in which their anonymity can be more completely guaranteed.

- *Types of feedback.* Most participants would prefer to get more textual feedback and comments rather than numerical scores from peers. Similarly, the participants also wanted a requirement to provide and leave textual comments to others in the peer assessment.

- *Need to provide an action plan.* Some participants wanted the online assessment system to provide an action plan that would enable them to improve their weaknesses, rather than to simply show students their average scores in each of the assessment items, their overall scores, and textual comments provided by peers.

- *Leadership item in the assessment rubric.* Some participants reported their trouble with rating one of the assessment items, which is related to leadership: "Provides leadership and support whenever necessary." Since there was usually one leader for each group project and the other members became followers, participants seemed to have difficulty in rating the followers in the leadership item.

The issues and problems noted above offer guidance for the design and use of peer and self assessment systems. The suggestions and recommendations include:

- *Showing assessment results only after all group members have submitted their ratings.* To resolve the first problem, which is related to the lack of guarantee of confidentiality, it is necessary to re-design the online assessment system so that students can see scores from their peers only after all the group members have finished conducting the peer and self assessment. By doing so, students' ratings would be more completely guaranteed anonymity, and would be less biased because students will not see the ratings receiving from peers before giving ratings to their peers.

- *Making textual comments required*. In order to resolve the second issue of
  feedback, instructors could require students to provide textual comments to all
  other group members. In addition, as shown below (Figure 5.2), by dividing the
  comment questions into two parts such as "What did well?" and "What needs to
  improve?" in the peer and self assessment, more detailed and constructive
  feedback could be provided to students.

| Items | Member 1 | Member 2 | Member 3 | Member 4 |
|---|---|---|---|---|
| 1. Takes active role in initiating ideas or actions. | ▲▼ | ▲▼ | ▲▼ | ▲▼ |
| 2. Is willing to take on task responsibilities. | ▲▼ | ▲▼ | ▲▼ | ▲▼ |
| … | | | | |
| 16. Openly shares needs and feelings with team members. | ▲▼ | ▲▼ | ▲▼ | ▲▼ |

Comments:

| | What did well? | What needs to improve? |
|---|---|---|
| Member 1 | | |
| Member 2 | | |
| Member 3 | | |
| Member 4 | | |

**Figure 5.2 Peer and Self Assessment Format**

- *Providing more specific feedback*. To satisfy the third need for the online
  assessment, which is to provide an action plan to enable students to improve
  their weaknesses, it could be possible to change the results display format in the

assessment system as shown below (Figure 5.3). That is, instead of simply

showing the average scores of each assessment item as the current system did,

each assessment item would be placed into one of three different categories:

"outstanding areas," "satisfactory areas," and "areas requiring improvement,"

based on the average scores of each item. As an example, items above 4.0 out

of 5.0 points can be placed to "outstanding areas," items between 3.0 and 4.0

can be included in "satisfactory areas," and items below 3.0 points can be

located in "areas requiring improvement."

*Your peers indicated an outstanding level of your performance in the following areas.*
- Takes active role in initiating ideas or actions.
- Acknowledges other members' good work and provides positive feedback.
- …

(List of the comments on "What did well," which is provided by peers.)

*Your peers indicated a satisfactory level of your performance in the following areas.*
- Produces high quality work.
- Understand problems and responds with helpful comments.
- …

*Your peers indicated that the following areas require improvement.*
- Accepts responsibilities for tasks determined by the group.
- Provides leadership and support whenever necessary.
- …

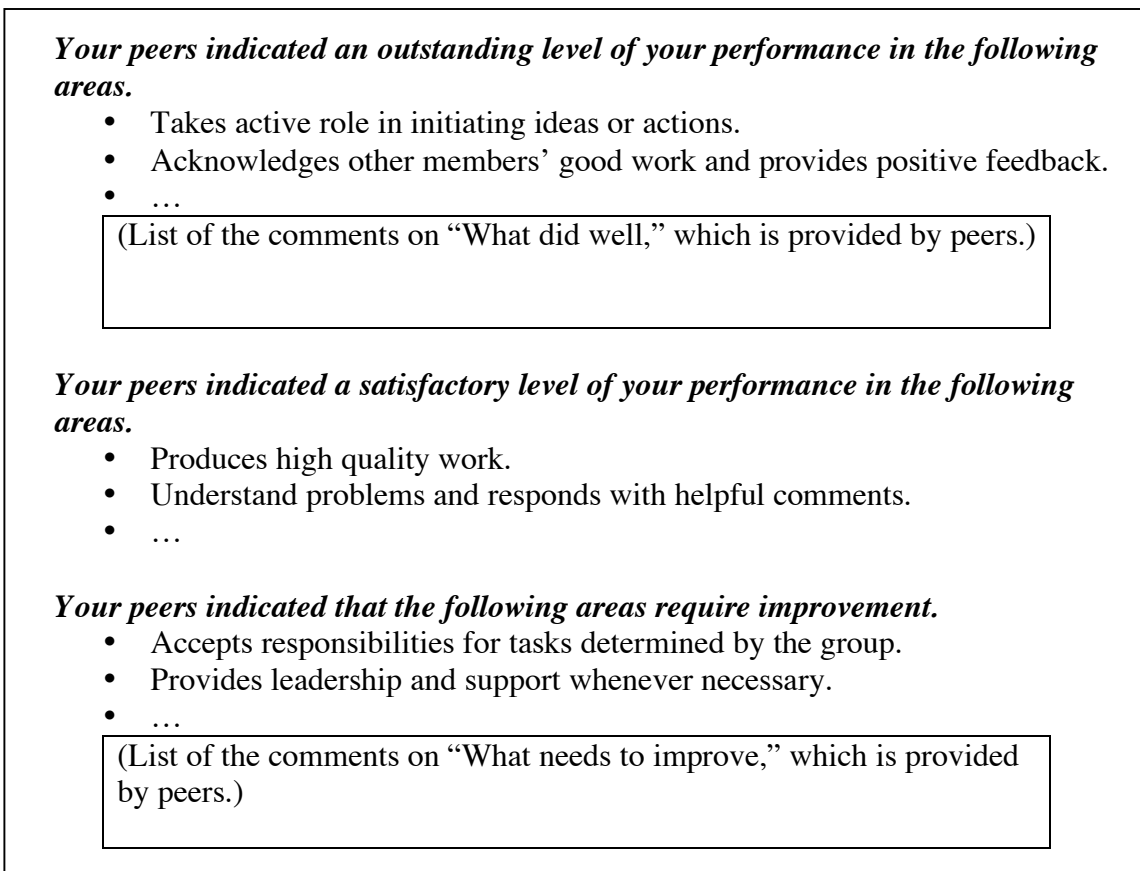(List of the comments on "What needs to improve," which is provided by peers.)

**Figure 5.3 Results Display Format**

- *Consideration for the leadership item.* For the last issue related to the leadership item in the assessment rubric, it is suggested that the leadership item be designed as an optional item in the online assessment. That is, the assessment system can be designed to ask students to rate only their group activity leader on the leadership item. Students would not need to rate other members who were not the leader of the group project at the time on the item.

If the indicated issues and problems can be improved as suggested above, a more effective online assessment system can be offered to students so they can feel more comfortable conducting the assessments.

## LIMITATIONS AND FUTURE RESEARCH

In this section, limitations and suggestions for future research are discussed. There were a number of limitations to this study. First, data was collected in a specific one-semester online graduate course in CSCL. Due to the unique characteristics of the course, the results of this study may not be appropriate to generalize to other online learning course contexts. Therefore, this study may need to be replicated in different settings. Ideally, the replicated study would test if the factors influencing students' perceptions and the impact on group collaboration are valid across other courses contexts. This would indicate whether the conclusions drawn from this specific online course would apply to other courses and groups of students.

Second, another limitation of the present study arises from the sample of students on which the findings are based, in terms of the volunteer sampling and the small representation of the participants. That is, 14 participants of this study were voluntary graduate students at a university. Even though significant differences between voluntary participants and non-participants in this study were not found and observed (Table 3.4), it may be necessary to evaluate the representation of the volunteer sample against the relevant population on the variables of interest in future research to reduce volunteer sample biases (Lonnqvist, 2007; Rosenthal & Rosnow, 1977). In addition, due to the small number of the participants, the findings of this study may not be representative of the entire student population as a whole. Therefore, it is possible that different results in future research may be seen with a different group of participants, and that would guide development of a more comprehensive study of students' perceptions and feelings on the use of peer and self assessment.

Third, data in this study were collected from the following sources: face-to-face or online video conferencing interviews with the participants; participants' written reflections; their portfolios; messages that each participant posted to their group online discussion board; and peer and self comments on the online assessments. However, in the course of analyzing the data, interviews became the primary source because participants described their views of the peer and self assessment in more detail. Even though other sources had been acquired in order to facilitate triangulation of the data, they ultimately were not used extensively in the data analysis. Therefore, in order to enhance

triangulation, it would be necessary to incorporate the multiple sources of data in the study to a greater extent.

Fourth, the most distinguishing characteristic in this study was that 13 of the 14 participants had already experienced peer assessment as well as self assessment. Only one participant had not done the peer assessment before, and another participant had not experienced the self assessment until enrolling in the CSCL course. As shown in the results of this study, participants' previous experiences with the peer and self assessment was one of the factors that influenced their perceptions and feelings about the assessments, the way they evaluated their peers and themselves, and their perceptions while conducting the assessments. That is, participants with past experience showed more positive attitudes toward the assessments than participants with no experience. Therefore, studies that have a sample consisting only of students who have never experienced the peer and self assessment or of students who all have experience with the assessments may yield different results on the students' perception and feelings.

Fifth, it is possible that I, in some way, influenced participants' responses during the interview because I was serving as a teaching assistant for the CSCL course that was used in this study. That is, participants might have regarded me as one of the staff members of the course who could influence the students' grades, rather than as an objective researcher. It is possible that the power of the researcher to student relationship could influence the study results. For instance, when the students were asked to participate in an interview for the study, my position might affect a student's decision to participate. In particular, since one of the interviews was conducted during the semester,

participants might not want to express their negative attitudes and perceptions of the assessments in the CSCL course. Thus, for future research, I would like to suggest that it would be better for researchers to use courses in which they themselves are not involved.

Sixth, in this study, participants not only indicated the problems but also offered many suggestions to improve the online peer and self assessment in the CSCL course, in terms of showing assessment results only after all group members have submitted their ratings, making textual comments required, providing more specific feedback, and consideration for the leadership item. Based on the participants' suggestions, the university's instructional technology center where the online peer and self assessment was developed has modified or re-designed the online assessment system. Therefore, after the completion of the modifications, it is expected that research on students' attitudes and perceptions of the peer and self assessment may be conducted again by using the updated online assessment.

Seventh, this study only investigated the students' perceptions of the peer and self assessment. However, some of the participants mentioned their perceptions of the product assessment, which is one of the assessment types provided in the CSCL course. That is, in addition to the peer and self assessment in the CSCL course, students were asked to evaluate all other groups' projects at the end of every group project. One of the participants expressed his positive attitude toward the product assessment.

> I do like the fact that someone outside of the group grade your work because that gives you the third party, the outside review they have a much, I used to tell my wife, it's always better when you get someone that doesn't know you to give you an opinion of what they think because they'll give you an honest opinion, a first

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impression. Same thing with this. When you bring someone else and view the work, it gives you a more realistic, you ask what quality your work was done. So I like the fact that you have other team members grading other team's project. (Anthony, 11/17/06, the first interview)

On the other hand, another participant indicated an issue related to the reciprocity effect, such as rater-ratee relational effects, which could skew the product assessment ratings.

There were some groups that did, I mean the WebQuest, about intelligence and being a spy just seemed way too complicated. A crazy idea but obviously there was a ton of, they put a ton of work into it or at least it seemed like they did. And so maybe other groups had different experiences but I felt like grade, the scores we received from our groups were so inflated just based on kind of these win-win, you know, you better give us good scores, and we're going to give other groups good scores. (Isaac, 1/11/07, the second interview)

Therefore, based on the students' comments on the product assessment, future research needs to examine students' attitudes and perceptions toward product assessment in the online collaborative learning environment.

Eighth, when interviewed, Jasmine, one of the participants, mentioned the portfolio as a factor that influenced her feelings and attitude toward the peer and self assessment. Students were required to write and submit information for a portfolio at the end of each project in the CSCL course. The purpose of the portfolio was to enhance students' analysis of the group collaboration, their own contribution to the group project, and what worked well and what could be improved. Therefore, in order to complete the portfolio, students needed to review and re-read the transcripts of the online group discussions, the messages they posted to their group online conference area, and the final output of their group project. Jasmine indicated that in the process of completing the

portfolio, she had the opportunity to see, know, and remind herself of other members' contributions to the group project; this helped her to evaluate other members more easily.

> It [conducting peer assessment] is quite easy for me because actually I did the portfolio before I did the peer evaluation. … When I checked on the transcript, I can see that I actually participate in the chat kind of less than other members. And also I can see a lot of interesting ideas that my members come up with during the discussion so it's kind of easy for me to evaluate them. (Jasmine, 11/7/06, the first interview)

Even though Jasmine was the only participant to indicate the portfolio as a factor that affected her perception of the peer assessment, it would be valuable for future research to investigate how the portfolio affects students' perceptions and feelings on the peer and self assessment in the collaborative learning environment.

Ninth, future research also needs to examine the relationship between the peer and self assessment and the sense of community, including relationships among group members, trust, and team-building. As the results of this study indicated, participants thought of the sense of community as a factor affecting their perceptions of the use of the assessments, as well as an impact on their group collaboration. First of all, having the sense of community could either make participants feel comfortable or cause them to have difficulty with the peer and self assessment. That is, as they became closer and developed more personal relationships with their group members, some participants felt it was easy evaluating their peers because they knew each other well and how their peers would respond to their ratings; conversely, other participants felt it was harder to give constructive, critical, and honest feedback to peers because they had become real friends

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with each other rather than just remaining classmates or teammates. In addition, the sense of community was mentioned as an impact of peer and self assessment on group collaboration. That is, participants saw the peer and self assessment as a communication channel with their peers and a built-in opportunity to provide their honest thoughts. In this way, they could reinforce and strengthen the group collaboration, team-building, and relationship among the group members. Therefore, it would be valuable and interesting to investigate how the sense of community, which includes the relationships between group members, trust, and team-building, works in the peer and self assessment process in the collaborative learning environment.

## CONCLUSION

This study sought to investigate how students perceive the use of online peer and self assessment in an online collaborative learning environment. This inquiry generated information regarding the factors that influence students' perceptions of the use of peer and self assessment in an online collaborative learning environment and how peer and self assessment impacts the online collaboration of the students. The findings of this study can contribute to a better understanding of the assessments in such an environment, which is increasingly required of students.

Results of this study showed that many factors allowed students to have varied perceptions, attitudes, and feelings in conducting the online peer and self assessment. The factors were grouped into three: learning context, individual differences, and online

learning community. Additionally, the results revealed the impact of the use of peer and self assessment on the group collaboration in terms of understanding others' perspectives, reflections on themselves, awareness of the assessments, interpersonal skills for collaboration, accountability, participation, personal criteria for the assessments, level of confidence with the assessments, and group collaboration.

Understanding the factors that influence students' perceptions and the impact of the peer and self assessment on group collaboration may help instructors to more effectively apply the assessments in collaborative learning environments. In addition, if instructors continue to consider additional issues related to the online peer and self assessment, such as the impact of group size, accuracy and potential bias effects, anonymity, situated assessment practice, and peer and self assessment as a formative assessment, then they may be able to identify and design better online collaborative learning contexts containing the assessments, thus encouraging students' behaviors and attitudes toward the development of online collaboration.

# Appendices

| Topics |
| --- |
| **Syllabus** |
| |
| **Module 1. Building a Learning Community** (Sept. 5 – Sept. 27) |
| **Webcast:** Refer to the newsletter for details. |
| **1.1 Introduction** |
| **1.2 What Is a Learning Community?** |
| **1.3 Getting to Know Each Other**<br>**<Assignment 1.3.a>** Setting up your personal Web log (Blog).<br>**<Assignment 1.3.b>** Introduce Yourself.<br>**<Assignment 1.3.c>** Read and Respond to Others' Introductions.<br>**<Assignment 1.3.d>** Read One of the Following Articles. |
| **1.4 Providing Information for Staff Directory**<br>**<Assignment 1.4>** Provide Information for Staff Directory. |
| **1.5 Working Together Online**<br>**<Assignment 1.5>** Establish Norms for Effective Online Collaboration. |
| **1.6 Demonstration of CSCL Tool**<br>**<Assignment 1.6>** Evaluate and Demonstrate CSCL Tool |
| |
| **Module 2. Understanding CSCL** (Sept. 25 – Oct. 9) |
| **Webcast:** Refer to the newsletter for details. |
| **2.1 Introduction** |
| **2.2 The Key Elements of CSCL, Cooperation, & Collaboration** |

| |
|---|
| **<Assignment 2.2>** Get to Know Your Office Mates. |
| – Post your views and experiences in cooperative or collaborative learning. |
| – Read and respond to others' postings. |
| **2.3 CSCL: What & Why** |
| **2.4 Benefits of CSCL** |
| **<Assignment 2.4>** Make Connections & Check Understandings |
| – Read an article and post your ideas emerging from the article. |
| – Synthesize your ideas with office team members and post them. |
| **2.5 Social Aspects of Learning & CSCL** |
| **<Assignment 2.5.a>** Make Connections. |
| – Post your ideas. |
| – Identify key strategies. |
| **<Assignment 2.5.b>** Reflections |
| – Review your reflections |
| – Respond to others' reflections |
| **<Assignment 2.5.c>** Practice Peer and Self Evaluation. |
| |
| **Module 3. Collaborative Controversy and Collaborative Writing** (Oct. 9 – Nov. 2) |
| **Webcast:** Refer to the newsletter for details. |
| **3.1 Introduction** |
| **3.2 Academic Controversy** |
| **<Assignment 3.2>** Creative Controversy |
| – Argue Your Position with Opposing Team. |
| – Come to Agreement. |
| **3.3 Developing the Wikipedia topic entry** |
| **<Assignment 3.3.a>** Prepare team Wiki |
| **<Assignment 3.3.b>** Develop a Wikipedia topic entry Related to CSCL. |
| **<Assignment 3.3.c>** Reflections |

| |
|---|
| – Review your reflections |
| – Read and comment on at least one other reflection. |
| **<Assignment 3.3.d>** Evaluation & Portfolio |

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| |

| **Module 4. Strategies for Collaborative Online Inquiry and Problem Solving** (Nov. 2 – Dec. 11) |
|---|
| **Webcast:** Refer to the newsletter for details. |
| **4.1 Introduction** |
| **4.2 Exploring and Using TeachNet**<br>**<Assignment 4.2>** Install TeachNet on Your Own Computer. |
| **4.3 Teaching Problem Solving** |
| **4.4 Solving a Real World Problem**<br>**<Assignment 4.4>** Identify a Problem and Three Solutions. |
| **4.5 Learning About WebQuests**<br>**<Assignment 4.5>** Explore a WebQuest. |
| **4.6 Backward Design** |
| **4.7 WebQuest Design Process**<br>**<Assignment 4.7.a>** Create a WebQuest Related to a Topic or Question of Interest<br>**<Assignment 4.7.b>** Carry Out Your WebQuest and Participate as a Learner in Others'.<br>**<Assignment 4.7.c>** Report on WebQuests<br>**<Assignment 4.7.d>** Reflections<br>– Review your reflections.<br>– Read and comment on at least one other reflection.<br>**<Assignment 4.7.e>** Evaluation & Portfolio |
| **Webcast:** Refer to the newsletter for details. |

1. Takes active role on initiating ideas or actions.

2. Is willing to take on task responsibilities.

3. Is willing to frequently share ideas and resources.

4. Accepts responsibilities for tasks determined by the group.

5. Helps promote team esprit de corps.

6. Respects differences of opinions and backgrounds, and is willing to negotiate and make compromises.

7. Provides leadership and support whenever necessary.

8. Acknowledges other members' good work and provides positive feedback.

9. Is willing to work with others for the purpose of group success.

10. Communicates online in friendly tone.

11. Keeps in close contact with the rest of the team so that everyone knows how things are going.

12. Produces high quality work.

13. Meets team's deadlines

14. Sensitive to the needs and feelings of other members of the team.

15. Understand problems and responds with helpful comments.

16. Openly shares needs and feelings with team members.

**APPENDIX C. SCENARIO FOR PEER AND SELF ASSESSMENT**

John was a student in a web-based online Instructional Design course. It was typical for the students in the course to be divided into teams of approximately six members each. The members of his team were Mary, Liam, Le Quyen, Jack and Analisa. There were four teams of six members each in this particular course. It is typical to have four to six modules in a course of this nature. The professor suggested that teams schedule chats throughout each module and set an agenda for each chat. (A chat is a conversation with team members in an online instant messaging environment. The first chat of a course sets the norms or the rules the team members will follow throughout the course. The first chat of a module sets parameters for how the team will handle the tasks for that module as well as setting guidelines for future chats.)

Each team in the course had a team folder, and each team member had a personal e-mail account. The students communicated with their team members by posting messages in the team folder for all other team members to see and respond to. Each team member could also communicate individually through the e-mail system if there was a need or desire to communicate discretely.

John and his team members met for their first chat of the course. During the chat, the team members determined that it was necessary to pick a module leader for the first module, determine what tasks each member would be responsible for, whether the team would work cooperatively (each taking an individual task to complete) or collaboratively (working together on each task) to complete the module tasks, and decide on the time allotment for each chat. These items would comprise the agenda for the next. All team members decided on the time and date for the next chat.

The evening before the second chat session, John sent a message to his team members in the team folder expressing his need to change the scheduled time for personal reasons. His timing was not very good as the chat was scheduled for the next evening at 8:00 p.m. Three members responded to his message stating that they would not be able to change the day or time. Mary indicated that she could not meet at another time. She suggested that the team conduct the business of the second chat by messaging each other and cancel the chat altogether. The other members sent messages suggesting they meet at the scheduled time. John did not respond to any of the messages and did not attend the chat the next evening.

The other members were confused as to whether the chat would occur as scheduled, but all showed up on time anyway. It had not been decided how to handle a situation in which a member could not attend a chat. The module tasks had due dates, so the time

allowed for accomplishing the tasks was limited. The attending members decided to reschedule the chat within a couple of days and try to conduct their business when all members could be present. They decided on three possible times and took a vote as to what would be the best time for each of them. Mary offered to post a message in the team folder to John with the three times and ask him which one would be best for him. They asked that he respond quickly. The meeting was adjourned. It was customary to summarize and save the chats and attach them to a message in the team folder. Le Quyen offered to summarize, save and post the chat.

John checked the folder the following day and found the message with the saved chat. He quickly sent an e-mail message to Le Quyen thanking her for saving the chat, but did not read the message, summary or chat. He decided that the business planned for the chat had been conducted and he would read the message later when he had more time.

When John finally took the time to read the chat and message, it was too late to attend the second rescheduled chat. The other team members had already met. One of the agenda items was to select a team leader. The attending members decided that none of them had the time to spend on the first module but would ask John if he would be willing to take on the responsibility for leading this module. Concerning the other items on the agenda, the members suggested they work on the module tasks cooperatively, each taking a portion of the tasks in the first module to complete. It was also decided that each chat would last no longer than thirty minutes. Liam offered to summarize and save the chat. He included a message to John with the request that he act as team leader for the module.

John realized at this point that he not only missed the first chat, but the second one as well. He knew he was getting behind and did not want his team members to think that he was not interested in being an integral part of the team. He knew he could not turn down the request the he serve as module leader. He posted a message to the team folder expressing his gratitude for his team members' good work and decisions, and accepted the leadership role.

John's heart was not in the leadership role for this module, however. He knew that he should message the team often giving them encouragement and checking to see if help was needed, and generally communicating with his team members, but he did not take the time or the effort to do so. He did however show up on time for the third scheduled chat. The module had a four-week timeline and there were two weeks left to complete the module tasks.

Liam was absent for the third chat. He had sent a message to the team folder informing his team members that he was not well and would not be able to participate, but would they please make any necessary decisions and inform him of the decisions in the message to the saved chat. John expressed his disappointment that all members were not present. He had hoped he could discuss his desire to work collaboratively on the module tasks

instead of cooperatively. Although all team members were not present, he decided to bring the matter up anyway. Mary suggested working collaboratively on the module tasks would be very time consuming, and Analisa said she preferred working individually on her module tasks. John said that if this was to be a true collaborative effort, they should all work on each task together. Le Quyen wanted to know how much time it would take to complete the tasks collaboratively. John said he had not thought about the time element, but would consider that point and bring some ideas to the next chat. He asked all of the team members to think about working collaboratively and to express their thoughts and ideas in the next chat. Before they adjourned, John asked each member to give an update on his/her module tasks. The fourth chat was set for the following week at the same time as agreed upon by all present team members. The team adjourned. Jack offered to summarize, save and post the chat.

The following week, John posted only one message to his team's folder urging members to continue working on their tasks, as time was short. He checked in and saw that the other members were communicating with one another in the team folder, but he did not reply to any of the messages.

John was late to the fourth chat. All other team members were on time. John told his team members he had an obligation that evening and could only stay for a few minutes. Before he left the chat, however, he encouraged all of the team members to finish their assignments and submit them to him two days before the scheduled due date. He said he would review the assignments to make sure everything was complete and then he would submit the assignments on the due date. He did not ask his team members if they thought this was a good idea. The fifth and last chat was scheduled for the following week at the same time, and John stated that he would see everyone then. The rest of the team members continued the online chat until they had discussed all of the problems they were having with the module tasks. Analisa saved and summarized the chat.

The following week, John sent one message to the team folder reminding the team members of the upcoming fifth and final chat of the module. He asked that they be on time for the chat. The other team members communicated in the folder more this week than the previous week. John did not communicate again with him teammates.

Everyone logged in on time for the final chat of the module. John reminded his teammates that they were to submit their completed tasks to him two days before the due date and he would submit everything on time. His teammates went along with John because he was the module leader.

When the day to submit the completed tasks to John arrived, Liam's tasks were not complete. He sent them to John the following day. John still had a small portion of his tasks to complete, but he did not share this information with his teammates. All other team members submitted their tasks to John. After reviewing all of the tasks, John

submitted the assignments on time and posted a message to the team folder to that effect. He had not made suggestions for changes nor did he provide any feedback to his teammates regarding their particular tasks.

The team members were eager to review each other's contributions to the module. John was able to review all of his team member's work, but the other team members had to wait until all tasks were submitted on the module due date to view their team's work. After John's teammates were able to review everything, it was obvious that his contributions were shorter and generally lacking in detail.

Although John's teammates had accepted his plan of action as leader of this module, it was obvious that the team needed to review the duties of the module leader for the remaining modules of the course. The team set a time for the first chat of the second module, and the first item on the agenda was to discuss the parameters of what they considered to be a good leader.

**APPENDIX D. PEER AND SELF ASSESSMENT RESULTS OF THE PARTICIPANTS**

| Group | Name | Ass. | Self Score | Peer Score | Comments from Themselves and Group Members |
|---|---|---|---|---|---|
| Elementary Education Group | Isaac | 1st | 4.4 | 4.9 | • Within the context of a busy semester I feel that I have done a very good job of working with a group. While I have not given my life over to CSCL (as it appears we are encouraged to do) I have worked diligently to work with my team.<br>• Isaac, you provided good leadership in assignment 3. |
| | | 2nd | 4.9 | 5.0 | N/A |
| | | 3rd | 4.9 | 5.0 | N/A |
| | Minjung | 1st | 4.7 | 4.9 | • Minjung has been the star member of the team. Her work has shown more effort than other group members. Overall an excellent job on her part. |
| | | 2nd | 4.8 | 5.0 | • I had a great time working with you Minjung! :-) |
| | | 3rd | 4.7 | 4.9 | • Really great working with you :-) |
| Secondary Education Group A | Jasmine | 1st | 4.9 | 4.9 | • Excellent contributions. Very much a team player. |
| | | 2nd | 5.0 | 5.0 | • Jasmine has been the team project manager, reminding everyone of the tasks and timelines with a smile and uplifting spirit.<br>• Jasmine was a very involved and valuable teammate and was essential to keep the group moving in the right direction. |
| | | 3rd | 5.0 | 5.0 | • You were always willing to take on more tasks, and consistently produced quality work!!<br>• Your attention to detail was exceptionally helpful. |
| | Ava | 1st | 4.9 | 5.0 | • I feel like I have been a supportive and collaborative member of the group. I have tried to provide positive feedback as well as helpful topics for our discussions. I have thoroughly enjoyed working with this group. |

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| | | | | | |
|---|---|---|---|---|---|
| | | 2nd | 4.9 | 5.0 | • I worked with a great team and wanted to live up to my teammates hard work ethic. I tried to provide helpful input and ideas and I think that I proved to be a collaborative and supportive teammate.<br>• Ava brings a sense of stability to the group and allows the team to succeed through support and positive feedback. |
| | | 3rd | 4.9 | 5.0 | • Your communication skills are outstanding. |
| | Linda | 1st | 5.0 | 5.0 | • Linda is an excellent contributor to online and face-to-face discussions. She often brings up important points from research conducted that would take our conversations to a higher level. She is also a supportive team member and I have enjoyed working with her. |
| | | 2nd | 5.0 | 5.0 | • What I like about being in a team with Linda is the experience and point of view she brings. She is always seeing things from a grounded position that helps others to keep their eye on the project goal.<br>• Linda played an important role on the team and provided valuable input for our assignments and research paper. She was a supportive, collaborative and creative teammate. |
| | | 3rd | 5.0 | 5.0 | • You were an excellent team member and an innovative thinker!! |
| Secondary Education Group B | Luke | 1st | 4.4 | 4.9 | • I think I have been a good team member. I probably need to work on thanking and acknowledging the good work of others.<br>• Luke is a quiet source of strength within our group. His technical expertise and thoughtful analysis of the material we work with continues to benefit our group. Luke participates very positively in all group discussion and also takes the time to patiently explain things that are out of the realm of experience of other group members. Not all experts are also good teachers, but Luke has demonstrated this skill many times.<br>• Luke is the quiet contributor who keeps the anxiety level to a minimum, who offers to help others as needed and who provide expertise in the field of technology when there is a problem. The quality of his |

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| | | | | | academic work is exceptional and he prefers the direct, concise approach to informing on the chosen topic. Luke is timely, committed to excellence and supportive of others.<br>• Luke has submitted excellent work and has been a strong member of the team. |
| | | 2nd | N/A | 4.9 | • Luke consistently produces quality work and the Whyville presentation was another example of this commitment. He did a great job of introducing and navigating the site to show its capabilities to the rest of the class.<br>• Luke promotes team spirit as demonstrated through his willingness to share his talents, to assume major roles in the planning and production process and to help others with technical problems. His expertise was evident in the demonstration of Whyville.<br>• As always Luke was very reliable and provided the team with an excellent contribution. |
| | | 3rd | 5.0 | 4.8 | • Luke is quiet but intense. He is quick to offer support and solutions, but does not impose his ideas on others -- rather, he offers his ideas up for consideration. His technology skills were invaluable in completing the webquest project, as were his "real world" skills in working in this collaborative group. |
| | Ryan | 1st | 4.8 | 4.9 | • Ryan often offers the touch of levity that makes on-line groups seem more human. Quick with a witty comment, he also is quick to share ideas and solutions to problems. His experiences working in other group settings adds depth and quality to this group.<br>• Ryan is the team member who can quickly and professionally lay out the plan. Ryan has a talent for listening to the discussion and creating the template or overall floor plan for the presentation. He is the organizer and through the process, Ryan remains calm and supportive of the team. He is very skilled in technology and assists members as needed.<br>• Ryan has been a great group member. He is an effective leader, knowledgeable, and |

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| | | | | | always willing to take on work and responsibilities. |
| | | 2nd | 4.9 | 4.8 | • Overall I think I did a good job with this project. My frequency of communication with the group could probably stand to improve a bit.<br>• Ryan not only consistently produces quality work for his own responsibilities in the group, he also integrates the work of the rest of the class into coherent and cohesive presentations. Great job of pulling it all together.<br>• Ryan has vast knowledge and skills in project-based planning and production. He demonstrated this expertise in the presentation on Whyville as he gave the background and technical requirements for the online tool. His energy invites the audience to stay involved in the presentation. |
| | | 3rd | 4.9 | 4.8 | • Ryan has the gift of being able to "cut to the chase" and not get bogged down by unimportant details. This trait allowed us to focus on the important aspects of our webquest, without getting sidetracked. He is at ease with technology, but never condescending to those of us less blessed! I appreciated working with him this semester. |
| Higher Education Group A | An-Ni | 1st | 5.0 | 4.9 | • It was a pleasure to work with you on the presentation project. I felt confident in your quality of work, and in your willingness to work for the good of the group.<br>• You show honest effort to help your team succeed. You volunteer on a regular basis and go above and beyond the expectations of the team. |
| | | 2nd | 5.0 | 4.9 | • Once again An-Ni, it was great to work with you on this project. I have no suggestions except to ask that maybe you do share with us more, because when you do, it always a positive experience.<br>• You provide excellent support and encouragement. Great job. |
| | | 3rd | 4.8 | 4.9 | • Thanks for all your hard work this semester, An-Ni. Good luck next semester!<br>• Always supportive of the group, always |

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| | | | | | volunteering to assist or take on duties without being asked, you are a great team player. |
| | Anthony | 1st | 4.6 | 4.9 | • My personal life complicated my students' activities, but I was able to readjust and realign my efforts. My efforts might not have measured up to the team's expectations, but 5 days in the hospital can ruin anyone's schedule.<br>• I love your way communicating with others so friendly and with respects. I feel very comfortable to be your teammate ^^<br>• It was a pleasure to work with you on the presentation topic. You were very helpful, and produced great work, despite the pressures of being at a considerable distance, and having the significant time pressures of a full time job and a new baby! |
| | | 2nd | 4.9 | 5.0 | • Missed a couple of deadlines.<br>• You did a fantastic job as team leader on this project and put in more than fair share of work on the project, while keeping us all on task... and you did it all while having the most demanding schedule of us all! |
| | | 3rd | 4.9 | 4.9 | • Great team player<br>• Thanks for all your hard work this semester Anthony! Good luck next semester! |
| | Junghoon | 1st | 4.6 | 4.6 | • You are a very responsible person and always devoted for contribution. Nice to collaborate with you ^^ |
| | | 2nd | 4.6 | 4.9 | • My only suggestion is that you make your opinion better known. Your work is of outstanding quality, and your ides and perspectives are valuable and unique. I would just like to encourage you to take a more prominent role in our discussions! I am really looking forward to you leading our next project; I think it will be our best yet.<br>• You are a great team member. |
| | | 3rd | 4.8 | 4.8 | • Thanks for all your hard work this semester Junghoon! Good luck next semester!<br>• Great to work with and always provides excellent input. |
| Higher Education Group B | Sangjun | 1st | 4.9 | 4.4 | • Sangjun communicates better on-line than in person mainly because of the language barrier issue he faces. He works hard at |

| | | | | | |
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| | | | | | being understood and does not get flustered. But small misunderstandings can and do occur that require other teammates to also show the same amount of patience. |
| | | 2nd | 4.8 | 4.7 | N/A |
| | | 3rd | 4.4 | 4.6 | N/A |
| Business Education Group | Yen-Ping | 1st | 4.8 | 4.7 | • Good job. Yen-Ping!<br>• Yen-Ping works hard on our activities and provides excellent quality work. |
| | | 2nd | 4.4 | 4.8 | N/A |
| | | 3rd | 4.4 | 5.0 | • Provided valuable insight and perspective to our group. |
| | Allison | 1st | 4.4 | 4.4 | • Allison is knowledgeable and she enlightens our thoughts!<br>• Allison works hard and brings a great deal of experience to the team. |
| | | 2nd | N/A | 4.9 | • I would like to thank you, Allison. You have put lot of effort in coordinating of the presentation project. |
| | | 3rd | 4.8 | 5.0 | • Very excellent job of the WQ!!! |
| | Gabriel | 1st | 4.6 | 4.9 | • Gabriel shows real leadership on all levels. |
| | | 2nd | 4.9 | 4.9 | • With clear mind and technique savvy. It is a pleasant experience to work with Gabriel. |
| | | 3rd | 4.9 | 5.0 | • Very excellent job of the WQ! |

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## APPENDIX E. PRE-INTERVIEW SURVEY

Please answer the following questions.

1. What is your gender?     ☐ Male      ☐ Female

2. How old are you?   _____

3. Have you taken online courses before taking this course?      ☐ Yes ☐ No

    a. If you answered, "Yes", how many courses?   _____

4. Have you taken online collaborative courses before taking this course? ☐ Yes ☐ No

    a. If you answered, "Yes", how many courses?   _____

5. Have you ever experienced self-evaluation before taking this course?  ☐ Yes ☐ No

6. Have you ever experienced peer evaluation before taking this course?  ☐ Yes ☐ No

7. Are you a full time student?     ☐ Yes ☐ No

8. What is your major?  _____

9. What degree are you currently pursuing?   ☐ Master's      ☐ Ph.D.

**APPENDIX F. QUESTIONNAIRE FOR ONLINE TEAM DIRECTORY**

Please add your entry to the directory.

| | |
|---|---|
| **Name** | |
| **Address** | |
| **Phone** | (H)<br>(O)<br>(M) |
| **Email** | |
| **Skype ID** | |

**Work Experiences**

**Educational Background**

**What do you want to learn from this course?**

**Other instructional design/technology-related courses or training workshops that have been taken:**

**How comfortable do you feel using the following computer technology?**

| | Very | Some what | Not at all |
|---|:---:|:---:|:---:|
| **Word Processing** (Word, Word Perfect, ClarisWorks, Simpletext, etc.) | ○ | ○ | ○ |
| **Spreadsheets** (Excel, etc.) | ○ | ○ | ○ |
| **Desktop Publishing** (Pagemaker, QuarkXpress, Print Shop Deluxe, etc.) | ○ | ○ | ○ |
| **Authoring or Multimedia** (Hyperstudio, Authorware, Director, Multimedia ToolBook, etc.) | ○ | ○ | ○ |
| **Instructional Demonstration/Tutorial** (Powerpoint, Persuasion, etc.) | ○ | ○ | ○ |

| | | | |
|---|---|---|---|
| **Audio/Video Editing** (Premiere, Videoshop, etc.) | ❍ | ❍ | ❍ |
| **Art/Graphic Development** (Photoshop, Painter, Illustrator, Canvas, etc.) | ❍ | ❍ | ❍ |
| **Internet or Online Service Access** (Navigator, Internet Explorer, AOL, Compuserve, etc.) | ❍ | ❍ | ❍ |
| **Web Page Development** (FrontPage, Dreamweaver, BB Edit, etc.) | ❍ | ❍ | ❍ |
| **E-mail** (Eudora, Outlook, Exchange, Emailer, Groupwise, etc.) | ❍ | ❍ | ❍ |
| **Computer Conferencing Tool** (FirstClass, Webboard, etc.) | ❍ | ❍ | ❍ |
| **Database** (Access, MySQL, etc.) | ❍ | ❍ | ❍ |
| **Scripting or Programming Language** (Javascript, ColdFusion, PHP, etc.) | ❍ | ❍ | ❍ |

**What kind of computer are you using?**

|  |
|---|
|  |

**How do you access the Internet for this course?**

|  |
|---|
|  |

**1st Interview Questions**

1   Have you taken other courses that used collaborative learning methods?

    1.1   Does collaborative learning method fit in well with you?

2   What do you think about CSCL course? (Just overall opinion)

3   Before beginning of CSCL class, did you already know CSCL course has peer/self assessment as one of the criteria for grading?

    3.1   If so, what do you thinking about that?

4   Have you ever evaluated PEERS and YOURSELF in other courses?

5   How about your feelings when you evaluated PEERS? Was it comfortable? Or what else?

6   How about your feelings when you evaluated YOURSELF? Was it comfortable? Or what else?

7   How did you feel when seeing the scores and the comments given by your team members?

8   Why do you think SELF and PEER assessment is performed in collaborative learning?

9   Do you think the result of SELF and PEER assessment is useful for you?

10  Do you think SELF and PEER assessment is necessary in collaborative learning? or not?

11  What do you think about the influence or effects of SELF and PEER assessment in this course?

12  What do you think about the role of the SELF and PEER assessment?

13  What do you think the reason why SELF and PEER assessment is placed in CSCL course?

14  Do you have any criteria when you evaluate PEER and YOURSELF?


**2nd Interview Questions**

1.   How was your CSCL course experience? (Enjoyed the class?)

2.  Based on CSCL course experience, do you think, "What is important thing in collaborative work"?

3.  How was your team? Went well? Every team member worked hard? Every team member was on the same page?

4.  How was your SELF-assessment experience in CSCL course?

5.  In your case, what kind of criteria (aspects, points, items) was important to evaluate YOURSELF? (e.g., communication, task-completion)

6.  Do you think that SELF-assessment process and results influenced your TEAM's WORK process or INDIVIDUAL work? And how?
    (i.e., self assessment influenced team relationship, team communication, or other team process?)

7.  Compared with your first SELF assessment experience in CSCL course,

7.1 In the last SELF assessment, how about your feeling when you evaluated YOURSELF? (more comfortable?...) Why?

8. How was your PEER assessment experience in CSCL course?

9. In your case, what kind of criteria (aspects, points, items) was important to evaluate your PEERs? (e.g., communication, task-completion)

10. Do you think that PEER assessment process and results influenced your TEAM's WORK process or INDIVIDUAL work? And how?

(i.e., peer assessment influenced team relationship, team communication, or other team process?)

11. Compared with your first PEER assessment experience in CSCL course,

11.1 In the last PEER assessment, how about your feeling when you evaluated PEERs? (more comfortable?...) Why?

12. How much did you agree with your scores and comment given by your peers?

13. After the PEER assessment in CSCL course, did you notice any kinds of changes in your group members' messages and online chatting and their performance and collaboration degree?

14. How about YOURSELF? Did you change anything?

15. Were you sensitive on the results of peer assessment? How about others (that is, you think other members were sensitive either?)

16. Did you have any problem when you evaluate your peers?

17. When evaluating your peers, how did you use "Peer-assessment" tool? (For example, did you use peer assessment as a tool to criticize peers or as a tool to give motivation, etc.)

18. What do you think about the effects of PEER and SELF assessment on your group and individuals?

19. Feel free to tell me any comments and suggestions for improvement of the peer/self assessment.

**APPENDIX H. LIST OF CATEGORIES RESULTING FROM OPEN CODING**

**CSCL Course as an Online Learning Environment**

Characteristics of CSCL course

Experience of CSCL course

Online peer and self assessment

- Feature of the online assessment system
- Value of the online assessment system

**Groups in CSCL Course as a Learning Community**

Individual differences

- Personal characteristic
- Previous experiences of collaborative learning
- Previous experiences of peer, self, product assessment
- View on the assessments in collaborative learning

Characteristics of group

- Group atmosphere
- Individual aspect
- Group aspect

**Peer Assessment in CSCL Course**

Experience as an assessor

- Feeling on conducting peer assessment
  - Comfortable
  - Generous
  - Honest
  - Positive

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          o  Fair

          o  Hard / uncomfortable / careful

- Criteria for peer assessment
- Way to conduct peer assessment
- Purpose of peer assessment

Experience as an assessee

- Score and comments given by peers
- Feeling on seeing peer assessment results given by peers

Influence of peer assessment

- Participation
- Contribution
- Responsibility
- Motivation
- Reflection
- Improvement
- Understanding others
- Confidence

## Self Assessment in CSCL Course

Experience as an assessor and assessee

- Feeling on conducting self assessment
    - o Comfortable
    - o Uncomfortable / hard / difficult
    - o Harsh on myself
    - o Honest
    - o Generous
    - o Weird
- Criteria for self assessment
- Way to conduct self assessment

Influence of self assessment

- Reflection
- Improvement

**APPENDIX I. LIST OF CATEGORIES RESULTING FROM AXIAL CODING**

**Learning Context as Environmental Conditions**

Course

- Assessment practice
- Repeated assessments
- Assessment as a built-in step

Online assessment system

- Assessment system design
- Anonymous assessment
- Online assessment
- Problem of assessment system
- Rubric of assessment

Results of assessment

- Score/number
- Textual comments

Graduate School Environment

- Characteristics of graduate school
- Grades in graduate school
- Equal level with peers

**Individual Differences as Individual Conditions**

Personality

Difficulty of being objective

Previous experience

Purpose for assessment

Criteria for assessment

**Online Learning Community as Community Conditions**

Group composition

- Diversity of group members
- Group size

Involvement in group work

- Involvement of group members
- My involvement

Sense of community

- Conscious of members
- Personal relationship

**Consequences of the Use of Peer and Self Assessment**

Knowing my status

Knowing others' mind

Aware of other members

Reflection

Motivation

Communication

Improvement

Involvement in group work

Sense of community

Confidence of conducting assessment

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