

UNIVERSITÉ DE SHERBROOKE

Faculté d'éducation

**The Role of Teacher Presence during Computer Supported Online
Collaborative Sessions in an Adult Education Course**

par

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SUMMARY

Using Internet Technology in the classroom has become more than just another pedagogical obligation; it has opened doors to a new and exciting style of teaching. Technology now provides the essential tools with which to accomplish the goals of a social constructivist classroom. Recent studies suggest that using such tools, which facilitate new forms of interaction, may enhance student engagement by enabling both in and out-of-class collaboration. Increasing collaboration and student engagement with an assigned task is consistent with social constructivist theories of learning as well as with current trends towards “active learning” pedagogies; both of which show increasing positive changes in learners’ practices and performance. The purpose of this research is to (1) to determine the effect of scaffolding and the timing of scaffolding on the co-construction of an artefact and (2) the impact of the order of teacher presence in an online setting and further (3) to examine the role that social presence may play in helping teams to succeed in achieving their objective.

Until now, Computer Supported Collaborative Learning (CSCL) tools have not always provided a realistic collaborative experience; but the new generation of online tools that have recently become available support rich collaborative affordances. Tools such as *PrimaryPad* combine both synchronous and asynchronous capabilities, and support multiple team member connections providing both an interactive ‘whiteboard’ facility and a chat window. Not only can teams now connect using a browser from any remote location served by the Internet, but teachers may also join in with teams to offer support and advice during their online session. Previous models of team-working only allowed teachers to see the end-product, the completed artefact of the team’s efforts, whereas this new capability offers a unique opportunity to be present during the development stages of assignment completion.

The convenience sample for this study was taken from an A.E.C. (Attestation of Collegial Studies) Communication course of the Continuing Education Technical Support Program. A key component of this course competency is for students to develop the skill to write business letters for various purposes and to apply the three-step writing process during the crafting of the correspondence. This is achieved with a number of writing assignments which are carried out by students working in teams and completing the writing assignments out-of-class. The out-of-class work was convened using the PrimaryPad program to complete two of the writing assignments, which formed the basis of the research. This research uses a *case study* design that employed a *repeated measures* method with two conditions (teacher scaffolding vs. no teacher scaffolding). The possibility of an *order effect* was controlled for by using a *counterbalancing* of treatment design. A post-treatment questionnaire was used to gather descriptive statistics.

The findings suggest that teacher presence with scaffolding can support better writing skills, resulting in a higher quality artefact than no teacher presence and no scaffolding. Particularly, lower-achieving teams benefited more from scaffolding than did higher-achieving teams and conversely suffered a greater loss once scaffolding was faded. Higher-achieving teams did relatively well even after scaffolding was removed. The data from this research signifies that scaffolding early in the process supports better co-construction of an artefact than the converse. Results indicate that teams that attained strong social presence and higher levels of collaborative success achieved higher marks than teams that did not attain a high level of collaborative success and consequently did not develop strong social presence. Perception information gathered by the post-treatment questionnaire show that students enjoyed this way of collaborating and were also satisfied with their team interactions and with the quality of the co-constructed artefact.

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RÉSUMÉ (FRENCH ABSTRACT)

L'utilisation de technologies d'Internet en salle de classe est dorénavant autre chose qu'une obligation pédagogique de plus; ces outils ont ouvert la porte à une nouvelle et stimulante façon d'enseigner. La technologie offre maintenant les outils essentiels à l'atteinte des objectifs d'une salle de classe socioconstructiviste. De récentes études donnent à penser que ces outils, qui facilitent de nouvelles formes de collaboration, peuvent mobiliser les étudiants en suscitant l'interaction à la fois en classe et hors de la classe. La collaboration accrue et l'engagement de l'étudiant à l'égard d'une tâche assignée sont conformes aux théories socioconstructivistes de l'apprentissage ainsi qu'aux tendances actuelles en matière de pédagogies d'apprentissage actif; les deux entraînent un accroissement des changements positifs tant dans les pratiques que dans les résultats des apprenants. La présente recherche 1) évalue l'effet d'un échafaudage pédagogique, ainsi que celui du moment choisi pour l'intervention, sur la construction conjointe d'un artéfact 2) analyse l'impact de l'ordre de la présence de l'enseignante dans un environnement en ligne, et 3) analyse le rôle que peut jouer la présence sociale pour aider les équipes à atteindre leur objectif.

Les outils d'apprentissage collaboratif en ligne (CSCL) disponibles jusqu'à maintenant n'ont pas toujours permis une expérience véritablement participative, par contre la plus récente génération d'outils en ligne propose de généreuses mises à disposition de collaboration. Des outils tels que PrimaryPad offrent des fonctions synchrones et asynchrones, et assurent aux membres d'une équipe des connexions multiples, présentant à la fois une fonction tableau blanc électronique interactif et une fenêtre de clavardage. Non seulement les équipes peuvent-elles se connecter à distance par le biais d'un fureteur, dans tout emplacement doté de service Internet, mais aussi les enseignants peuvent se joindre aux équipes pour leur offrir soutien et conseils en mode interactif pendant le déroulement de leur session de travail. Les modèles antérieurs de travail en équipe ne permettaient aux enseignants que de consulter le produit final, l'objet achevé des efforts de l'équipe, alors que cette nouvelle fonctionnalité présente l'occasion inusitée d'être présente au cours des

étapes du développement de l'exécution de la tâche par les apprenants.

Un échantillon de commodité a été composé par les étudiants d'un cours en Communication à la formation continue à l'Éducation permanente dans le cadre d'un programme dans le cadre d'un programme d'attestation d'études collégiales (A.E.C.) en soutien technique. L'un des éléments clés de ce cours est le développement d'une compétence en matière de rédaction de divers types de correspondance d'affaires, en y appliquant le processus de rédaction en trois étapes. À cette fin, on assigne plusieurs exercices de rédaction qui sont exécutés par les étudiants travaillant en équipes, la tâche devant être achevée en dehors des heures de classe. Le travail hors des cours est réalisé à l'aide du programme PrimaryPad : chaque groupe doit achever deux exercices de rédaction qui ont formé l'objet de la présente recherche. On a appliqué un modèle d'étude de cas faisant appel à une méthode de mesures répétées à deux conditions (avec échafaudage/sans échafaudage). L'application d'une formule d'équilibrage visait à tenir compte des effets éventuellement attribuables à l'ordre de traitement. Un questionnaire ultérieur a servi à recueillir des statistiques descriptives.

Les résultats indiquent que la présence de l'enseignant, doublée d'un échafaudage pédagogique, mène à de meilleures compétences en rédaction, ce qui produit un artéfact de qualité supérieure qu'une situation sans la présence de l'enseignant et sans appui pédagogique. Les équipes moins performantes ont profité davantage de l'échafaudage que les équipes très performantes et, inversement, ont affiché une perte plus importante quand l'échafaudage a été retiré. Les équipes très performantes ont relativement bien réussi même quand on leur a retiré l'échafaudage. Les données de cette recherche démontrent que la présence précoce d'échafaudage contribue à une meilleure construction conjointe d'un artéfact que l'inverse. En outre, les résultats indiquent que les équipes ayant établi une robuste présence sociale et un niveau plus élevé de succès collaboratif ont obtenu de meilleures notes que les équipes qui avaient failli à la tâche d'établir une forte présence sociale. Les données sur les perceptions recueillies par le questionnaire post-traitement indiquent que les étudiants ont trouvé agréable cette façon de collaborer et étaient satisfaits des interactions au sein de leur équipe ainsi que de la qualité de l'artéfact.

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INTRODUCTION

BACKGROUND INFORMATION

The focus of this research is to examine the effect of teacher scaffolding on the performance of students who are working in teams and their ability to collaborate meaningfully with each other using a Web 2.0 blended synchronous/asynchronous Internet tool. According to the Research Council of Canada (2011), learning and collaboration play a privileged and central role in our lives, and new technologies have greatly extended our abilities to manage and support those capacities. Increasing collaboration and student engagement with an assigned task is consistent with social constructivist theories of learning, actualized in active learning approaches to teaching; which show increasing positive changes in learners' practices and performance (Bransford et al., 2006). However, research warns us that students using such tools often engage primarily in social processes (referred to as "social presence"), and articulation of individual perspectives (Murphy, 2004). As a result, they do not easily reach a stage of sharing goals and producing shared artefacts, and thereby, may not benefit from the affordances for learning available with these new collaborative environments. Meanwhile, studies in the area of scaffolding of learning have shown that it is important to support students in their development of the skills required to participate in meaningful and cognitively engaging conversation (Vygotsky, 1962). This research serves to investigate whether using a recently developed internet tool, *PrimaryPad*, intended to facilitate a new form of online shared document collaboration, can by itself promote the development of deeper and more meaningful group learning; or whether teacher scaffolding is a necessary part of moving student interactions toward more successful co-construction of a shared artefact, when using this tool.

The term Web 2.0 is commonly associated with Web applications that facilitate interactive information sharing, interoperability, user-centered design and collaboration on the World Wide Web. According to Wikipedia (2011), Web 2.0 sites give its users the free choice to interact or collaborate with each other in a social media dialogue as creators (consumers) of user-generated content in a virtual community. Web 2.0 technologies can be considered to be an extension of the previous generation of Web technology tools that presented information to the user, but did not allow for much interaction (Hazari, North & Moreland, 2009).

Emerging technologies provide opportunities for instructor–student as well as student–student real-time (synchronous) and/or time-delayed (asynchronous) collaboration. Beldarrain (2006) points to first-generation Web tools, such as Email, chat rooms and discussion boards, as examples of these technologies. He predicts, however, that it is the second-generation of tools, such as the tool under discussion here, that promises to take interactivity to the next level to create engaging learning environments. Many second-generation telelearning/teaching tools have recently been developed that now effectively combine mobile learning, social interaction and collaboration. Even though collaboration technology may be instructionally imperfect, according to Taran (2004) it may be engineered in such a way as to support active student participation, engage deeper levels of learning and positively transform educational practices.

The use of Information Technology (IT) as part of a teaching strategy has become an important aspect in today's classroom. It is not only Generation Y students (often called the Net Generation)—those born between 1982 and 1991—who feel at home with the Internet; young people born after those dates are even more comfortable and expect to use technology in the classroom. These students, who for the first time in history are more technologically advanced than their parents, will embrace the Internet in the classroom since their use of technology is already sophisticated and pervasive. Hazari (2009, citing Driscoll, 2007) states, "Today's tech-savvy student generation is actively participating in social networking and other online communications, so most students not only understand

how to use Web 2.0 teaching tools, they thrive in the environment when Web communication solutions are integrated in the classroom" (p.10). Research conducted by the Insights division of Ypulse in September 2010 and reported by MediaPost (Coates, 2010), shows that 94 per cent of Gen Y students are on Facebook. It is therefore highly likely that all Generation Y students in our classrooms are already online and connected. It is also becoming evident that as technology grows to support out-of-class work, students will make use of the facilities offered by Internet software. They often prefer to continue their collaborative group-work after class from locations such as cafeterias, coffee-shops or from home, since all they require is a browser interface.

The Internet brings a plethora of hitherto unthinkable powerful tools to educators' disposal and the development of such tools creates a push/pull effect on students who are technologically savvy. As these ever more powerful tools become available, educators may feel an incentive to deploy these and incorporate them in their teaching strategies to keep pace with trends and expectations. Many of the new collaborative tools can be used to create innovative and exciting methods of teaching. They have the power to motivate and instruct students in ways that were not possible only a few years ago. MacLean (2010) challenges teachers to create learning tools that provide an insight into how students learn whilst ensuring that these tools provide for the base activities the student is expected to master.

Katz and Rezaei (1999) report that student-student talk often lacks the eliciting and reformulating features of teacher-student talk, although it has its own distinctive features. Therefore the teacher may be crucial, to design a collaborative environment that encourages exploratory peer-discussion leading to the successful co-construction of a joint artefact and learning. Another of the key features in such collaborative environments is the requirement for each student to establish *social presence* within these Computer Supported Collaborative Learning (CSCL) groups. Rourke (2001, citing Garrison, 2000) defines social presence as the ability of participants of an online group to project their personal characteristics into the group, thereby presenting themselves to the other participants as

“real people.” Their work suggests that social presence creates group cohesion, which enriches interaction. When a sense of community is formed through communicating on a social rather than just an informational level, interaction can move to a higher level and become collaborative.

These advancing technologies brought about by the Internet have crept into every facet of our lives, as they are creeping into every facet of our students’ lives. The tool selected for use in this research, *PrimaryPad*, with blended synchronous/asynchronous text processing capability, may provide ways of engaging students and teachers in social constructivist activities both inside and outside of the classroom. Needless to say, instructional tools need to be embedded in good instructional practices.

This study looks at the question: what is the effect of teacher scaffolding on student and team performance when using computer supported interactive tools such as *PrimaryPad*? Broadly speaking, this research will address the question of what roles the two identified factors of teacher support and social presence play in supporting the process of collaborative learning using technology.

CHAPTER ONE

STATEMENT OF PURPOSE

The move to harness the power of IT to promote richer learning experiences, which can be described as a new paradigm of teaching, is gaining momentum - where the teacher/student relationship changes and a peer-mentoring capability of the students, through peer collaboration, emerges. This new kind of teaching hands the baton to students so that they share in the responsibilities of knowledge construction and exploit/incorporate the possibilities/affordances of technology to enhance communication, to promote motivation and to foster cooperation among peers. Students are encouraged to take an active role in their own learning, which includes problem solving, decision making, and other high-level cognitive processes.

Using IT in the classroom has become more than just another pedagogical obligation; it has opened doors to a new and exciting addition to instruction. Its addition encourages a new style of student collaboration that manifests both in- and out-of-class. In the old style of IT, collaboration takes place in class as teams huddle around a keyboard, but when class ends and students disperse, it may be difficult for groups to continue working together collaboratively, particularly when working on text-based documents. If one copy of the document exists and it is worked upon individually and is sent back and forth from student to student using Email to make comments and changes — it is cooperation but not true collaboration. Kieser and Golden (2009, citing Alluri & Balasubramanian, 2006) defines collaboration as "a coordinated, synchronous activity that is the result of a continued attempt to construct and maintain a shared conception of a problem" (p.1). Additionally, it is difficult for a teacher to keep track of such a geographically distributed learning process.

Until now, CSCL tools have not always provided a realistic collaboration experience. Email is an asynchronous communications medium that allows users to send messages and attachments and gives time for responses to be formulated. In computer-mediated communication, the Glossary of Web Terms (2011) defines *asynchronous* as usually meaning that different users accessing the same channel of communication (Email, newsgroups, etc.) can submit data independently of one another, so that other users do not have to wait until a submission is finished before submitting data of their own, and users do not have to be connected to the network simultaneously. It is an excellent tool when time is required to consider the response or time is needed to work on a document. Email does not allow for synchronous communication, but Instant Messaging (IM) does. Anderson-Inman, Knox-Quinn and Tromba (1996) define 'synchronous' as "simultaneous; happening at the same time" (p.1). In synchronous writing environments, multiple students are able to write in the same document simultaneously (*i.e.*, at exactly the same time). In some ways, synchronous writing is like a dynamic, free-flowing conversation. There is immediacy to the communication, even though the dialogue is conducted through computer networks, fibre optic cables, or telephone wires.

Instant messaging provides the medium for students to type text messages to communicate with others and to chat with one person or a group of people across multiple computers. IM is a powerful synchronous tool which provides for dynamic, synchronous communication that facilitates immediate feedback and response.

Using an Email program and an IM program separately may not provide the integrated medium that is needed for students to be able to collaborate effectively and work on a joint project outside of class. However, within the past few years, a new set of Web 2.0 tools using blended modes of asynchronous and synchronous communications have become available. These tools combine these modalities in such a way that both the document being worked on and the IM capabilities are contained on one Web page. They are browser driven and thus allow a number of participants to work on a joint document either synchronously or asynchronously, and offer an IM capability on the same page.

One example of this type of tool is *PrimaryPad* and it is this tool that is being used in this study. Students in many classrooms may find this tool to be useful in facilitating team interaction and collaboration. It has the potential to take out-of-class collaboration to new levels and offers an affordance for the teacher to not only see the end product of that collaboration but be part of the group; be part of the process - offering advice and encouragement if needed. It may offer a new perspective and facility to the teacher and could encourage students towards active learning, bringing them together in an exciting way; offering a high level of engagement and improving interactions among students and the instructor. Many articles reviewed in Chapter 3 show that active learning using socio-constructivist theories offers a dynamic, motivating and more interesting collaborative experience, leading to better retention of material.

Katz and Rezaei (1999, citing Anderson, 1989) state that having shared group goals is not enough; students need to feel a commitment and concern for others in their group. Working together with emphasis on teamwork makes for a positive social experience. Socially meaningful interactions require evidence that the others in the group are attending. This is a critical feature in promoting socially meaningful interactions; responses and rejoinders serve several beneficial purposes in conversation according to Rourke (2001, citing Short, 1976). Responses and rejoinders are expressed in CSCL in a number of ways, including humour, self-disclosure and the use of *emoticons* and *initialisms*. Initialisms, as defined by Wikipedia (2011), express bodily reactions (particularly laughter) as text, including more emphatic expressions of laughter such as ROTFL (Rolling On The Floor Laughing) or LOL (Laughing Out Loud). Affective responses, the expression of emotion, feelings, and mood are a defining characteristic of social presence as described by Rourke (2001, citing Garrison, 2000). Social presence is a required stage in the six stages leading from interaction to collaboration, as illustrated in the collaboration model of Murphy (2004) see *Figure 6 - Continuum of Processes from Interaction to Collaboration*.

The collaborative environment, served by *PrimaryPad* and the structure of the purposive interaction encourages exploratory peer-discussion, which is one of the vital

roles of the teacher, according to Katz and Rezaei (1999). Another vital role is scaffolding is to provide a temporary framework that allows learners to negotiate problems, which otherwise would be beyond their unassisted efforts and can potentially produce long-lasting and significant improvements in students understanding (Wood, Bruner & Ross, 1976), is provided by the teacher/researcher on this research.

This research project examines the effect of teacher scaffolding on teams and the role that social presence may play in helping teams achieve their objective in the co-construction of an artefact.

CHAPTER TWO

CONCEPTUAL FRAMEWORK

The socio-constructivist learning theory provides a conceptual framework for why Web-based synchronous text processing tools can be such an effective model for collaborative learning.

According to social constructivist learning theory, every higher mental function is constructed first as a social form (Vygotsky, 1962). According to the research of Baldwin, Pierre Janet and Jean Piaget, children learn to think logically as they observe social discussion and argumentation between people. In other words, higher mental functions represent only "a cast of collective social relations between people" (p.169). It is only through cooperation that children develop logic. This idea is supported by Piaget, who argues that a child is only able to develop his or her own ideas when confronted by other ideas, which force the child to prove, confirm or verify his or her own thinking.

Vygotsky argues that the same model is reproduced in the classroom, where interactions are imitated, practiced and internalized by the student. Just as children move from one level of understanding to the next based on their social interaction with others, so do students in the classroom move from one level of understanding to the next, as they interact with teachers and peers. This is the idea behind scaffolding theory (Powell & Kalina, 2009), which asserts that learning occurs through cooperation with others. The classroom is a community charged with developing knowledge (Green & Gredler, 2002).

Powell and Kalina (2009) cite Piaget "[...] social interaction does occur and may be part of the learning process; but it is the individual who constructs knowledge based on his or her personal experience" (p.6). They state that social constructivism is also historically parallel to Piaget's theory and evolved to include a more dynamic and social interactive

environment for learning. Developing tools that secure inquiry and social interaction in the classroom, along with cooperative skills and individual discovery learning, help teachers produce an effective constructivist environment. Both students and teachers involved in an interactive facilitating environment can benefit from this dynamic and effective learning atmosphere. Students' concepts can be made public through dialogue. According to Vygotsky (1962) dialogue can be a very significant tool, because it is a mechanism through which individuals can negotiate conceptual change, either collectively or individually.

Students should not only work with teachers one-on-one but also with other students, according to Vygotsky (cited by Powell & Kalina, 2009). Cooperative learning plays a part in creating a social constructivist classroom and it is an integral part of creating a deeper understanding. Students have a lot to offer one another. Though internalization of knowledge occurs for each student according to his or her level of experience, it is made more effective when social interaction is part of the learning process. Piaget (cited by Green & Gredler, 2002), claims that objectivity in thinking can be developed in group situations where one's views are challenged and must be defended, and that schooling should include both independent and collaborative spontaneous student experimentation.

Vygotsky (cited by (Powell & Kalina, 2009) believed that internalization occurs more effectively when there is social interaction. Teachers can create work experiences for students to collaborate with each other to construct cognitive or individual internalization of knowledge.

Wood et al. (1976) explains that skills are developed in a hierarchical sense, lower level skills building to higher levels, if the learner is unassisted. In a social context, modelling and imitation may be a factor in skill acquisition, but when the learner is scaffolded, and the elements of the task that would be beyond the learners competence are "controlled" by a knowledgeable other, the learner may progress even further. Under guidance, the learner may progress to an area in the Zone of Proximal Development (ZPD) (Vygotsky, 1962), that would otherwise be beyond the learner's unassisted efforts.

Scaffolding provides a temporary framework within which a learner may more easily negotiate and construct meaning.

Zumbach and Schoneman (2005) describe two types of scaffolding: design based and management based. Design based scaffolding is concerned with the creation of a structure *in advance* of student interaction whereas management based scaffolding is concerned with assisting students *during* their interactive session.

One example of design based scaffolding would be where students could be 'forced' to collaborate by so distributing course material that each student has only a part of the resources required by the team to accomplish a goal. Hence members are forced to exchange information in order to correctly complete the task.

Management based scaffolding is "run time" scaffolding or collaboration management. It may take the form of dynamic feedback on the interaction between group members and their participation behaviour. Feedback in other dimensions, such as: members' problem solving contributions; members' contribution to the group's work; the group's emotional and motivational state and members' collaborative behaviour are also examples of management based scaffolding. According to Zumbach and Schoneman (2005) these scaffolding actions are designed to get group work going, to reduce cognitive load and mitigate disorientation.

CHAPTER THREE

LITERATURE REVIEW

3.1 INTRODUCTION

A considerable amount of research has been done in the area of socio-constructivism, which is defined by EduTechWiki (2011) as “Incorporating influences traditionally associated with sociology and anthropology, socio-constructivism emphasizes the impact of collaboration and negotiation on thinking and learning. A central notion in socio-constructivism is assisted learning, a concept that is influenced by socio-culturalism and its concept of proximal learning. Some also would include situatedness, *i.e.* interaction with the social and physical context”.

The focus of this research is the implementation of socio-constructivist teaching methods using technology-integrated instruction, with the Internet as a medium and *PrimaryPad* as the tool for collaborative learning and examining the effect of social presence and teacher scaffolding on group collaborative processes. Rourke (2001, citing Tinto, 1987) describes the role social presence in supporting cognitive objectives by its ability to instigate, sustain and support critical thinking in a community of learners.

The articles examined in this literature review are mainly from educational institutions in the United States, though a small sample is from Canadian and European sources. The bulk of this work comes from research focused on the topics of distance education, computer assisted learning, information systems education and education and information technology. It is becoming clear from the focus of this literature that Information Technology (IT) and the Internet are playing a broader part in the overall educational sphere than ever before, and are no longer seen in the narrow context of

distance education only. The bulk of the studies reported apply qualitative methods of research to explore the benefits of using emerging technology tools on student interaction in an online environment. They recognize that Internet and IT tools diversify the modes of access to knowledge and enhance teachers' ability to mentor students. Many articles explore ideas of how to maximize the benefits of these networks, including social networks, both virtual and those organized through teamwork or student activities, in order to create an active learning environment to achieve long term pedagogical gains.

This literature review will first examine articles focusing on the topics of socio-constructivism, collaboration and active learning leading to students' engagement with one another and with the course material.

Secondly, the articles reporting on the deployment of synchronous and asynchronous tools in industry and classrooms will be examined and the role of the teacher in setting up an environment that encourages exploratory peer-discussion. Collaboration using the Internet and the available tools to support synchronous and asynchronous communication are researched, and the important ideas that emerge from this examination are reported.

Finally, articles discussing the factors affecting the relative success of teams which use browser based Internet tools to connect in a distributed network will be examined. The success or lack of success in achieving the team's objective of constructing a shared artefact may very well depend on their early social discourse using text based cues to social interaction, using this new collaborative online environment.

3.2 BENEFITS OF COLLABORATION AND GROUP WORK

Cheng (2009) defines collaborative learning as "a systematic and structured teaching strategy, which can improve the drawback of conventional competitive learning and individual learning methods in which the training of cooperative and social skills is usually neglected" (p.2). Small group learning has many advantages, in its ability to promote:

critical thinking, interpersonal communications, and problem solving; and, unlike lectures, this type of learning can increase student engagement and behavioural interaction. Reinforcing this, Clark et al. (2008, citing Michaelsen, Knight, & Fink, 2004) states “Overall, team-based learning seems to enhance students' attitudes about learning and working in teams, and it raises students' knowledge based performance, at least as favorably as traditional didactics do” (p.2).

Vygotsky (cited in Cooperstein, 2004), states that an important aspect of constructivism is the need for social interaction. Not only is social interaction essential for knowledge construction, but it also allows students to verify their understanding. Cooperstein (2004) adds “group activity increases discussion, experimentation, enthusiasm, and participation, although our lessons may be used by individuals at separate work stations, the class is much livelier and more productive when students work in groups or at least in pairs. Sessions seem less formal and, therefore, students are more relaxed, more likely to venture a guess, to share an opinion, to correct one another, to demonstrate confidence, and to feel less self-conscious about mistakes” (p.7). Referring to purely anecdotal observations, Cooperstein claims that students are more enthusiastic, engaged, more productive and motivated during class and that students leave class with a feeling of accomplishment and confidence. He found that students are more readily able to apply the skills and concepts learned to other activities even after the session has ended.

Cooperstein (2004) warns however, that these group activities need careful planning to correctly lead students to discover concepts and develop skills because concepts are attached to the performance of an activity, they become more meaningful, transferable and are better retained. This is further supported by Cheng (2009) who states that “Many studies have empirically verified that collaborative learning can enhance students' learning effectiveness” (p.1). According to Pilkington and Walker (2003) the opportunity to have critical discussion with other students and the tutor in small group collaborative learning is a key element of effective teaching and learning, and such teaching methods help students to develop their ability to reason in a specialized subject area.

According to Clark et al. (2008), “Team-based learning uses theoretically based and empirically grounded strategies for ensuring the effectiveness of small groups working independently in classes” (p.2). Team-based learning raises students’ knowledge based performance and has been effective in promoting out-of-class study, in-class engagement and has elevated teamwork amongst students.

They list four principles of team-based learning:

1. *Proper group formation.* Groups should be visibly and fairly selected, so that students are aware of this, and should comprise members with varying abilities, equally spread amongst the groups.
2. *Student accountability.* Students should be given the group-work and be given time in-class to study the material. They need to be tested on these both individually and as a group to ensure that all students feel accountable for their work.
3. *Team assignments.* Assignments must require team interaction; work must not be split up between members and done individually. Assignments must be so structured that they lend themselves to be worked on by all members of a group who must come up with a team solution.
4. *Feedback.* Feedback is given frequently and in a timely manner. This feedback is important both for individual learning and for team development; it allows students to apply this new or corrected information to build on more complex situations throughout the course.

Clark (2008, citing Dunaway, 2005), reports a high level of engagement in small group or team activity with pharmacology students. Most of his students agreed that their participation in small groups improved their learning of course content, as well as motivating them to come to class prepared. Clark (2008, citing Vasan & DeFouw, 2005) reports there was a 5% increase in examination scores in years when students collaborated

in teams. Students working in teams also improved cognitive abilities with higher levels of engagement.

3.3 INTERNET USE IN SCHOOLS AND INDUSTRY

Mahdizadeh (2009) states that the Internet has the potential to increase students' participation and interaction, giving them a more active role in their learning. It has the potential to motivate both teachers and students and increase autonomy in the educational process. These are powerful learning technologies with the potential to impact learning outcomes and provide students with relevant skills and increase their marketability in the workplace.

The Information Systems (IS) curriculum is widely acknowledged to have an interdisciplinary background; it is also a key component in other business disciplines. As such, and in response to the current contraction and elimination of separate IS programs, faculty seek to provide the application of information technology concepts in other classes. Such integration actually both strengthens the application of those concepts to problem solving across business disciplines and improves the network connections to other faculty and the business community. Hazari, North and Moreland (2009) point out that since most businesses use groupware software that allows collaboration, students should develop skills associated with teamwork and sharing of ideas when using technology tools.

The business world holds the importance of information systems literacy as a high priority and managers across a range of industries are assessing the value and capabilities of Web 2.0 applications. Williams and Chinn (2009) suggest that students need to realize that their prior experiences with social networking can contribute both in the classroom and in their future professional lives.

3.4 COLLABORATION USING THE INTERNET

The Internet has become more advanced and prevalent in recent years and the implementation of collaborative learning it affords is no longer found only in traditional classrooms (Cheng, 2009). If a number of students use application systems on computers connected to the Internet, then this process can be considered Web-based collaborative learning and many scholars support this as an ideal medium for collaborative interaction. Students who work in online groups have been found to fare better in their work, when compared to peers who work in a traditional face-to-face way. Barcelona and Rockey (2010, citing Laird & Kuh, 2005) found that the use of technology by college students increases student-faculty interaction and collaborative-learning practices. The added control and interaction provided to learners by their use of technology tools may help tap into students' expertise and promote collaboration through peer-to-peer mentoring, teamwork, and other strategies, according to Beldarrain (2006).

Not all authors agree that the Internet is an ideal forum for collaboration. Katz and Rezaei (1999) warn that using the Internet in a social constructive manner requires careful instructional design; otherwise the activity can be very isolating. In fact, most use of the Internet is not collaborative at all, since it provides plenty of opportunities to look at or read material, but usually not as many opportunities to exchange opinions. According to Murphy (2004) facilitating and supporting peer interaction in the context of online learning will not necessarily lead to collaboration. True collaboration in schools requires not only the technology, but also well-designed learning activities based on sound principles of collaborative learning. The active promotion of higher-level processes by the teacher may counteract the tendency for team members to remain at the individual level, rather than progressing to group or collaborative levels. Katz and Rezaei (1999) point out that continuous disputation can lead to a breakdown of communication within the group if discussion fails to be exploratory and it is the teacher's role to design an environment that encourages peer-to-peer discussion by taking specific measure to promote collaboration.

Furthermore, effective interpersonal behaviour within groups may be noted and verbally reinforced by the instructor.

Lipponen (2002) details a wave of empirical research revealing that computer networks break down the physical and temporal barriers of schooling by removing time and space constraints. 'Thinking made visible' by typing one's ideas provides opportunities for students to reflect on each others' responses and share expertise. Lipponen (2002) states that "Shared discourse spaces and distributed interaction can offer multiple perspectives and Zones of Proximal Development (ZPD) for students with varying knowledge and competencies" (p.5).

Computer-mediated communications provides students with a different social context, note Katz and Rezaei (1999), which may influence the quality of their communication. Observations suggest that students develop more mature viewpoints as they negotiate activities online, which may be due in part to the public and virtual nature of the interactions.

3.5 SYNCHRONOUS AND ASYNCHRONOUS INTERNET TOOLS

Asynchronous communication is believed to have advantages over synchronous communication in distance education (Maushak and Ou, 2007). Asynchronous communication provides learners with the convenience of participating in discussions wherever and whenever they desire. Thus, it allows participants more time for thoughtful reflection. It is synchronous communication, however, that enables the immediacy of feedback and responses, and this type of communication could provide online learners with the opportunity to interact when they collaborate in their group projects. Maushak and Ou (2007, citing Pena-Shaff, Martin & Gay, 2001), found, in a comparative study, that critical thinking and in-depth analysis of course content was enabled when student used

asynchronous communication tools and that synchronous communications created a communication dialogue which was useful for brainstorming.

In a case study examining a group of students working online in both a synchronous and asynchronous environments Maushak and Ou (2007) focused on examining the students' collaborative experiences. Primarily they wished to examine how synchronous communication facilitated graduate students' online collaboration and their perceptions of synchronous communication, such as the pattern and focus of the interactions. The case study was centered on a business class of 30 students and one of the core courses of an online master's program in instructional technology with no face-to-face meeting during the semester. One objective of the course was for students to explore a variety of communication tools and identify potential uses of the tools for different educational settings. Groups were required to use Instant Messaging (IM) to share ideas and discuss their group projects. A leader was assigned to each group for each project to facilitate collaboration. Some of the discussions were joined by the instructor who participated on a random basis. IM discussions were saved and submitted as proof of participation.

Data Analysis of the IM transcripts and messages on the discussion board revealed the collaborative interactions in face-to-face situations could be identified in online project-based collaboration among graduate students who used IM for synchronous communication. Students regarded synchronous communication as an efficient and effective way for collaborating on group projects, according to Maushak and Ou (2007). Students found it very helpful in creating a sense of an 'online learning community' among the themselves. Students' reactions to their use of IM messages posted on the threaded discussion board were analyzed and the major themes of what they liked and disliked about their collaboration through synchronous communication were summarized. Overall, it was a positive experience, which had a significant impact on students' online learning and their working.

As the power of the Internet tools such as wikis, blogs and podcasts is being realized by educators, it must be noted that they are not appropriate for every situation, states Beldarrain (2006), and it is the responsibility of the educators and support staff to investigate which of these synchronous and asynchronous tools offer the best solution to support interaction in their learning environment. "Technology tools may also change the roles of learners as well as instructors. The added control and interaction provided to learners using technology tools may help tap into a students' expertise, and promote collaboration through peer-to-peer mentoring, teamwork, and other strategies"(p.10).

Synchronous communication, because it occurs in real time, is more closely akin to a traditional classroom discussion, except learners do not always have the benefit of body language or other social cues. Mabrito (2006) and Taran (2004) point out that when building online collaborative experiences, instructors may need to consider structuring collaborative time in both synchronous and asynchronous environments. It is a blended synchronous and asynchronous tool that is used in this research and is described fully later in this chapter (see 3.7 *THE PRIMARYPAD TOOL*).

3.6 SOCIAL PRESENCE

Lipponen (2002) poses the following question: "The idea of collaboration as mutual engagement appears to imply synchronous activity or even a situation of face-to-face interaction. Hence, one may ask, how is this prerequisite for collaboration, mutual and reciprocal engagement, created through networked learning environments, or is it possible at all?"(p.5). The value of CSCL lies in the promise that positive interdependence is likely to be generated as students gain trust, persuade, explain and negotiate, while building an understanding of their collaborative effort. Rourke et al. (2001) argue that it is the absence of social context cues that is the critical difference between face-to-face communication and CSCL. Research indicates that lack of cues that define the nature of the social situation

sometimes lead to hostile and intense language, uninhibited communication resulting in flaming, and resistance to defer speaking turns to other participants. Stahl (2006) also warns that it may be difficult to achieve a productive, stimulating and sustaining student online interaction; it requires skilful planning, coordination and implementation and technology.

Collaboration begins with interaction, as participants show awareness of each other's presence and begin to relate as a group. Rourke (2001, citing Garrison et al. 2000) defines Social Presence as a key element in the move towards the creation of a 'sense of community' within a group. When a group's communication moves from informational to social levels, the interaction is enriched and may move from lower to higher levels and become collaborative.

The adjectives attributed to both social presence and teacher immediacy, for example closeness, warmth, affiliation, attraction, openness, all point to affective interaction. In computer-mediated communication, unconventional symbolic representations such as emoticons and abbreviations or Internet slang, humour and self-disclosure are used to facilitate expressiveness and to generate affective responses. The more one discloses personal information, the more others will reciprocate, and the more individuals know about each other the more likely they are to establish trust, seek support, and thus find satisfaction. The capacity to express this type of socio-emotional communication is reduced when body language, facial expressions, and vocal intonations are eliminated as is the case in text-based interaction.

Expressions of emotion, feelings and mood are a defining characteristic of social presence as described by Rourke (2001, citing Garrison et al. 2000) who notes that interlocutors enhance their socio-emotional experience, filling in missing nonverbal cues by employing these unconventional symbolic representations such as emoticons to facilitate expressiveness in the medium - the text-based written form. According to

Maushak and Ou (2007), students like emoticons because they help them better express themselves despite the absence of facial expression.

3.7 THE PRIMARYPAD TOOL

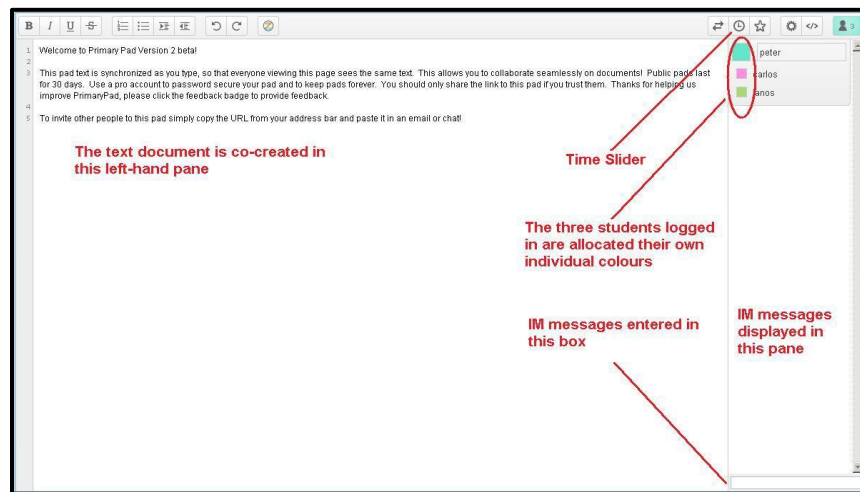
The tool being used in this research, *PrimaryPad* (see *Figure 1- The PrimaryPad Tool Interface - User View*) is a Web 2.0 blended synchronous/asynchronous Internet tool. It is one of the new generations of Internet tools that provide rich functionality to facilitate productive ways to collaborate on text documents. The CSCL environment in general, and in this particular research the *PrimaryPad* tool, offers greater opportunities to share and solicit knowledge. Asynchronous communication should allow students time for reflection in interaction, whereas the synchronous feature, when used effectively, can ensure thoroughness of material coverage and spontaneity of ideas, which feed creativity; it can also change attitudes, motivate mastery, and encourage more effective behavior on the job (Taran, 2004).

Synchronous and asynchronous engagement of collaborators is provided by *PrimaryPad*. Two panes (see *Figure 1 - The PrimaryPad Tool Interface - User View*) are available to the user:

The larger, left-hand pane contains the text document that is being co-created by the team. This shared document is available for *add/delete* or *change* functions, at all times – both during team collaboration sessions and also at times when individuals decide to use the Web interface without other team members being online.

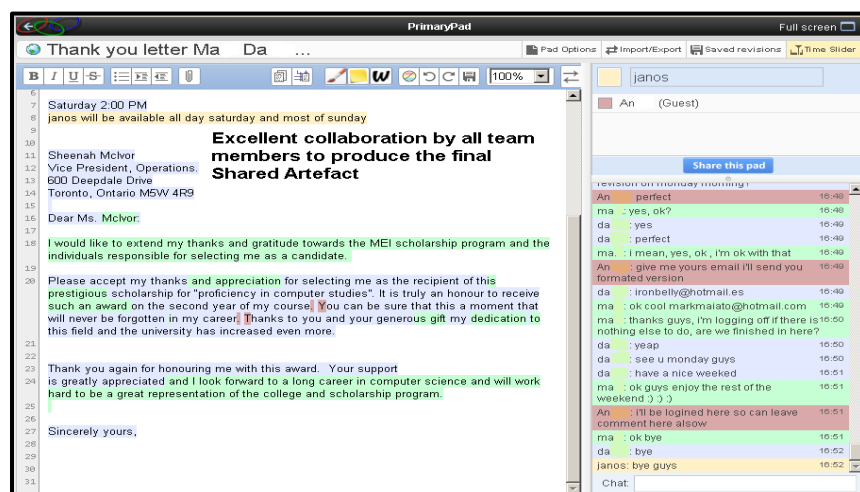
The right-hand pane records synchronous IM chat messages exchanged between team members, which is also accessible at all times.

Figure 1 - The PrimaryPad Tool Interface - User View



Replay of all that has been entered either in the document pane or in the IM messages pane is available through a Time Slider. The Time slider provides for unlimited *undo* of entered text and *redo* of history playback. By activating the Time-Slider the application re-creates the original text entry, character by character, edit by edit and insertion by insertion, bringing the document to its present state. A permanent indelible record of individual effort and team collaboration is thus available, and data cannot really ever be deleted, because the large number of versions being constantly saved as the document is being used.

Figure 2 - Primary Pad in use



An example of PrimaryPad in use is provided in (see *Figure 2* - Primary Pad in use). Different colours denote individual contributions both in the left-hand pane where the document is being co-constructed and in the right-hand pane of IM messages. The person originating the message and the time it was entered can clearly be seen in the colour coding and in the names that precede each entry. For example in *Figure 2*, it can be seen that the person whose name begins with the letters 'ma' (names have been shortened to abbreviations to maintain anonymity) and using the dark green colour, had written the entire first paragraph and part of the final paragraph of the letter. This person had also changed/added words in the second paragraph. The person identified with the letters 'An' made corrections, while "da" had written much of the second paragraph. The researcher's comments may be seen in both the left-hand pane and in the right-hand IM pane of the figure identified by the beige colour.

3.8 SMALL-GROUP LEARNING

The conceptual framework of socio-constructivism is linked to active learning by Petress (2008) who states that students who share findings, exchange views and debate topics among themselves are typically active learners. Such exchanges add measurably to what is learned. These learners take a dynamic and energetic role in their education and through the learners' participation, such learning is self-reinforcing. They are not overly dependent on the teachers and tend to use them more as resource people. Active learning increases confidence stimulates pride and imparts credibility in the eyes of their teacher, their classmates and parents. It tends to make learning more fun and personally satisfying and stimulates a thirst for broader and deeper understanding.

Small-group learning – which is one method of active learning and is supported by socio-constructivist learning theory – is advantageous in its ability to promote problem-solving skills, interpersonal communication and critical thinking (Clark et al. 2008). This is

reinforced by Petress (2008) “ ... for learners, not only is this method more energizing, but it also has been associated with greater assimilation of subject matter”(p.1). It has a positive effect on student achievement in almost any discipline (Katz and Rezaei, 1999) and when students are encouraged to produce new knowledge and to share that knowledge publicly, they will be compelled to produce their best work.

Studies on group learning with computers have reported a greater quantity and quality of daily achievement, more successful problem-solving and higher performance on factual recognition when compared with competitive learning or individualized learning with computers, according to Katz and Rezaei (1999, citing Johnson, Johnson, & Stanne, 1981). Educational technology can enhance good instructional design.

The Web 2.0 blended synchronous/asynchronous Internet tool *PrimaryPad* used in this research may enhance student engagement by enabling both in and out-of-class collaboration. *PrimaryPad* overcomes some of the limitations of collaborative software listed by Taran (2004), and provides:

- the ability for students to engage asynchronously and synchronously
- the ability for the instructor to see who is absent
- facility for future replay

The perceived limitation of CSCL interactions - the instructors’ ability to see who is present and to identify individual students’ contribution is overcome by this generation of tools. *PrimaryPad* allows any number of participants to collaborate and individually colour-codes their contributions and identifies each IM entry with the students’ name and timestamp. Maushak and Ou (2007) point out that effective interaction between groups of students (and instructors) in their collaboration should be one of the considerations for improving the existing online learning environments. The instructor is able to be part of

the creative process of the group when using this tool, and can act in many roles to help, support, comment or advise the group during their collaborative sessions.

It is only recently that the *PrimaryPad* tool, with blended synchronous and asynchronous communication mode capability and the ability to support rich levels of student and teacher/student interaction, has become available. The use of this tool in CSCL environments requires enquiry into the social dynamic of online collaboration and the value of the tool in supporting the productiveness of learner teams. According to Leinonen et al. (2005) referring to Fischer et al. (2002), externalization of knowledge to the other team members with an active visualization technique is an effective support for collaborative knowledge construction, and a shared workspace can function as a collective memory for a work team, helping to record the history of their knowledge construction process for possible later revisions.

Establishing social presence is a step towards and a prerequisite to collaboration according to Murphy (2004) who states that successful group functioning needs to move through the steps: (1) articulating individual perspectives (2) considering the perspectives and finally (3) moving towards creating a shared artefact, cannot happen without social presence being established. It is the 'projection of self' into the group and the group's identification of its members on the level of personality and realness. In text-based CSCL interactions, this has to be achieved without face-to-face social cues. The use of emoticons to replace missing non-verbal cues was found to be one way of enhancing socio-emotional experience according to Rourke (2001, citing Garrison et al. 2000).

3.9 SCAFFOLDING

The approaches to scaffolding may be broken into two major categories, according to Zumbach and Schoneman (2005): Design based and Management based.

Design based scaffolding is already built into the structure of the teams by the assignment of roles to each member and the order or stages in which they are encouraged to complete the writing task. The roles define clear tasks and may charge members with a responsibility and help them work towards their common objective. Wood, Bruner and Ross (1976) suggest that one of the ways that educators can provide scaffolding is to structure the task in stages. The suggested order of task execution for teams completing the writing tasks for this research project, is provided as first: Planning (and only once notes and fragmentary sentences have been jotted down) then the move to the formal Writing phase and finally of the Revision phase.

Management based scaffolding, on the other hand, may comprise feedback or advice (scaffolding) that is provided dynamically during the teams' online collaboration. Feedback in the form of problem-solving or collaboration approaches or participation parameters could prove valuable for some teams. External guidance may help members to focus on the task and to avoid extrinsic cognitive load for teams. Rourke (2001, citing Stark 1996) points out that reinforcement, which falls part of management based scaffolding, fuels the development and maintenance of interpersonal interaction. "Complementing and acknowledging and expressing appreciation are ways of communicating reinforcement in a text-based medium" (p.7).

What then is the value of teacher scaffolding? How important is the establishment of social presence, and does teacher scaffolding disrupt the peer-to-peer process of its establishment? At what point should scaffolding be given: at the outset or at a later stage? Does teacher scaffolding benefit the lower-achieving teams more than the higher-achieving teams? These are the areas that are being studied here, and are more clearly articulated in the research questions posed in the following section.

4.0 RESEARCH QUESTIONS

1. Does teacher scaffolding support better co-construction than no teacher scaffolding?
2. Does scaffolding at the first assignment followed by no scaffolding on the second assignment support better co-construction than the converse?
3. What is the impact of the order of teacher support in these two contexts? In other words, is there an order effect?
4. What is the role of social presence in these two contexts?

CHAPTER FOUR

METHODOLOGY

4.1 INTRODUCTION

Electronic networks increase opportunities for collaboration and extend the relationships created in the academic environment. Promotive interaction is created by positive interdependence (Maushak & Ou, 2007) and by applying key learning and interaction design principles in the selection of tools used during the online sessions; the likelihood of positive interdependence may be increased. Katz and Rezaei (1999) point out that the vital role of the teacher in this context is to design a collaborative environment that encourages exploratory peer-discussion. The value of teacher scaffolding in general; the role of teacher scaffolding given at the outset of group working versus the effect of no scaffolding at the outset followed by scaffolding at a later stage of group working; the importance of this order of support on group performance (the 'order effect') and the role of social presence in these contexts are the focus of this research project.

Computer Supported Collaborative Learning (CSCL) promotive interaction, active learning and socio-constructivism are all themes connected to the research questions:

1. Does teacher scaffolding support better co-construction than no teacher scaffolding?
2. Does no scaffolding at the first assignment (Treatment 2) followed by scaffolding on the second assignment (Treatment 1) support better co-construction than the converse? The converse being scaffolding on the first assignment (Treatment 1) followed by no scaffolding on the second assignment (Treatment 2).
3. What is the impact of the order of teacher support in these two contexts? In other words, is there an order effect?
4. What is the role of social presence in these contexts?

This researcher has been using the online application *PrimaryPad* (and its predecessor Typewith.me), that is the ‘workhorse’ of this research, for the past few years in various courses and various classes. The lessons learned during these classes have helped to mould and inform the methodology that is being developed in this research.

4.2 RESEARCH DESIGN

This research is a case study that employs a *repeated measures* method with two conditions (teacher scaffolding vs. no teacher scaffolding). The possibility of an *order effect* was controlled for by using a *counterbalancing* of treatment sequence (Condition A & Condition B). As with case study designs generally, this study is based on a small sample of 18 students which is made even smaller when the students are divided into 6 teams of 3 students. This results in 3 teams in each of the two conditions - Condition A with teams 1, 2 and 3 and Condition B with teams 4, 5 and 6.

- (1) Condition A teams received the treatment sequence of: No Teacher Scaffolding (**T₂**) followed by Teacher Scaffolding (**T₁**)
- (2) Condition B teams received the treatment sequence of: Teacher Scaffolding (**T₁**) followed by No Teacher Scaffolding (**T₂**) (see *Table 1*).

Balance has been generated with all students/teams receiving the same number of treatments, and all students/teams participating in the same number of assignments (see 4.4.2 Assignment Details).

Table 1 - Treatment Order

	Assignment 1		Assignment 2	
Condition A	T ₂	A	T ₁	A
Condition B	T ₁	A	T ₂	A

T₁ = Teacher Scaffolding (i.e., the teacher supports the students as they work, with helpful suggestions, motivational responses).

T₂ = No Teacher Scaffolding (i.e., the teacher does not contact the group but allows them to work independently).

A = Assessment implemented to measure learning and collaboration.

4.3 PARTICIPANTS

4.3.1 The Sample

The convenience sample for this study was comprised of students from a Network Administration class of the A.E.C. (Attestation d'études collégiales) program of the Continuing Education Department of a post-secondary college in Montreal. The researcher was also the teacher. The age range of students in the program varies between young adults of 18, to close to retirement age of 65 years old. The student profile comprises both men and women and tends to favour a much higher proportion of men to women. This was reflected in the sample with 17 men and only one woman in the case study.

Student selection requirements for this AEC are either a Québec Secondary School Diploma (DES) or equivalent, or a Québec Diploma of Professional Studies (DEP) or equivalent; or a combination of experience and/or training as deemed appropriate for the program. A letter of intent must be submitted, explaining the applicant's reasons for

seeking admission to the program and demonstrating his or her interest in developing a career in the field. Selection also includes an interview to assess the applicant's ability, motivation and communication skills.

As the purpose of the study was to evaluate the effect of teacher scaffolding in an online collaborative environment, it was important that the class used in the research be both computer literate and be situated in a computer laboratory with continual access to a computer workstation that is online and connected to the Internet. This program complies with both these requirements because applicants for the Network Administration program are screened, interviewed and tested to assess their aptitude for a technical career, prior to being accepted on the program. Since this class is composed of students who are studying to become Network Support personnel, it would be expected that they would have a high level of comfort with and knowledge about the Internet even before they join the program. In order to verify students' level of comfort with working online, their keyboard proficiency and their level of comfort with working in teams, four questions were introduced into the end-of-course questionnaire to poll on these issues; answers to these questions are reported in Chapter 5.

4.3.2 Background to the Program

A.E.C. programs are specifically designed for adult students seeking official recognition of their studies and consist of a series of related courses in various fields, giving the student the professional tools required to succeed on the job. They are designed to provide adults with the training they need for today's job market and may comprise as many as 18 individual courses over the program duration of 12 months. In addition, students complete a two month internship or *stage*, as it is called in Quebec, where they apply and consolidate the skills acquired in school. These programs are skill related and are designed to develop a high level of technical competency. The majority of courses are

program specific and often highly technical in nature. Other courses are not specific to any particular program, dealing as they do with the development of attributes which are desirable in all walks of life and all occupations, for example: good communication skills, presentation skills, report writing skills. It is the Communication Skills course that was chosen for this study.

4.3.3 Course Selection

The selection of the course used for this research - Communications Skills - is ideal for students to gain maximum advantage from using the type of computer supported collaborative document offered by the software application *PrimaryPad*, in a team environment. The assignments of this course permit students to collaborate out of the classroom to produce an artefact - a specific purposeful letter. This type of undertaking also suits the requirements of this research project, because the output of the students' IM messages is available for analysis, and the teams' collaborative output may be inspected to assess their level of success.

4.3.4 Ethical Considerations

4.3.4.1 Method of Recruiting Participants

Rigorous measures were taken to ensure that students were fully informed of the purpose and methodology of the project and as a result, would be able to make an informed decision as to whether they wish to participate in the research. They were briefed on the extent of their involvement; how the anonymity of their responses protects their privacy; the measures taken to maintain the confidentiality of their responses and how the data used in the research will be destroyed at the termination of the project. All students

recorded in this study voluntarily agreed to participate and signed the consent form (see Appendix).

4.3.4.2 Methods of Precluding Teacher Bias

The IM messages exchanged between the students and in some instances the teacher/researcher during the completion of the letter-writing assignments and the completed letters of the Assignment 1 and Assignment 2 form the input to the research. The level of interaction is on a one-on-one basis and it might seem that at this level of involvement precluding bias would not be possible. The solution was to provide the students with the control to grant the researcher access to these data only after marks for the whole course are given out. For the entire course, their IM message interaction transcripts with each other and with the researcher/teacher were part of their collaborative input to the assignments, but whether they opted in or opted out of the research was not known until after the course was marked in its entirety. An additional safeguard, the return of the Consent Forms was done through a member of the Continuing Education support staff, with the respondents placing their forms in an envelope and the class representative passing the sealed envelope to a member of the support staff. Thereby consent was a voluntary decision and gave students' the assurance that their participation or non-participation would have no affect on their marks whatsoever.

This proposal and all required information were submitted to the College Ethics Review Board for its scrutiny, suggestions, endorsement and assessment of the morality and fairness of this research project. The Board gave its approval for the research in a letter dated June 2011.

4.3.4.3 Deception

There was no deception involved in carrying out of this study. Students were told that the purpose of this research project is the evaluation of the PrimaryPad Internet tool for this type of writing assignment but the sequencing of the treatments was not disclosed. Their role in this project was given as of evaluators: to analyse the effectiveness of PrimaryPad during the completion of their team assignments. They were informed that they would be asked to complete a comprehensive end-of-session questionnaire once their marks for the course had been given out. During the debriefing session, the design and sequencing of the study was described.

4.3.4.4 Following Master Teacher Program Ethical Guidelines

This design project takes into consideration the ethical guidelines set forth by the Government of Canada and published in the *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans* (TCPS), 2005. With respect for human dignity, it is assured that every effort was made to guarantee that all participants in this study be treated in a morally acceptable way and according to the following principles:

- Principle of Minimum Risk - no participant was harmed or subjected to any unnecessary risk of harm during the course of this study.
- Principle of Free and Informed Consent - this researcher/teacher made every effort to fully inform students and participants about the goals of the project, the potential benefit of the findings to themselves and future students. They were given all information to assess the time commitment that would be expected of them, the potential risks, discomfort or potential stress. They were given the opportunity and encouraged to ask questions that might help them make a considered choice of whether or not to participate in the study.

- Principle of Privacy and Confidentiality - this researcher/teacher guaranteed the anonymity and confidentiality of the participants and assured them that any information obtained through personal interviews, questionnaires or from observation would not be shared with others. The information collected during the online sessions, the IM messages and transcripts will not be shared or disseminated and will be coded in such a manner that it can be referenced without the participant's identity being revealed.
- Principle of Inclusion - is inherent in this research; the project was as inclusive as possible.
- Principle of Avoiding Conflicts of Interest - careful consideration was given to avoiding any existing conflicts of interest that might affect the objectivity of this research project.

4.4 COURSE DETAILS

4.4.1 Communications Skills Course

The Communication Skills course, the outline of which is illustrated in *Figure 3*, is the course from which the convenience sample for this study was taken.

Figure 3 - The Communication Skills Course Framework of this Study

Course Title	Communication Skills
Course Number	420-Z13-AB
Course Ponderation	1-2-3
Total Hours	45
Number of Credits	2.00
Program Competency	Communicate in English in a networking environment
Course Description	In this learning activity the student will learn the fundamental concepts and application of communication in English in the context of business environment. Communication includes speech, e-mail, telephone, fax and letter. Using a PC type computer workstation connected to the Internet, the student will learn to use Microsoft Word, Excel and PowerPoint to create business documents while integrating correct business communication concepts.

This is an intensive *forty-five hour* course, spread over *nine days*, with each day being split into two sections: in-class time and out-of-class time as set out in the Course Ponderation of *Figure 3*. The Ponderation (1.2.3) in the above example specifies that each day consists of: 1 teaching hour, 2 hours for lab work and the last digit represents the hours that should be spent on homework for this course. It is these 3 hours that is being targeted as the time during which out-of-class work may be done, and *PrimaryPad* was used by teams to support their collaborative efforts. The in-class time is devoted to reviewing previous work; working on new concepts; the introduction of and scaffolded practice on new material, and working in teams to begin and finish assignments. Team presentations of completed work are also done in-class. While working on assignments is begun in-class, students are permitted to collaborate in their teams and to complete assignments out of the classroom. It has been the experience of this teacher/researcher that when given the option of either working on an assignment in-class or working on an assignment out of class, students invariably prefer to work out of class. The adult students on this program may find that it is more convenient to balance their household responsibilities and class-work by completing assignments in the evening rather than during the day. A time when all team members are free to connect from home can easily be arranged before leaving the classroom. Completed assignments may be shared with all participants by posting them to a WIKI and reviewing these during in-class sessions.

4.4.2 Assignment Details

The communication skills course used for this research states as a competency that students will learn the fundamental concepts and application of communication in English in the context of a business environment using a workstation connected to the Internet and that the student will learn to use Microsoft Word to create business documents while integrating correct business communication concepts.

A key component of this competency is for students to develop the skill to write business letters for various purposes and to apply the three-step writing process during the crafting of the correspondence. For the purpose of this study it was important that assignments be chosen that require collaboration and group interaction. The two exercises set for students on this course correspond to two of three general categories into which business correspondence generally falls. The first two categories are detailed below and fall part of the research project, but the third category: *Negative Correspondence*, such as turning down an invitation to speak or telling customers that a shipment will be late or rejecting a job application, is covered in class but was not part of this research project.

- **Assignment 1:** *Thank You Correspondence*: Is a specific type of good-news, positive or goodwill message. It has a unique format and construction which is identified by the marking rubric applied to this type of correspondence (see *Appendix E*).
- **Assignment 2:** *Persuasive Correspondence*: Is at the heart of successful marketing and is used to change the audience's beliefs and actions, whether it is to persuade a potential customer to try a product or to persuade your boss to raise your salary. See *Appendix F* for the marking rubric for this type of correspondence.

Each assignment needs to be executed in a particular way, in a particular order: conforming to the order of the three-step writing process. This requires that the *Planning* stage is done first, before the next step: that of *Writing* the business message. Finally, only once the first draft has been written should students move to the final stage: that of *Completing* the business message. Assignments 1 and 2 are the focus of this research study and students are required to use the *PrimaryPad* Internet application, because typically, these assignments will be started in-class and completed out-of-class.

Both assignments are marked according to the rubric Performance Criteria - Business Correspondence - Letter (see *Appendix D*) and a further rubric is applied to each of the assignments: the Thank-You correspondence rubric (see *Appendix E*) for the thank-you letter and the Persuasive Correspondence rubric (see *Appendix F*) for the persuasive letter.

One of the functions of the *PrimaryPad* application is a *Timeline* and it is this function that will allow the researcher to check that teams did indeed follow the 3-step writing process as outlined in the previous paragraph. *Timeline* is a feature that archives the document under construction and provides unlimited *undo* of entered text and a history playback. By activating the *Timeline*, the application re-creates the original text entry, character by character, edit by edit and insertion by insertion, bringing the document to its present state. This facility provides the function of going back in time and actually witnessing exactly how the shared document was created, character by character and step by step. It allows a chronological view of the development of this document from when the first character was entered to the last. It can be easily checked that teams did indeed first *plan*, that only after completing the planning stage did they move into the *writing* stage, and that only after a draft had been created did they move to the *completing* of the shared document.

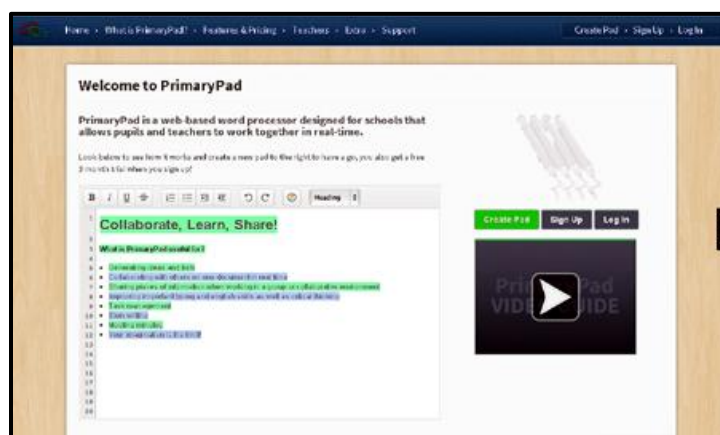
It is the IM chat messages of the students during their online collaborative sessions in the completion of two of the three assignments that will be saved. These messages were, at the completion of the course, analyzed, categorized and reported for the purpose of this research project.

4.5 INSTRUMENTATION AND PROCEDURES

4.5.1 The Treatment Instrument

At the heart of the project is the CSCL Internet application *PrimaryPad*, which is used in this research and is described in Chapter 3 of this document. This application employs both synchronous and asynchronous modes of communication. Students collaborate by entering their contributions to a mutually constructed document, while negotiating in IM chat on the input of others.

Figure 4 - The PrimaryPad Tool Interface - Home Page



4.5.1.1 Setting up the Teams and Conducting Assignments

4.5.1.1.1 Optimum Online Team Size

The dynamics of working in teams in the classroom may differ from the dynamics of online teams. Oakley et al (2004) discusses how to turn groups into effective teams. A team size of around three to four students is recommended and this size creates both advantages and disadvantages.

Part of the advantage is that this number of students is able to use the IM chat window to easily maintain a coherent message flow between the members. A message that is typed into the chat window of *PrimaryPad* will appear to all team members once the Enter key is pressed. During the typing of a message, other team members would usually be formulating/planning/entering either their own messages or replies to a previously posted message. Since participants tend to type short messages and purposefully break up a long sentence into shorter word bytes during their IM interactions, replies often appear out of synchronization with the original posted message. An 'interleaving' tends often to occur, during which a number of message threads are interlinked with each other and their respective replies, and where a new topic is begun before the previous message topic has been fully debated.

This is not a problem with teams of around three or four members, because the number of messages and topics can be visually discerned at a glance and fast enough for the messaging to proceed smoothly despite the interleaving effect. Increasing the size of teams to five or above is likely to increase the difficulty of separating messages/topics and the corresponding replies of team members. This could have the effect of not only slowing messaging down but also adding to the complexity of the IM interaction to a point where confusion may occur. Slow reacting team members or those with slower typing ability may now find that they are left out of the conversation stream because of the number of messages that are being exchanged before they can type a reply; by the time they have formed a reply, the messaging has moved to another thread and posting their reply would be out of phase with the other team members' communication.

A disadvantage of establishing teams of three members may be experienced if one team member does not show during an agreed online workgroup or if one or more team members only appear much later than the agreed meeting time. Teams do agree on a meeting time before leaving the classroom, but unforeseen circumstances occasionally prevent team members from participating punctually. Since teams are mostly working from home, the pressure of family and life commitments may disrupt their efforts. In these instances, teams of three run the risk of not functioning as a team at all. A single team member finding him or herself to be the only one online at the agreed rendezvous time, may be forced to take on the team's task alone; or two members of a team may work together to complete the assignment that was set for three.

4.5.1.1.2 Team selection and member roles

To demonstrate clearly that no bias exists when choosing teams, the researcher has found that it is worth using a program to create random teams. A program is available online at *www.random.org*, and the team members are randomly assigned in full view of the whole class, with the website projected on the whiteboard. Refer to YouTube video

(2011) link in the Bibliographical References section for a demonstration of the use of this online program.

Randomized team selection will inevitably create varying strengths of teams: some that are high achieving and others that are not. The outcome of teacher scaffolding on these varying strengths of teams, whether strong teams benefit more or less than those teams that are not strong, will be reported in Chapter 5 - Presentation and Interpretation of the Results.

All of these assignments required students to assign roles and responsibilities, set protocol for interaction, establish deadline, and proofread results before final submission. Research by Pilkington and Walker (2003) revealed that the use of CSCL tools may be made more effective by encouraging students to take different dialogue roles. A discussion on the roles available and the rotation of these roles among team members for each of the three assignments was held. The hypothesis is that this discussion with the students to reflect on the roles during the synchronous online discussions would encourage their adoption. The roles chosen was taken in part from a study by Hara et al. (1998) and altered to suit the requirements of this researcher. Each of the two assignments had students rotating in their teams to perform different roles.

- *Leader/Listener*: Give cohesion, structure and overall support to the group while ensuring that group member's suggestions or interjections do not go unnoticed.
- *Timekeeper/Encourager*: Entrusted with time management of online interactions and productive use of time in their shared collaborative modes, as well as supportive comments to help the group.
- *Wrapper/Checker*: Required to bring and keep the co-constructed work together into a harmonized whole, ensuring that the assignment requirements are met at all stages of construction.

4.5.1.2 Treatment Strategies

Two types of actions were employed as strategies in the treatment for teams:

T₁ = Scaffolding: Teacher will make contact with the team to offer helpful suggestions and motivational responses. Full scaffolding of the team members, including: greeting upon entry to the collaborative event; positive remarks on their work - if appropriate; guidance on their progress so far; suggestions on how best to proceed; motivational remarks and teacher immediacy responses will be made. Students will not be warned in advance that the teacher/researcher will definitely join them on their online session. They would have been told that this may happen, but that is all.

T₂ = No Scaffolding: No teacher contact with the group. In this scenario the teams will be working out-of-class on their own and the researcher/teacher will not connect with them during the CSCL sessions. Students will have an unfettered occasion to develop social presence together without interference or suggestions from outside. It is pertinent to note that these teams will not be told in advance that the teacher will not join them during their collaborative session. They would only have been told that the teacher may join them, so if no teacher contact is experienced, they will not be disappointed.

4.5.2 Procedure

The Communications Course Agenda encompassing the research implementation procedure is shown below in *Figure 5*. A discussion follows the figure but focusing only on the days which are relevant for this research.

Figure 5 - Communications Course Agenda

Communications Course Agenda		
	Activity	Research relevance
Day 1	Introduction to the course and the research. Consent Forms handed out but students are not asked to sign at this time.	Students understand course content and are clear on research details.
Day 2	Personality Types. Conflict. Discuss letter formats. MS Word exercises in creating documents.	N/A
Day 3	Writing for Business Audiences. Formatting and organizing text. Practice letter completed & analyzed. Exercise using <i>PrimaryPad</i> .	<i>PrimaryPad</i> practice.
Day 4	Body language and non-verbal communication. Graphics and Tables. Discuss Thank-you letters. Practice letter completed in class. Teams are picked randomly and Thank-you letter (Assignment 1) assignment is handed out. Teams meet in class.	Teams randomly picked. Assignment 1 is begun in class and completed out-of-class. Assessment implemented to measure learning & collaboration.
Day 5	Memo Business Correspondence discussed. Power Point introduction. Practice memo completed in class. Teams are picked randomly and Persuasive Memo (Assignment 2) assignment is handed out. Teams meet in class to discuss strategy.	Teams remain as for Day4. Assignment 2 is begun in class and completed out-of-class. Assessment implemented to measure learning & collaboration.
Day 6	Negative Business Correspondence discussed. Power Point designing presentations. Practice Negative letter.	N/A
Day 7	MS Excel creating worksheets and charting data. Negotiation discussed. Listening.	N/A
Day 8	Negotiation exercise. Morality, Ethics and the Law. Technical correspondence.	N/A
Day 9	Course marks are handed out. Students are asked to sign the Consent Form to signify their wish to either participate or not participate in the research.	Students are debriefed on the research. All students signify participation and complete Post-Research Questionnaire.

4.5.2.1 Day 1

Day 1: During the first session of the course, the class was given a PowerPoint presentation, detailing the outline; the purpose; the procedures; the methods of data collection; anonymous examples of IM message data; data analysis and possible results of such a research project. They were told that the purpose of the research is to evaluate the effectiveness of the tool itself - they were not told that their IM message interactions will be scrutinized. Their attention was drawn to the Consent Form (see *Appendix A*) which allows them to opt out of the project, resulting in their data not being used on this research. The Consent Forms were handed out during the first session, and it was made clear that the decision to participate or opt out of the research need not be made until after the assignments are completed and after the marks for the completed course are handed out.

A full and in-depth presentation of the purpose, the methodology and the requirements for Assignments 1 and 2 was made to the class as a whole. According to Chalmers and Nason (2005), group members need to understand the task if they are to work effectively together in a problem-solving capacity, and students need to meta-cognitively consider their group work as a component of group problem-solving around the computer. When students are engaged in a group cooperative activity within a CSCL environment, they need to take responsibility for meta-cognitive functions. How students communicate and behave around the computer also influences group learning: through correct behaviour, ICT becomes a tool that promotes learning at a deeper level.

4.5.2.2 Day 4

Day 4: Teams are picked randomly. In each team, students were given the task of acting in certain roles, which are fully discussed in the section (see 4.5.1.1 *Setting up the Teams and Conducting Assignments*). Chalmers and Nason (2005) state that while whole groups are responsible for achieving group goals, each individual member needs to take on a certain role in order to do his or her share of the work.

Murphy (2004) points out that after analysing an Online Asynchronous Discussion (OAD), she found that participants engaged primarily at the lower levels of the Interaction/Collaboration continuum in processes relating to social presence and articulating individual perspectives. This is supported by Rourke (2001, citing Garrison et al. 2000) who found a significantly higher than expected amount of social interchange occurring during computer mediated conferencing. It is suggested that higher-level processes related to collaboration may need to be more explicitly encouraged to counteract the tendency on the part of participants to remain at the individual rather than the group collaborative levels. It is this encouragement that may be fulfilled by occasional teacher presence during groups' CSCL interactions.

Zumbach and Schoneman (2005) point out that individuals in a group may not automatically cooperate and act as a group. If students have not worked together before or

if the teams have been formed for only a short while or if the goals of the group do not emphasize a collaborative aspect, teams may not act as a group. Teacher scaffolding may be useful in these circumstances to rally the group members, mitigate disorientation and get the group work going. A positive correlation exists between non-verbal teacher immediacy and student behavioural and cognitive learning. Teacher immediacy is conceptualized by Rourke et al. (2001) as those nonverbal behaviours that reduce psychological distance between the student and the teacher. Nonverbal behaviours in the context of CSCL interactions may be viewed as the use of emoticons and other abbreviated messaging with which casual social presence may be developed.

Prior to the 'Thank-you letter' writing task, students already had practice in using *PrimaryPad* in previous exercises on this course and so they may have felt more confident in using this tool for collaboration in completing this letter. They were already told that the purpose of the research being carried out is the evaluation of this tool and that they will be asked to fill out a questionnaire once the course marks are handed out. Teams began their work in class, but out-of-class work using *PrimaryPad* was discussed and times of online engagement were set before students left class. The teacher/researcher participated (scaffolded) with Group B teams during their remote collaborative sessions and provided **T₁** Treatment (see 4.5.1.2 *Treatment Strategies*). Group A was not scaffolded in any way in accordance with **T₂** Treatment plan.

4.5.2.3 Day 5

Day 5: This is a 'Persuasive Memo' writing task. Teams again began their work in class, but out-of-class work using the tool was discussed and times of online engagement was hopefully set before students left the class. The researcher/teacher participated (scaffolded) with Group A teams during their remote collaborative sessions and provided **T₁** treatment (see 4.5.1.2 *Treatment Strategies*). Group B was not scaffolded, in accordance with **T₂** Treatment plan.

4.6 DATA ANALYSIS

Three instruments were used to assist in determining whether teacher scaffolding in CSCL environments is effective in helping teams create a quality artefact. The first is the marks gained by the teams for the created artefact. The second instrument is the analysis of the IM messages recorded by *PrimaryPad*, and the third is the Questionnaire that is filled out by the students on completion of the course. These instruments are summarized in *Table 2* and further detailed in the following sections.

Table 2 - Data Analysis Summary

Data Collected	Method of analysis	Results presented
Written - Assignment 1 and Assignment 2	Assignment criteria coding rubrics (see <i>Appendices D, E, F</i>)	As averages
IM chat	Murray's Online Asynchronous Discussions OAD (see <i>Appendix C</i>)	Line graph
Survey	Collate and report	Descriptive statistics

4.6.1 Assessment Instrument 1 - Written Assignment Assessments 1 and 2

The rubrics shown in *Table 3* were used to grade the Thank-you letter and the Persuasive Memo assignments - the unabridged rubrics are shown in *Appendices E, F and G*.

Table 3 - Business Correspondence, Thank-you Letter & Persuasive Memo marking rubrics (abridged)

Business Correspondence		Thank-you Letter		Persuasive Memo	
Layout and presentation	32	Structure tone and length	12	Begins with the main idea	8
Clarity and conciseness	12		Expands on the initial thank you	12	Explains and justifies the request
Message development	12	Summarizes in the last paragraph in a courteous tone		12	Provides necessary details, explanations
Brevity and construction	12		Requests specific action in a courteous tone	12	
Clarity and language	12				
Sincerity and information	12				
Tone	12				
Total possible marks	104		36		52

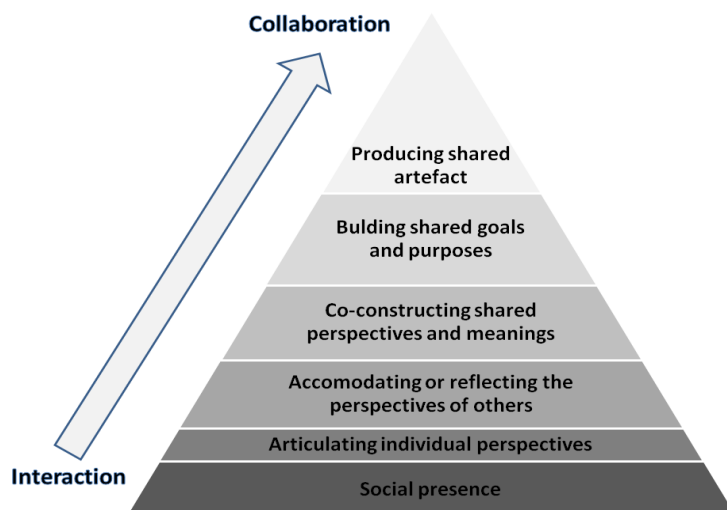
Both the Thank-you letter and the Persuasive Memo were each first marked using a general Business Correspondence rubric. A further rubric applicable to that particular correspondence type was then used and the two marks were converted to a mark out of 100 to form the final mark for that assignment. The mark informed the quality of the artefact and is used to gauge the success of the group collaborative effort.

4.6.2 Assessment Instrument 2 - Analysis of IM Chat Messages.

This study adapted an assessment Rubric developed by Murphy (2004) designed to assist in the identification and measurement of collaboration in an Online Asynchronous Discussions (OAD). The six processes of the model, described in *Figure 6 - Continuum of Processes from Interaction to Collaboration*, serve as main categories for the instrument. The highest level cannot be reached without moving through the lower levels, but progression through lower levels does not guarantee that the highest level will automatically be reached. Simple interaction is a necessary prerequisite to full collaboration, but simple interaction may occur without ever moving forward to higher levels of collaboration.

Process indicators are developed by identifying types of statements falling within certain categories - for example: posing a question, disagreeing with another participant, or sharing information about oneself. One message may contain more than a single process indicator. The categories and process indicators and examples of messages for each process indicator are shown in *Appendix C, Tables 14 to 19*.

Figure 6 - Continuum of Processes from Interaction to Collaboration



4.6.2.1 *Criteria for Classification of Online Discussions*

The instrument developed by Murphy (2004) was to identify and measure the Online Asynchronous Discussions (OADs) of students during online sessions, on a continuum of processes: from social presence at one end to the production of an artefact at the other end. For the purposes of this research it is the Online Synchronous Discussions (OSDs) visible in the IM chat window of the tool, occurring in real-time between one or more students during their collaborative session, that revealed the level of collaboration attained, and it is these OSDs that were saved and analyzed in this research project.

The tool used in this research - *PrimaryPad* - employs both synchronous and asynchronous modes of communication. For the *PrimaryPad* tool, the asynchronous communication refers to times when only one person is online. A student may enter data and even enter chat messages in the IM window, but since no one else is online at that particular time, these entries and messages are deemed to be asynchronous. The moment another person comes online; both discussants will automatically engage each other in synchronous mode, since this is the standard operating mode of this Internet tool. Though OAD messages may form part of the overall conversation, it is primarily the OSD IM chat messages which will form the material which will be analysed by this instrument.

4.6.2.2 *Categorization of IM Chat Messages*

The transcripts of IM messages generated during the collaborative process of completing the assignments were analysed and their process indicators identified. The six steps of the OSD IM chat message process indicators are supplied. (see *Appendix C*)

4.6.2.3 *IM Chat Message Transcripts*

The transcripts of the IM messages generated during online interactions are available after the online sessions have ended and form the first of the two instruments of this

research. The *PrimaryPad* application saves all communication: both the messages exchanged between collaborators and data entered into the text document being co-created. Whether the entry is made during group sessions or by individuals in their own time, the data is available for later retrieval.

The IM messages sent and received by collaborators during online sessions are recorded and saved by the *PrimaryPad* application. The messages entered in the Chat Box and recorded in the larger message box on the bottom right part of the screen (see *Figure 1 PrimaryPad Tool Interface - User View*) were gathered for offline processing. These messages were analysed and placed in categories according to message type (see 4.6.2.2 *Categorization of IM Chat Messages*). The asynchronous documents being co-created were also inspected for messages. Because students cannot see each other, it takes time for them to build trust and speak freely (Taran, 2004). Instructors should encourage students to interact casually and enable them to create discussion threads or areas for 'hanging out' and making personal introductions.

Part of the research objective is to analyze discourse in both synchronous and asynchronous communications for evidence of collaborative content which either provides good evidence or poor evidence of the hypothesis.

4.6.2.4 Analysis of IM chats:

There are 6 components to the operationalization of collaboration:

1. *Social Presence*
2. *Articulating Individual Perspectives*
3. *Accommodating or Reflecting the Perspectives of Others*
4. *Co-constructing Shared Perspectives and Meanings*
5. *Building Shared Goals and Purposes*
6. *Producing Shared Artefacts*

Each of these concepts is composed of a different number of sub-components. For the purposes of this research, it is only required to analyse messages to these six concepts.

The sub-components are shown and illustrated here, only for completeness, and the messages generated by the teams of this research are not categorized and are not reported to the sub-component level.

Social Presence is defined as the ability of participants in a community of inquiry to project their personal characteristics into the community, thereby presenting themselves to the other participants as “real people”. Social presence can create group cohesion, enriching interaction. It is made up of the following six indicators:

1. Sharing personal information
2. Recognising group presence
3. Complimenting/expressing appreciation towards other participants
4. Expressing feelings and emotions
5. Stating goals or purposes related
6. to participation
7. Expressing motivation about project or participation

Articulating Individual Perspectives is defined by participants introducing themselves, and then moving on to articulating their individual perspectives. In this stage they are aware of the presence of other participants but do not explicitly reference their perspectives or solicit feedback from them. It is composed of two indicators:

1. Statement of personal opinion or beliefs making no reference to perspectives of others
2. Summarising or reporting on content without reference to the perspectives of others

Accommodating or Reflecting the Perspectives of Others is defined by participants exposing themselves to each other’s viewpoints and may be seen challenging each others’ reasoning or mutually influencing each others’ reasoning or behaviour. They may begin to

accommodate and reflect the perspectives of others (Henri, 1995). Giving and receiving help and assistance; exchanging resource information, and giving and receiving feedback on teamwork and teamwork behaviours are part of this stage which is a prerequisite towards building knowledge and constructing new meanings (Rourke, 2001; Maushak & Ou, 2007).

It is made up of five indicators:

1. Directly disagreeing with/challenging statements made by another participant
2. Indirectly disagreeing with/challenging statements made by another participant
3. Introducing new perspectives
4. Coordinating perspectives
5. Sharing information and resources

Co-constructing Shared Perspectives and Meanings is defined by group members not only sharing, but also challenging and refining perspectives. Participants articulate and externalise their perspectives, challenge and mutually influence each others' reasoning and behaviour, and areas of disagreement or conflict may become explicit. This process of questioning, evaluating and criticising perspectives, beliefs and assumptions, allows participants to restructure their thinking (Steeple et al. 1994). When individuals' perspectives are challenged, they must work together to produce shared meanings (O'Malley, 1995). It is composed of six indicators:

1. Asking for clarification/elaboration
2. Posing rhetorical questions
3. Soliciting feedback
4. Provoking thought and discussion
5. Responding to questions
6. Sharing advice

Building Shared Goals and Purposes is defined as the stage that the individuals begin to work together and take a common direction towards their shared goal (Murphy, 2004). It is made up of two indicators:

- | |
|---|
| 1. Proposing a shared goal or purpose |
| 2. Working together towards a shared goal |

Producing Shared Artefacts is defined as sharing goals that leads to the production of a shared artefact, ‘an explicit intention to “add value”—to create something new or different through the collaboration’ (Kaye, 1992). The success of the collaborative effort can be measured by the creation of ‘something new’ and collaboration is not complete until this shared artefact is produced. It is made up of one indicator:

- | |
|--|
| 1. Document or other artefact produced by group members working together |
|--|

4.6.3 Assessment Instrument - Survey Questionnaire

A survey (see *Appendix B*) was conducted after the completion of the project, to form the third instrument. The 41 questions are grouped into five broad categories:

1. *Demographic information*: Two questions on demographic information on students’ age group and gender.
2. *Attitudes towards computer based exercises*: Three questions to identify the respondents’ attitude towards computer based exercises and to determine their keyboard skills and their level of Internet expertise and experience. It is thought that some learners may not feel comfortable with communicating in IM chat if they have difficulty in keeping up with the threads of a conversation. They may find it difficult to type fast enough to reply to a topic before it is changed by another question or reply. These learners and others, who may feel insecure about using the

Internet through lack of expertise in this area, may respond with a negative bias to other questions in the survey. It is hoped that by identifying these respondents, the validity of this instrument may be increased.

3. *Team spirit and team members' participation*: Nine questions to gauge the student's level of satisfaction with: their own and fellow team members' participation; the success of their collaborative effort, and instructions received for the assignments.
4. *Perceptions of PrimaryPad*: Five multiple choice and open ended questions on the use of the *PrimaryPad* tool.
5. *Learning effectiveness*: 22 questions on computer self-efficacy, learning climate and learning satisfaction. Questions in this category were taken or adapted from Chou and Liu (2005).

Data from the multiple choice questions on this survey were collected, aggregated and presented as descriptive statistics. Open-ended questions were recorded and categorized. An analysis was made of the questions dealing with factors that may affect student attitude and preparedness in participating in this research. These responses are reported under Presentation and Interpretation of the Results. Only answers to questions which proved relevant to the study are reported here.

CHAPTER FIVE

PRESENTATION AND INTERPRETATION OF THE RESULTS

5.1 THE SAMPLE

5.1.1 Description of the Participants

The Post Research Questionnaire (see *Appendix B*) contained 4 questions on factors that may affect students' attitudes towards completing the online assignments for this course:

- two questions on their level of comfort with *working online*
- one on their *keyboard skills*
- one on their level of comfort with *working in teams*

Results for each of these factors are described in *Tables 6 to 8* below.

5.1.2 Comfort and Expertise with the Online Environment

Table 4 shows that 78% of students had more than 10 years of Internet experience. This means that the sample population is relatively homogenous; therefore the results may be understood within the framework that experience is not an issue.

Table 4 - Internet Experience

Which of the following categories best describes your level of Internet experience?					
	> 10 years	5 -10 years	1 -5 years	< 1 year	Total
Raw score	14	4	0	0	18
Percentage	78%	22%			

The answers of respondents to the question of level of Internet expertise (see *Table 5*) show 16 students to be either experts or advanced Internet users and two who consider themselves to possess only average Internet expertise. With 89% of students self-identified as expert and advanced users of the Internet (i.e., 'Internet savvy') it is reasonable to suggest that the case study participants would be capable of completing the assignments for this study.

Table 5 - Internet Expertise

Which of the following 5 categories best describes your level of Internet expertise?						
	Expert User	Advanced User	Regular User	Little Expertise	A beginner	Total
Raw score	7	9	2	0	0	18
Percentage	39%	50%	11%			

5.1.3 Keyboard Ability and Familiarity

Regarding their typing ability (see *Table 6*), we see that only one respondent indicated that he/she considered him or herself to have slow typing ability, with 94% indicating that they were adequate or better.

Table 6 - Typing Ability

Which of the following categories best describes your speed and ease of typing?						
	Very Fast	Quite Fast	Adequate	Slow	Very Slow	Total
Raw score	5	6	6	1	0	18
Percentage	28%	33%	33%	6%		

5.1.4 Comfort with Working in Teams

The majority (55%) of respondents reported that they enjoy working in teams, with

39% indicating that they felt neutral in this regard (see *Table 7*). Only one student reported that they did not enjoy this way of working.

Table 7 - Working in Teams

Which of the statements do you most agree with, working in teams?						
	Very much enjoy	I enjoy	I am neutral	I do not enjoy	Really don't enjoy	Total
Raw score	2	8	7	1	0	18
Percentage	11%	44%	39%	6%		

5.1.5 Mixed Ages and Varied Life-Experiences

By nature, any class being set in the Continuing Education Department will consist of students of varying ages (see *Table 8*) and experience. Some students will be mature and would have had experience of business correspondence, whereas other students may have graduated from school only recently and have not been exposed to the business environment. We accept the multicultural nature of our classrooms in Canada, since many immigrants choose to settle here and with this, we accept the varying levels of English language knowledge that they bring with them. Having students with varying ages, varying degrees of experience in writing business correspondence and varying levels of English creates an interesting and sometimes difficult team dynamic, when the team's goal is to write a business letter in English.

Table 8 - Age of the Students of the Research Class - by Groups

Age of students in the research class					
	18 - 24	25 - 34	35 - 44	45 - 54	Total
Raw score	3	9	3	3	18
Percentage	17%	50%	17%	17%	

If one or two team members have superior skills or knowledge, there is a tendency on their part to write whole paragraphs or even the complete letter. Team members may find it difficult to negotiate with each other as to which part of each person's contribution should form the final submission. Members with weaker English or weaker letter writing skills may not feel to be in a position to make constructive comments or positive contributions and these members will need sometimes to be drawn out and encouraged to participate to obtain fuller benefit of the exercise. Teacher participation or scaffolding of the team during their online sessions may be of help in encouraging reticent students to participate more fully. The ideal scenario is one where team members' English knowledge and letter-writing skills are pretty evenly matched and members are then more able co-create the artefact.

5.1.6 Student Satisfaction

This study would not be complete unless it also considered the feelings of the participants and their level of satisfaction with this method of working. The Post-Research Questionnaire (see Appendix B) was used to poll students, to elicit their opinion on many and varied issues. The overwhelming majority of participants reported positive attitudes towards the use of synchronous/asynchronous software for their team remote interactions. Their responses to a few of the questions of the questionnaire are reported in the table below:

Table 9 - A Snapshot of the Post-Research Questionnaire

Student responses	1=Negative 3=Median 5=Positive				
	1	2	3	4	5
How satisfied are you with the collaboration between the group members?			4	8	6
How satisfied are you with the final document created by your team?				8	10
I was satisfied with the overall learning effectiveness			1	5	12
I think this learning environment was more interesting			2	4	11
The learning climate was enjoyable			1	3	13

Students participating in this research reported that the biggest difficulty they experienced was the coordination of members to meet online at a specific time. Despite setting a time in class, frequently team members would not be punctual or they failed to rendezvous at all. Legitimate reasons are often the cause of such behaviour, but such disruption of the team effort can be very difficult to remedy. Setting up a marking scheme that provides for a Team Member Evaluation process referred to in the section: *4.5.1.1.1 Optimum Online Team Size*, would further motivate participants to keep their commitments to the team.

Of the positive comments, the most frequent comments to be made were participants expressing their joy at being able to work remotely and yet still function as a team. The comments in *Figure 7* are typical of the many comments that were made by students on the Post-Research Questionnaire.

Figure 7 - Typical Comments made by Students on the Post-Research Questionnaire

Really easy how we can all work together, not any one in the same place
Being able to connect with a team to brainstorm, create, edit and finalize group assignments
Sharing ideas, cooperation

5.2 ANALYSIS OF THE DATA

The analyses of the process data have been organized according to the four research questions specified for this study.

5.2.1 Research Question 1

Does teacher Scaffolding support better co-construction than No teacher Scaffolding?

Using the marking rubrics discussed in section 4.4.2 Assignment Details (see *Appendix D, E and F*), there was an increase in the students' performance as measured by grades on

the assessments when they were scaffolded, and a decrease in students' performance when they were not (see *Figures 8 and 9*).

Figure 8 - No Scaffolding followed by Scaffolding - Condition A

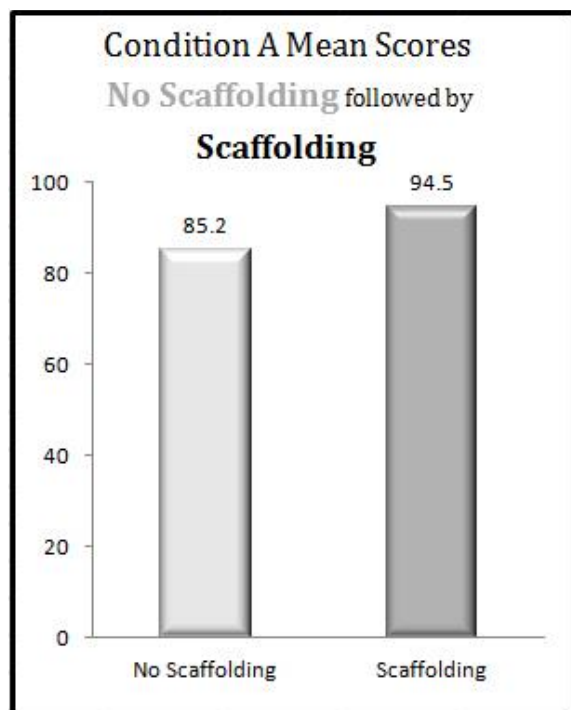


Figure 8 shows the results for Condition A: No-Teacher Scaffolding followed by Teacher Scaffolding. These results show that the Mean scores of Teams 1, 2 and 3 increased from 85.2 to 94.5 (9.3 gain), in moving from T₂ (No Scaffolding) to T₁ (Scaffolding).

Figure 9 - Scaffolding followed by No Scaffolding – Condition B

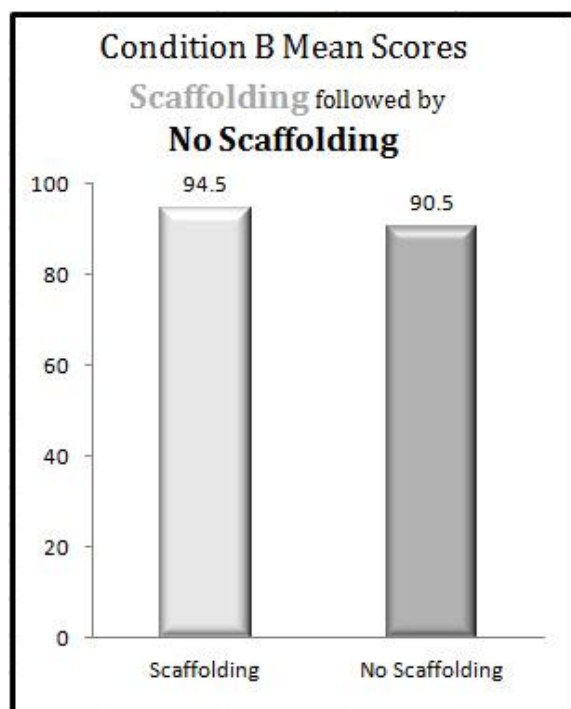
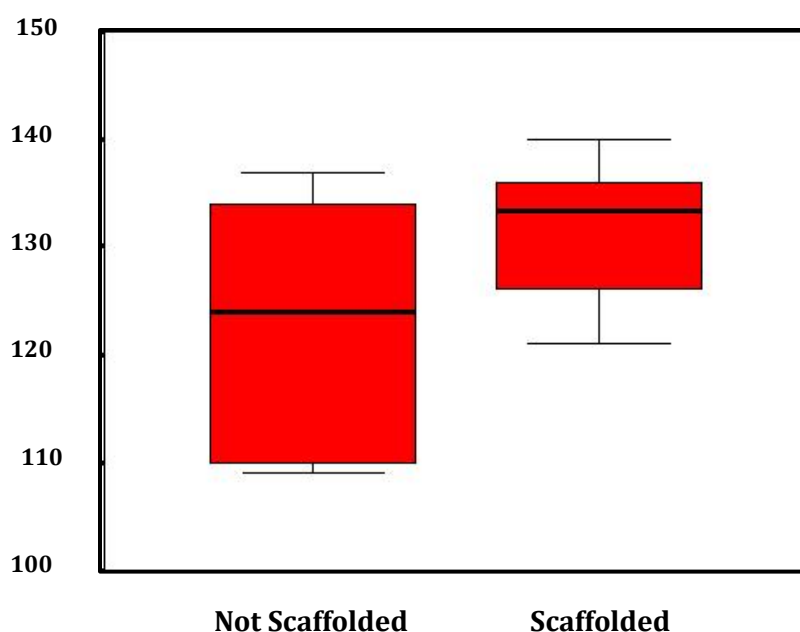


Figure 9 shows the results for Condition B: Teacher Scaffolding followed by No Teacher Scaffolding. These results show that the Mean scores of Teams 4, 5 and 6 decreased from 94.5 to 90.5 (4 loss) in moving from T₁ (Scaffolding) to T₂ (No Scaffolding).

Tests looking at mean differences showed no statistical significance. But in practical terms there is a noticeable difference: scores are noticeably higher when teams are scaffolded.

Side by side Box Plots (see *Figure 10*), using raw scores of all teams, illustrate that the distribution of grades for these two conditions is different. The box plot on the left is for the grades on the assessment when students were *Not Scaffolded*. The plot on the right is for the assessments where students were *Scaffolded*.

Figure 10 - Box plots showing Not Scaffolded and Scaffolded grades



The graph shows us that the distribution of grades for teams that were *Not Scaffolded* is more spread out than grades for teams that were *Scaffolded*. The grades for the scaffolded teams are on the whole higher; the median is also higher, indicating that scaffolding supports all levels of students.

The results suggest that Scaffolding can support better writing skills resulting in higher quality of correspondence (Artefact) than No Scaffolding.

5.2.2 Research Question 2

Does No Scaffolding at the first assignment (Treatment 2) followed by Scaffolding on the second assignment (Treatment 1) support better co-construction than the converse?

Figure 11 and Figure 12 compare Condition A - No Teacher Scaffolding (T₂) followed by Teacher Scaffolding (T₁) for Teams 1, 2 and 3 with Condition B - Teacher Scaffolding (T₁) followed by No Scaffolding (T₂) for Teams 4, 5 and 6.

Figure 11 - No Scaffolding followed by Scaffolding - Condition A

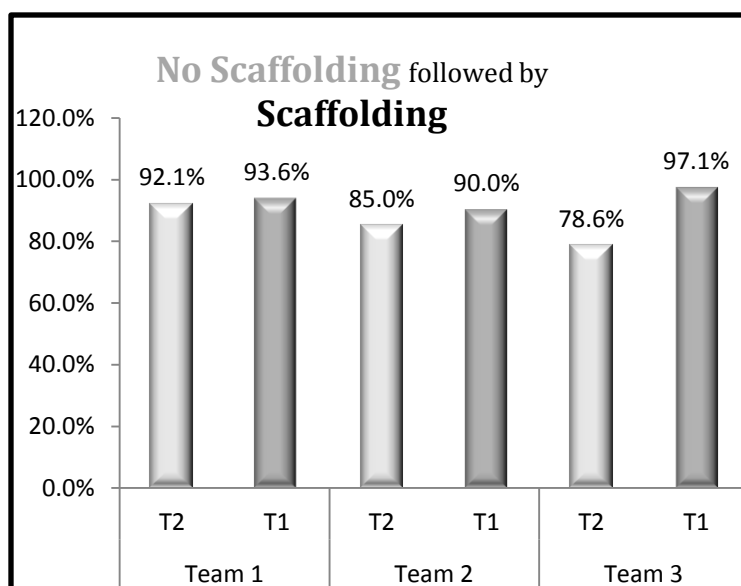
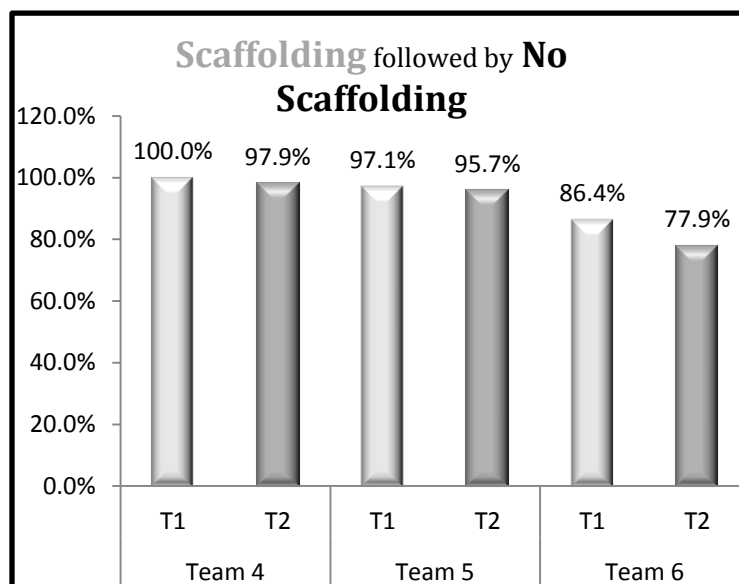


Figure 11 results show that the average mark of the teams 1, 2 and 3 under Condition A, increased by 8.4% in moving from T₂ (No Scaffolding) to T₁ (Scaffolding). Team 3 (which is not a high achieving team with a mark of 78.6 when not scaffolded for Assignment 1, and can therefore be classified in the 'low level' category), greatly improves on their mark when scaffolded. Their mark jumps to 97.1, well above the class average of 90.1 and better than all other scaffolded groups, except for Team 4.

Figure 12 results indicate that in Condition B, T₁ (Scaffolding) followed by T₂ (No Scaffolding), the average mark of the teams 4, 5 and 6 decrease from 94.5 to 90.5, a marginal change of 4% in moving from Scaffolding to No Scaffolding.

Figure 12 - Scaffolding followed by No Scaffolding - Condition B



However, the grades of teams under Condition A (who were not scaffolded for the first assignment) on the whole increased by larger amounts. Increases for Teams of Condition A were of 1.5, 5.0 and 18.5 points. The increases for teams of Condition B (where they were first scaffolded) were of, 2.1, 1.4 and 8.5 points).

On the basis of this, one might be tempted to conclude that scaffolding early in the continuum supports better co-construction of an artefact than the converse, but it should be noted that given the very small sample size, the conclusion should be regarded with caution.

5.2.3 Research Question 3

What is the impact of the order of teacher support in these two contexts? In other words, is there an Order Effect?

Looking more closely at individual team performance, it appears that 'high performing' teams, (characterised by teams with marks higher than the class average of 90.1), did not suffer significantly from having scaffolding removed. Take Team 4 and Team 5: both of these teams obtained much higher than average marks when scaffolded (100 and 97.1 respectively) and dropped only by 2.1 and 1.4 when scaffolding was removed (see *Figure 12*). The value of scaffolding for these groups was marginal.

Team 6, (see *Figure 12*) however, may be categorized as 'low performing', because their mark even when scaffolded falls below the class average. Their scaffolded mark of 86.4 dropped to 77.9 when scaffolding was removed - a drop of 8.5% in performance.

Order effect in this research indicates that strong groups, who are scaffolded early in the continuum, do well even when the scaffolding is removed, whereas weaker groups appear to suffer a greater loss of function once scaffolding is removed.

5.2.4 Research Question 4

What is the role of Social Presence in these contexts?

Rourke et al. (2001) referring to Mehrabian (1969) defines social presence as "those communication behaviors that enhance closeness to and nonverbal interaction with another" (p.3). Using CSCL, non-verbal interaction leading to the establishment of social presence has to be established in the absence of face-to-face signals and the absence of body language cues that usually accompany human communication. Social presence is a required stage in the six stages leading from interaction to collaboration, as illustrated in the collaboration model of Murphy (2004) and it is therefore important that this research examines this aspect of the team's communication.

The instrument developed by Murphy (2004) was used to analyse the IM interactions between teams, to assist in the identification and measurement of collaboration in each of the twelve online synchronous documents, corresponding to the twelve assignments completed by the teams. The six processes of the model served as categories for the instrument which is described in *Figure 6* and fully detailed in *Appendix C*.

5.2.4.1 Analysis of IM Team Interactions

Figure 13 - Snapshot of team interaction

15:02 ph: I am struggling with this one	15:07 ph: This is what I have
15:02 Bog: hy guys	15:09 Bor: Ph ... as our most english man in the team you may be have to decide what is better :)
15:03 Bor: hello	15:10 ph: heheh
15:03 ph: not as easy as the first one	15:12 Bor: Ok where are these charts ?
15:03 Bor: I have something but not all	15:14 ph: on the 2nd page
15:04 Bog: yes it not so easy	15:14 ph: but we are far from that still
15:04 Bor: yes	15:22 Bog: I think it is pretty well structured
15:04 Bor: But I don't think that we have to make a chart for that	15:24 Bor: Ph
15:04 Bor: he didn't say anything about that	15:24 Bor: As you are aware, last year's sales targets were not met and as a result of our efforts to improve the morale, sales projections for this year look excellent.
15:05 ph: it says in the instructions	15:25 Bor: doesn't make sence to me
15:05 ph: Two Excel pie charts are also supplied - chose the appropriate one.	15:25 ph: it does not ?
15:06 Bor: aha	15:26 ph: I think it makes sense
15:06 Bor: ok	15:27 ph: Let me try this let me know how it looks
15:06 Bog: yeah maybe insteted at the end	15:27 Bor: ok
15:06 Bog: the chart	15:30 ph: what do u think Bog?
15:06 Bog: inserted	
15:06 ph: yes	
15:06 Bor: ok this is what I have done till now	

Figure 13 illustrates the natural flow of conversation between team members and is shown here as an example of actual team working. A rich mixture of message types can be identified in this snapshot.

The analysis of teams' IM interactions, coded by identifying types of statements falling within the categories of *Tables 14 to 19 in Appendix C*, for example: posing a question, disagreeing with another participant, or sharing information about oneself, allows teams to be placed on a *Scale of Collaborative Success*. At the top end of this scale, the most successful teams with high *Collaborative Success* move with higher IM frequencies from the lowest levels of interaction - Social Presence, right up to the highest level of interaction, and their collaborative process culminates in the production of a high quality Shared Artefact. At the lowest end of this scale, teams do not collaborate successfully and display only low IM message frequencies in all categories deemed to have achieved low *Collaborative Success*, tended to produce a lower quality Shared Artefact. Examples of IM messages that were

exchanged between students on this research project are illustrated in *Figure 14*. These messages offer examples in all categories from establishing Social Presence to Producing a Shared Artefact and were gleaned from the interactions of the 6 teams participating in this study and have been placed in categories according to the instrument defined by Murphy (2004). The entire volume of IM messages exchanged between team members during this research project have been broken down into their discreet categories, and collated in *Table 10*.

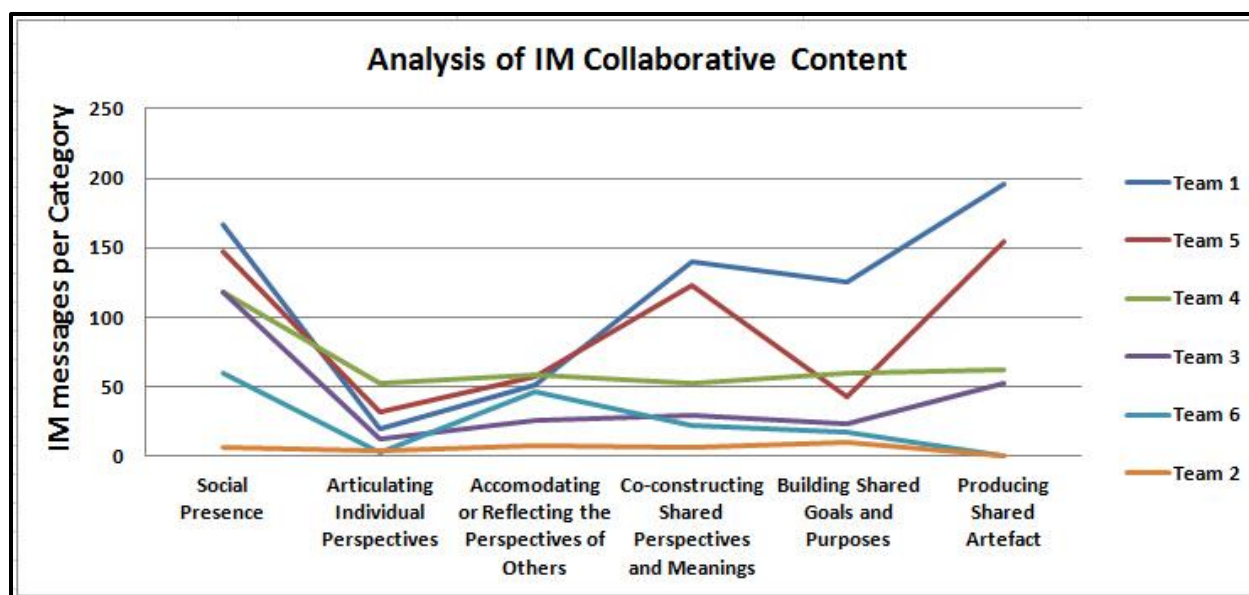
Figure 14 - Examples of IM Messages exchanged between Team Members on this Research

Social Presence	Examples of Indicators
Recognising group presence	hi guys :)
Complimenting/expressing appreciation towards other participants	where is jane when we need her?
Expressing feelings and emotions	shame on you gerald!
Articulating Individual Objectives	
Statement of personal opinion or beliefs making no reference to perspectives of others	the bad thing is that none of us is an english man ☹
Summarising or reporting on content without reference to the perspectives of others	not as easy as the first one ☹
Accommodating or Reflecting the Perspectives of Others	
Indirectly disagreeing with/challenging statements made by another participant	ok ... but I don't know what will be better
Introducing new perspectives	the problem that i see is that on the beginning we have to be clear
Co-constructing Shared Perspectives and Meanings	
Asking for clarification/elaboration	what about my sentence
Responding to questions	your totally right joe
Building Shared Goals and Purposes	
Proposing a shared goal or purpose	lets wait for joe and if he agrees we can upload it
Working together towards a shared goal	just copy it and paste it in that word file and send it to us one more time
Producing Shared Artefacts	
Document or other artefact produced by group members working together	aaa wait ... this big Claire is supposed to be a signature ?
	aaa ok ... my bad :)

5.2.4.2 Analysis of IM Collaborative Content

Messages sent between team members of all teams were coded and the results are plotted on a graph in *Figure 15 - IM Messaging - Quality of Collaborative Success* with IM message frequency on the Y axis and message categories on the X axis.

Figure 15 - IM Messaging - Quality of Collaborative Success



The analysis of team IM interactions as illustrated in *Figure 15 and Table 10* shows that teams on the lower end of the *Collaborative Success* scale sent fewer IM messages between team members in all categories and did not appear to achieve a high level of team cohesion and interaction. Teams on the higher end of the *Collaborative Success* scale messaged more frequently and their messages progressed on the scale of interaction from chatting and questioning, to supporting and negotiating with one another, and on to producing the Shared Artefact.

Table 10 - IM Messaging - Table of Quality of Collaborative Success

	Social Presence	Articulating Individual Perspectives	Accommodating or Reflecting the Perspectives of Others	Co-constructing Shared Perspectives and Meanings	Building Shared Goals & Purposes	Producing Shared Artefact
Team 1	167	20	51	140	125	196
Team 5	147	32	57	123	43	155
Team 4	118	53	59	52	60	62
Team 3	118	12	26	30	24	53
Team 6	60	3	47	22	17	0
Team 2	7	4	8	6	10	0

Teams 1, 5 and 4 are deemed to have achieved a higher *Quality of Collaborative Success* by the frequency of their IM message interactions for the various process levels during their online sessions. These teams maintained this higher level of collaboration demonstrated by their volume of messaging as they progressed from lower to higher process levels.

Adding together the messages sent by Team 1 members in all categories (the first row of *Table 10*) we see that they sent 699 messages. Teams 5 sent 557 and Team 4 sent 404. These 3 teams sent a total of 1660 messages. Compare this to Teams 3, 6 and 9 that only sent 447 messages between the 3 teams. Teams 1, 5 and 4 messaged at a higher frequency in all categories, demonstrating a higher *Quality of Collaborative Success* compared to the other teams.

Though simple ‘volume of messaging’ may not necessarily be an indicator of ‘quality collaboration’, it is prerequisite for successful artefact creation, as can be seen in the result of this research. According to Leinonen et al. (2005), awareness of collaboration will affect the way an individual understands it, and how well developed the shared outcome is. Rourke (2001, citing Garrison, 2000) defines ‘social presence’ as the ability of participants to project their personal characteristics into the group, thereby presenting themselves as “real people”. “... social presence creates group cohesion, which enriches interaction. When

a sense of community is formed through communicating on a social rather than just an information level, interaction can move to a higher level and become collaborative” (p.15).

According to Leinonen et al. (2005), Awareness is ‘continuously’ achieved in collaboration with others. Further, information about each other’s views and thoughts also provides a context for an individual’s own activity and cognitive development. Messaging is the vehicle to enable information about each other’s views and thoughts to be made known. The affective components of group interactions appeal and engage learners, making the interaction intrinsically rewarding. “Social presence supports cognitive objectives through its ability to instigate, sustain, and support critical thinking in a community of learners” Rourke (2001) (p.3).

5.2.4.3 Comparing Quality of Collaborative Success with Quality of Artefact

The quality of an artefact in this research is judged on the mark it is awarded, according to the discussion in section 4.4.2 *Assignment Details* and the rubrics in *Appendices D, E and F*. The marks for both writing assignments are averaged in *Table 11* and the result indicates the Quality of Artefact that each team attained in both Scaffolded and Not Scaffolded assignments.

Table 11 - Assignment Marks - Quality of Artefact

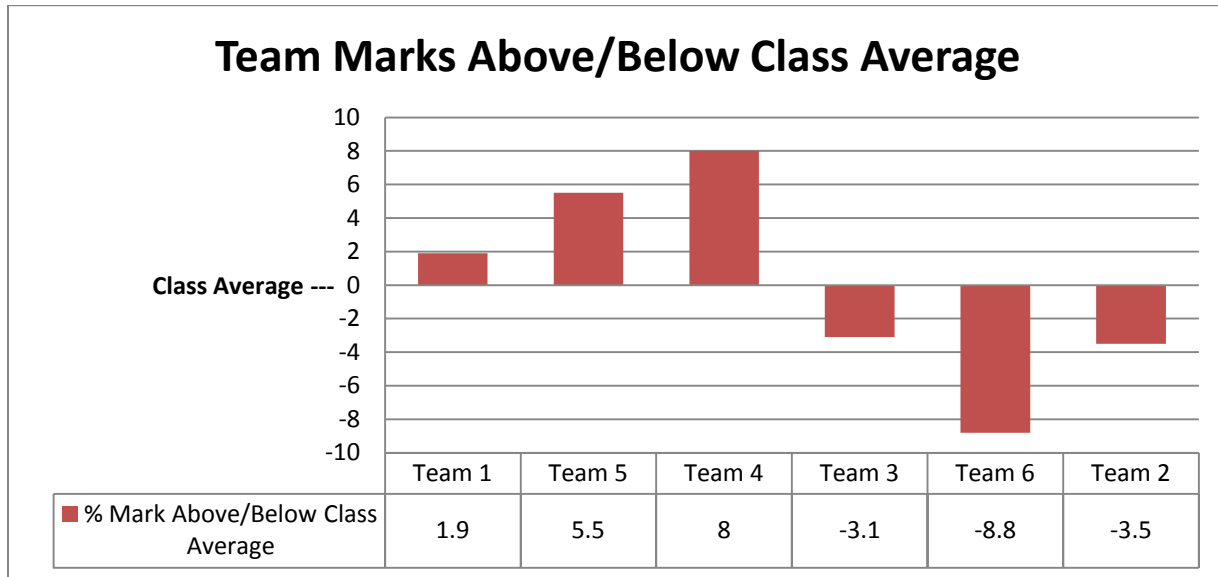
Average of Scaffolded and Not Scaffolded Marks - Highest to Lowest	Mark Scaffolded	Mark Not Scaffolded	Team
98.9	100	97.9	Team 4
96.4	97.1	95.7	Team 5
92.9	93.6	92.1	Team 1
87.9	97.1	78.6	Team 3
87.5	90	85	Team 2
82.1	86.4	77.9	Team 6

The *Quality of Artefact* is defined as a well-written letter gaining a high mark - a mark that is above class average, as illustrated in *Table 11* where Team 4 attained an average of 98.9% for both their assignments whereas Team 6 only attained 82.1% for their assignments. The *Quality of Collaborative Success* is defined in *Figure 15* and *Table 10*. Research Question 4 asks what the role of social presence is in the context of team members collaborating together online. *Table 12* endeavours to shed light on this question by comparing the *Quality of Collaborative Success* of each team, with the *Quality of Artefact* - the average of marks gained by that team from the completion both writing assignments and then positioning this mark against the class average. The result of the comparison is also plotted on a graph of *Figure 16*.

Table 12 - Comparing Quality of Collaborative Success with Quality of Artefact

Quality of Collaborative Success Level 1 - Highest Level 6 - Lowest	Quality of Artefact - Average mark gained for both assignments	% Above/ <i>Below</i> Class Average	Teams
Collaborative Success level 1	92.9	1.9	Team 1
Collaborative Success level 2	96.4	5.5	Team 5
Collaborative Success level 3	98.9	8	Team 4
Collaborative Success level 4	87.9	<i>-3.1</i>	Team 3
Collaborative Success level 5	82.1	<i>-8.8</i>	Team 6
Collaborative Success level 6	87.5	<i>-3.5</i>	Team 2

Figure 16 illustrates in visual form the content of *Table 12*. High collaborative success levels 1, 2 and 3, correlate with high artefact creation success - Teams 1, 5 and 4 all succeeded in attaining higher than average marks. Poor collaborative success levels 4, 5 and 6 correlate with poor artefact creation success - Teams 3, 6 and 2 all being awarded lower than class average marks.



5.2.4.4 Discussion of Quality of Collaborative Success linked to the Quality of Artefact

A discussion of team performance in the **order of high to low quality of collaborative success** - as illustrated in *Table 12* and *Figure 16* follows.

- **Team 1 achieved the third highest mark** both with and without scaffolding - 93.6 and 92.1 respectively, averaging 92.9 for both assignments - reaching 1.9% marks above class average. Their collaborative success is rated at Category 1, the highest level.
- **Team 5 achieved the second highest mark** both with and without scaffolding - 97.1 and 95.7 respectively, averaging 96.4 for both assignments - reaching 5.5% marks above class average. Their collaborative success is rated at Category 2 level.
- **Team 4 achieved the highest mark** both with and without scaffolding - 100 and 97.9 respectively, averaging 98.9 for both assignments - reaching 8.0% marks above class average. Their collaborative success is rated at Category 3 level.

- **Team 3 achieved excellent and well above class average marks** when scaffolded and a poor result when not scaffolded - 97.1 and 78.6 respectively, averaging 87.9 for both assignments. This mark is 3.1% below class average, is brought lower by their poor mark for the thank-you letter. Analysing the reason for the low mark obtained for the thank-you letter, it is evident that this team made errors in Layout and Presentation aspects of the letter, which account for 32% of the total mark (see *Appendix D*). Errors of this nature lose more marks than do other types of errors. This relatively poor showing occurred despite their very well-developed social presence. Their collaborative success is rated at Category 4 level.
- **Team 6 achieved below class average marks both with and without scaffolding** - 86.4 and 77.9 respectively, averaging 82.1 for both assignments - dropping 8.8% marks below class average. Their collaborative success is rated at Category 5 level.
- **Team 2 achieved below class average marks both with and without scaffolding** - 90.0 and 85.0 respectively, averaging 87.5 for both assignments - dropping 3.5% marks below class average. Their collaborative success is rated at the lowest - Category 6 level.

In analysing the results displayed in Table 12 and Figure 12 it can be seen that teams which developed strong social presence/collaborative success (Teams 4, 5 and 1) achieved higher marks than did teams that did not develop strong social presence/collaborative success (Teams 3, 2 and 6).

This finding is consistent with recent studies which reveal that, how participants manage the content of the problem and the social relations between individuals is critical to the outcome of collaboration (Leinonen et al., 2005) and that awareness of collaboration will affect the way an individual understands it, and how well developed the shared outcome is.

5.2.4.5 The Effect of Teacher Presence on IM Messaging

Is group IM messaging inhibited by teacher presence or does teacher presence enhance group interaction as may be gauged by simple message volume? The message volumes recorded both when teams were not scaffolded and when they were scaffolded are displayed in *Table 13*, where the higher level of messaging is highlighted in all message categories for each team within message category and for message totals.

Table 13 - IM Volumes with and without Teacher Presence (Shaded cells indicate the higher value)

	Social Presence		Articulating Individual Perspectives		Accommodating or Reflecting Perspectives of Others		Co-constructing Shared Perspectives and Meanings		Building Shared Goals and Purposes		Producing Shared Artefact		Totals
	Not Scaff.	Scaff.	Not Scaff.	Scaff.	Not Scaff.	Scaff.	Not Scaff.	Scaff.	Not Scaff.	Scaff.	Not Scaff.	Scaff.	
Team 1	69	98	11	9	36	15	30	110	59	66	112	84	699
Team 5	74	73	24	8	44	13	86	37	18	25	87	68	557
Team 4	72	46	50	3	42	17	44	8	50	10	47	15	404
Team 3	53	65	3	9	13	13	20	10	18	6	32	21	263
Team 6	3	57	1	2	8	39	1	21	7	10	0	0	149
Team 2	4	3	3	1	0	8	5	1	3	7	0	0	35
Totals	275	342	92	32	143	105	186	187	155	124	278	188	
Not Scaff.													1129
Scaff.													978

Message totals show that teams which were not scaffolded exchanged 1129 messages whereas teams which were scaffolded (teacher presence) exchanged only 978 messages - 15% less than teams that were not scaffolded. This could be interpreted as indicating that teacher presence does inhibit IM message flow between members of teams. However, teacher presence may mean more focused messaging and the production of messages more directed to task completion.

CHAPTER SIX

DISCUSSION AND CONCLUSION

6.1 SUMMARY OF FINDINGS IN RELATION TO PREVIOUS STUDIES

The present study explored the effect of teacher presence (what is also referred to as “scaffolding”) during computer supported online sessions of students working remotely from one another using Internet software that allows for synchronous and asynchronous collaboration on a shared artefact. Using this software, students work remotely and rely on text messaging to exchange ideas and affective components using initialisms. Teams in this study which managed to create strong social presence through their enriched IM interactions were able to develop stronger group cohesion and performed better, gaining higher marks than other teams which did not manage to develop a strong collaborative environment among themselves. These findings support those of an earlier study by Murphy (2004), that examined the significance of social presence in online environments and indicated that communicating on a social rather than just an informational level is pivotal for interaction to move to higher levels and become collaborative, culminating in the creation of an artefact. Social distance is reduced if symbolic communications of feelings are employed, which in the case of online communication takes the form of emoticons and other symbolic non-conventional representations. Teams in this study communicating in such symbolic fashion, using emoticons and other expressions, disclosing personal information as outlined by Rourke et al. (2001), and employing numerically greater messages to communicate with one another, gained higher marks in their summative assessments.

During teacher presence or scaffolding, similar non-verbal cues to convey immediacy were used. These cues according to Rourke (2001, citing Anderson 1979) may be

characterized as those affective symbolic communications that reduce physical and/or psychological distance between teachers and students. The researcher used such techniques when working with the teams in this study to create a psychological closeness enabling him to better support and encourage participants, and sometimes, to question the team's decisions and to challenge them to reflect on their ideas. Teams which at times were scaffolded by the researcher in this fashion, and in line with constructivist learning theory (Vygotsky, 1962), improved their performance compared to times when teams were not scaffolded. This is consistent with the notion of scaffolding action and fading of scaffolding.

6.2 PERFORMANCE OF TEAMS WORKING ONLINE

6.2.1 Balancing Scaffolding with Social Presence

This research found a strong correlation between scaffolding or teacher online presence and the successful creation of a quality artefact. In all instances, teams when scaffolded created a higher quality artefact than the same teams when not scaffolded. Teacher scaffolding appears to have a positive impact on helping teams achieve their objectives and as pointed out by Zumbach and Schoneman (2005), teacher presence may assist in moving a team of individuals who do not display strong cooperative tendencies to work cohesively, in a shorter timeframe.

This research also found, however, that teacher presence may have inhibited online discussion. *Table 13* clearly shows that teacher presence created a 15% drop in messaging between students. Free flowing messaging is required for the establishment of social presence in an online setting, and it is achieved through enriched interaction where participants project themselves as "real people" into the group by using initialisms, emoticons, self-disclosure and humour, according to Rourke (2001, citing Garrison, 2000).

Social presence is required for groups to move through the six stages from interaction to collaboration and to the creation of an artefact, as illustrated in *Figure 6*.

With teacher presence being both a positive force on the one hand and an inhibiting force on messaging on the other, some questions need to be asked. In what manner does teacher presence inhibit such free-flowing social intercourse between students? Besides dampening the flow of conversation, does it indeed have a negative effect on the establishment of social presence? What teacher actions may counter this phenomenon? Further studies in this area may shed light on this important aspect of online student/teacher relationship.

6.2.2 Team Formation and Team Population

The teams for this project were picked randomly using a computer program. This method of populating teams has its advantage in being fair and disallowing favouritism among members, but it also has the disadvantage of not balancing English knowledge and European/North American business letter experience between teams. Having students from different walks of life and having varied even life-experience also adds a complexity to team formation.

With teams being randomly picked and not carefully balanced on this research, we may ask the question - why did Teams 1, 4 and 5 do so well? Looking at the figures presented in Table 10 and the discussion on the contents of this table, we see that these teams sent 1660 messages in total between their members - nearly 4 times as many messages as teams 3, 6 and 9 sent. Looking back at the raw messages sent and inspecting their content, it seems that the teams that messaged with greater frequency simply got on well with each other. For want of a better term - they seemed to like each others' company; they seemed to enjoy the unfolding process in which they were engaged. Messages indicate that they had fun with the process of communicating/working with each other and would

have developed stronger social presence in the process. This researcher believes that the cohesion developed through a strong social presence continued to generate an attitude of creativity and cooperation throughout the duration of the assignment and this enabled these teams to do better than teams that did not relate so closely with each other.

Teams that exchanged affective messages whether using words or initialisms, members who joked with one another and developed an enjoyment of the process of being together while completing the assignment in the aura of lighthearted work, did better than teams that did not appear reach this level of connection between them. Team formation and team population appears to be an important aspect of the outcome of team performance and consequently, of student learning.

6.3 LIMITATIONS OF THE STUDY

6.3.1 Characteristics of the Sample

The characteristics of the sample are the primary limitations of this study. As is the case so often in case study research, the sample size was small and not randomized. This convenience sample did, however, meet research objectives. Using data from a relatively small sample in the Continuing Education Department with marked diversity in the age of students, extreme variance in their English knowledge and European/North American business letter experience and also students from different walks of life with varied life-experience may not be representative of the larger college community.

6.4 FUTURE RECOMMENDATIONS

6.4.1. Team Size and Peer Ratings

An optimum number in a team appears to be four members, as discussed under 4.5.1.1.1 Optimum Online Team Size. A team of this size should still function well if one team member does not show, yet it is still not too large to manage fluent IM engagement. This research was conducted with a team-size of 3 which did cause some delays in teams having to wait for members who did not come online at the arranged time.

Setting up Peer Ratings according to Oakley et al (2000) is an effective device for improving team performance, helping students develop teamwork skills, and adjusting team grades for individual performance. Students assess each other on “team citizenship”, on factors such as cooperating with each other, helping each other when the situation arises and fulfilling individual responsibilities. Team grades are then weighted by the average team rating a member receives to determine his or her individual rating. This method of students assessing each other on “team citizenship” was not used in this research and consequently teams could not express their dissatisfaction (in a quantifiable way) with any student who did not put in as much effort as other members of the team expected. Using Peer Ratings according to Oakley et al (2000) would be recommended.

6.4.2 Group-work with Teacher presence.

The opportunity offered by *PrimaryPad* for students to interact with each other and to enable the teacher to optionally join the team, almost as part of the team while they work, is unique. Team working using Internet facilities appears to be very different from face to face working and further studies in this area may reveal fascinating insights and possibilities in student/teacher relationships using the Internet.

In the classroom a teacher would not be so easily accepted into the physical setting of a team; to lessen his/her visibility to team members. The teacher's physical presence is likely to change team dynamics and inhibit what might otherwise be a free-flow of conversation and natural student behaviour. This apparent team disruption may of course change with time and frequency of occurrence and teams may come eventually to accept a teacher's presence in their midst.

The online presence of a teacher within a group using *PrimaryPad*, does not appear to create the same impact as physical presence might. During this research, students seemed to accept online teacher presence among their team as being less intrusive, though it was noticed and reduced the message volumes exchanged between team members, but teams seemed to continue with their normal interactions with little hesitation. Using IM messaging appears to 'level the playing field' amongst team members irrespective of their status outside of the online group. This has been the researcher's experience during this research and further studies in this area would be interesting.

6.4.3 Social Presence Using Other Online Facilities

The topic of online presence within a team and the acceptance of a teacher figure in working groups may be further developed in other online systems such as *Second Life*. Using personal avatars and interacting with fellow students and a teacher, in not two but three-dimensional cyberspace, may create a constructive pedagogical setting. Research into team interaction in such an educational setting may be worthy of consideration.

6.4.4 Larger Sample Size

The sample size of this research was sufficient for its purpose, but not large enough to provide statistical weight of evidence. A longitudinal study with a large sample of more homogeneous participants may bring statistical validity to research findings.

6.5 CONCLUDING REMARKS

6.5.1 Technological Reliability and Complexity

The Internet is constantly changing. At the time of starting this research project, the internet tool used was *Typewith.me*, but during the project, it ceased to be supported by the developers. Another tool named *PrimaryPad* took over and was touted to contain further functional improvements not available in the previous software. *PrimaryPad* works very well and will hopefully continue to be supported, but this support can only be maintained if the developers receive sufficient revenue for their efforts. Typically for emerging Internet software, developers make limited functionality available in a free version of the tool and offer further desirable functionality in a Professional version which is available for a fee. Currently the limited functionality of the free version of *PrimaryPad* is sufficient for use on courses that are not over 30 days duration and do not contain sensitive information that requires password protection. It is important to evaluate the offering of both the free and the fee versions, before embarking on using any Internet tool in the classroom.

New technology tends to further complicate an already complex structure of multiple variables - the learning environment. If, however, technology does not start, or fails during a session and the teacher's plan is thwarted, it can be a disaster unless a backup plan is in place. Preparing the scene to create an active learning environment using online facilities demands adequate planning and copious rehearsal. At times when software does not work as expected, or the system is down, or the Internet connection is lost, it can be terribly frustrating for students and harrowing for the teacher. Each of the methods of technology-assisted instruction has its merits and its level of complexity, and it is incumbent on each individual instructor to decide if it falls within his or her comfort zone.

Hutchings et al. (2007) points out that it is not what to teach students, as would be the case in a conventional classroom setting, that needs to be considered in a CSCL environment, but rather, what would students learn and how well does the online

environment facilitate the learning process? The educational challenge is to thoughtfully integrate technology within the teacher's frame of technical reference, to enhance student learning and to enrich the learning experience.

Similarly it is important to recognize that virtual learning settings require participants to have the necessary skills and discipline to take responsibility for their own learning. Online teamwork requires time management and a strong commitment to team effort that often takes place outside the classroom. An added level of maturity is required to make use of the resources and to manage the course requirements in a timely fashion. It was the researcher's experience on this project that some team members did not make sufficient commitment to the agreed rendezvous. The importance of being online at the agreed time needs to be stressed in the classroom before students disperse.

6.5.2 Teacher Time Commitment

Though the value of using such IM synchronous/asynchronous tools is many-fold, it may not be practical to emulate the circumstances of this research in everyday real-world settings. Teams are free to arrange their online session at virtually any hour and depending on the outside commitment of any one of the team members, and this arranged time may be out of the bounds of what might be termed 'reasonable working hours'. It may simply not be practical for a teacher to meet online with a team which has decided to do their work very late at night or at any other impractical time. The team may also not get right down to work and may be establishing social presence for a lengthy time, which could result in an inordinately long online session. This would make an onerous demand on the teacher's own private time and hence would not be practical. However, even if the teacher is not able to join the team online, having a printed record of the teams' interactions is of great value. The IM messages are colour coded to show contributor of the statement and the time it was made. Evaluating each member's contribution and being able to inspect the

teams' interactions and their method of tackling the exercise gives the teacher great insight and could add value, particularly if steps in the development of the work are important towards crafting the finished product.

6.6 CONCLUDING SUMMATION

The results from this study indicate that teams are able to work together without being in close physical proximity, using current online technologies to attain their desired goal. The team goal was set for this research as the creation of an artefact - a business letter. Teams were able to successfully collaborate from geographically distant locations using the PrimaryPad tool, and progress through levels of social interaction to negotiate the writing of a business letter that was, in most cases, a combined team effort. The teams which were most successful in writing a letter that gained a high mark were also seen to have reached a higher level of social interaction, gauged by the number of messages exchanged between them. It was not only the numerically greater volume of messages, but also the level of the interaction attained, that contributed to greater team success. Levels of interaction moved from social chit-chat on the lowest level, through recognising each others' perspectives on a higher level to actually working on crafting the correspondence and negotiating the content of the business letter between the members on the highest level. It was seen that teams which appeared to enjoy the interaction between members and immerse themselves in the assignment, created a superior artefact than teams that did not fully engage in the assignment.

The population of teams is likely to play an important role in creating teams that engage well with each other and hence work better together. This research used random team selection but in retrospect, careful consideration of criteria such as knowledge of the English language; age, gender and attitude as well as general business experience and correspondence skills should be evaluated when selecting team members.

Since the movement towards the use of online facilities in all aspects of our lives is becoming established, this research was successful in demonstrating that currently available online software may be used in an educational setting to power the completion of an assignment by teams whose members are geographically distributed. This research also analysed team interaction on a message by message level, providing insight into instant messaging development using emoticons and other nonverbal cues. These devices facilitate expressiveness in this medium and appear to satisfy socio-emotional requirements to a level that maintains team cohesion and brings satisfaction to team members.

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APPENDIX A

STUDENT INFORMATION SHEET AND CONSENT FORM

Evaluation of *PrimaryPad* Internet tool in supporting online collaboration and active learning in and out of the classroom.

Researcher: Janos Varga - John Abbott College (January 2012)

INFORMATION SHEET

Hi

I am extending an invitation to you to participate in a study to analyse the effectiveness of the *PrimaryPad* tool. *The information has been arranged in a question and answer format to make it easy for you to follow and understand. Should you have any additional questions, do not hesitate to ask.*

WHAT IS THE PURPOSE OF THIS HANDOUT?

The goal of this handout is to provide you with the information about the research study so that you can make an informed decision with regards to your participation in this study.

This handout consists of 2 parts:

1- Information sheets: This sheet - to inform you of the purpose and structure of the study, plus the extent of the involvement.

2- Consent form: to obtain your consent for your participation in the study.

WHY DO I HAVE TO GIVE MY CONSENT?

Your cooperation in any educational research study is voluntary, for which your consent must be provided. You have the right to decline participation, or to discontinue your cooperation in the study at any time, without penalty.

Note that declining participation in the study does not exclude you from doing the course work.

WHAT IS THIS STUDY ABOUT?

This study evaluates the effectiveness of the *PrimaryPad* Internet tool in supporting and enhancing student collaboration. The transcripts of the messages between your team during your *PrimaryPad* collaborative sessions will be analyzed to determine their nature: simply to chat or to discuss, to convince, to create, to assist or to manage the co-creative process.

WHAT'S IN IT FOR ME?

Technology in teaching is becoming very popular. A blended synchronous/asynchronous Internet tool such as *PrimaryPad* may be able to create a collaborative atmosphere and there is no evidence to show if this does or does not promote deeper learning. Your participation could contribute in many ways to the way such tools are used in this and other colleges. The study is being conducted as part of a master's degree program and no funding is available to compensate the participants. **Your contribution will play a valuable role in understanding the value of this tool in computer supported collaborative learning!**

WHAT DO I HAVE TO DO TO PARTICIPATE IN THIS STUDY?

Your feedback will provide valuable data for this study. You will be asked to complete a questionnaire at the end of the course. You are asked to fill out and sign the Consent Form to permit your IM responses to be analysed. Nothing more needs to be done.

WILL MY FEEDBACK BE USED AGAINST ME?

NO. When the researcher is also the teacher of the course the possibility of bias may be a concern. However, **to prevent any prejudice against students of the course and to ensure that the privacy and confidentiality of participants are maintained, the following measures have been taken:**

- Consent forms indicating the choice of whether or not to participate in the study will be kept by your Program Coordinator. The teacher/researcher will not be aware of who is or who is not participating.
- All the data collected for the purposes of this research **WILL NOT BE SORTED OR ANALYZED UNTIL AFTER THE FINAL MARKS OF THE COURSE HAVE BEEN SUBMITTED TO YOU.**
- All data collected will be safeguarded by the researcher and will be kept strictly **PRIVATE and CONFIDENTIAL.** They will be kept to a maximum of 5 years after the study is completed and shredded afterwards.
- **NO NAMES OR OTHER IDENTIFICATION will be used in reporting the results of the study.** Even though data collected by this project may be published, used with other data sets, and/or used in a future study, or series of studies, on the research topic, **the goal of research is to report percentages and other statistical information (which is collective and anonymous... always!)**

AM I ALLOWED TO ASK QUESTIONS ABOUT THE STUDY?

- You are **encouraged** to address questions at any time about the nature and structure of the study to the teacher/researcher, Janos Varga - John Abbott College Continuing Education Department - Tel 514 598 7979 - Email janosvarga@gmail.com
- The researcher reserves the right not to use participant feedback that is not believed to be offered in good faith.

Evaluation of *PrimaryPad* Internet tool in supporting online collaboration and active learning in and out of the classroom.

Researcher:	Janos Varga	Tel: 514 598 7979
Email address:	janosvarga@gmail.com	
Dept /Affiliation:	Continuing Education	
Supervisor:	JocelyneDuchesnau jocelyne.duchesnau@johnabbott.qc.ca	Tel: 514 457 6610 x5277

Research Question?

Does the use of a new generation of online Web2.0 blended synchronous / asynchronous Internet text-processing tools support group interaction and collaboration?

Purpose of the research:

The purpose of the research is to evaluate the effectiveness of the *PrimaryPad* Internet tool in supporting and enhancing student collaboration. The transcripts of the messages of students during their *PrimaryPad* collaborative session will be analyzed to determine their nature: simply to chat or to discuss, to convince, to create, to assist or to manage the co-creative process. The analysis will consider whether the interaction between participants can be classified into five general interaction types: Mutually Constructing Knowledge, Mutually Negotiating, Mutually Supporting, Group Facilitating, and Group Processing. The research objective is to analyze discourse in both synchronous and asynchronous communications for evidence of collaborative content which will either provide good evidence or poor evidence of the hypothesis.

What is involved in participating?

- Nothing more or less than your normal class-work. Whether you choose to participate or not to participate you will be required to do the same assignments as the other members of the class. If you choose to participate your IM chat messages will be used in the analysis of the effectiveness of the *PrimaryPad* Internet tool.
- There will be no way for anyone reading the results of this study to be able to link any data with you, personally.
- PSEUDONYMS WILL ALWAYS BE USED in any publications that may result from this study, as well as in the stored data.
- If you withdraw from participation as a participant at a later date, all data generated by you, of any kind will be erased and/or destroyed.

Participation or none-participation in this research will NOT affect your grades in any way.
Your participation is entirely voluntary and you may choose to withdraw at anytime.

- Confidentiality means that no person at John Abbott College, or any other organization will have access to the materials collected and that they will be coded and stored in such a way as to make it impossible to identify them directly with any individual.
- All names will be changed in the stored data and resulting publications.
- Data will be stored on a password secured hard drive, and will be destroyed after 5 years.
- All other type of information (audio-tapes, cd's, paper copies) will be stored in a locked filing cabinet and will be erased and/or destroyed after 5 years.

STUDENTS: please tick the appropriate box, sign and date.

- I have read and understood the information provided on the consent form, and I agree to participate in this study. I understand that my participation is voluntary, I may withdraw from participation at any time, and my academic standing will NOT be affected in any way by consenting or not consenting to participate in this study.
- I do not consent to participate in the described study.

Student's name (print): _____
First name, Last name

Student's signature: _____ Date: _____
signature dd / mm / yyyy

Researcher's signature: _____ Date: _____
signature dd / mm / yyyy

APPENDIX B

POST-RESEARCH QUESTIONNAIRE

Hi. The course is now over. You've got your marks. Your answers to this questionnaire cannot affect you in any way. However information on how best to use the *PrimaryPad* internet tool could affect and benefit future students. Please make every effort to complete it accurately.

Thank you.

Janos

1. Which category describes **your age**?

- Younger than 18
- 18 - 24
- 25 - 34
- 35 - 44
- 45 - 54
- 55 - 64
- 65 or older
- Prefer not to answer

2. What is your gender?

- Female
- Male

3. Which of the following categories best describes your level of **Internet experience**?

- Less than 1 year
- 1 year to less than 5 years
- 5 years to less than 10 years
- 10 years or more

4. How would you rate your **typing ability**? Which of the following categories best describes your speed and ease of typing?

- Very fast – using 10 fingers and not looking at the keyboard
- Quite fast – using two or more fingers in combination to achieve a rapid rate of keystrokes
- Adequate – using two fingers - but you are able to keep up an IM conversation with ease
- Slow – one finger most of the time and sometimes you have difficulty finding correct keys
- Very slow – you have great difficulty typing

5. Which of the statements do you most **agree** with?

- I very much enjoy working in teams
- I enjoy working in teams
- I am neutral on the aspect of working in teams
- I do not enjoy working in teams.
- I really do not enjoy working in teams

6. Which of the following 5 categories best describes your level of **Internet expertise**?

- Expert user –**
 - You use **advanced features** of Browser based programs.
 - You have probably chosen a **particular Browser** or use **multiple Browsers** according to evaluations of useful features.
 - You do your **banking, shopping, searching online** and you feel very much ‘at home’ to do these on the Internet – in fact you sometimes wonder how you managed these tasks before the Internet came along.
 - You are a daily user of **social networking** sites and probably **share photos** with family and friends.
 - You may **play online games** or participate in **online activities**. You keep up-to-date with new developments and could easily **advise others** on Internet issues.
 - You do or could **download podcasts** if you wished and you subscribe to **RSS**.
 - You may have your **own website** and maintain one or more **web profiles**.
 - You keep all **software up to date**.
- Advanced user –**
 - You **offer advice** to others on Internet issues.
 - You **bank and shop online** with confidence.
 - You use many **Internet facilities** and wonder why others do not do likewise.
 - You use **social networking** sites on a regular basis.
 - You have **chosen a Browser that suits your needs** and not one that came with the OS that you are using.
 - You **aware of the risks** involved while surfing online but have **installed safeguards** that you feel are sufficient to minimize the risks.
 - You regularly **update your software** to minimize security threats.
- Regular user –**
 - You use the **facilities you need** and feel comfortable and confident.
 - You are **not often stumped** as to what to do or how to respond to programs that are Internet based.
 - You have used **online shopping and/or banking** and feel more and more confident in these activities.
 - You hear a lot about the **threats and security problems** associated with Internet connectivity and you have **installed an antivirus program** but hear of other programs that are claimed to be better – you are not sure if this is true.
- Little experience –**
 - You often have **problems that you are not able to overcome** without asking friends or colleagues for advice.
 - You **do not bank or shop online** or have done this minimally.
 - You **worry about whether you have sufficient safeguards** installed on your computer to stop viruses but don’t know enough to install something else.
 - You may **occasionally forward Emails** to family or friends from unknown sources with offers that seem really good.
- A beginner –**
 - You **do not feel confident at all using the Internet** and sometimes worry about the **viruses that you could catch** when you are connected online.
 - **Internet jargon** seems more like a **foreign language** when you hear others talk.
 - You **do not bank or shop online**.
 - You are **not sure what is safe or what risky** online activity is.
 - You see **Emails offering of many ways of making money** or see warnings about serious virus threats and may **sometimes forward these to your family and friends**.

7. How satisfied are you that the rules of the **Assignment**, using *PrimaryPad* was **well explained**?
Completely unsatisfied 1 2 3 4 5 Very satisfied
8. How satisfied are you **with the final document** created by your team in this Assignment:
Completely unsatisfied 1 2 3 4 5 Very satisfied
9. How satisfied are you with the **collaboration between the group members**:
Completely unsatisfied 1 2 3 4 5 Very satisfied
10. How satisfied are you with your **own participation** in the project:
Completely unsatisfied 1 2 3 4 5 Very satisfied
11. How satisfied are you **with others team members participation** in the project:
Completely unsatisfied 1 2 3 4 5 Very satisfied
12. Would you **agree** with the statement that using **the PrimaryPad Internet tool enabled your team to easily connect during school** to work together on this Assignment?
 Strongly agree
 Somewhat agree
 Neutral
 Somewhat disagree
 Strongly disagree
13. Would you **agree** with the statement that using **the PrimaryPad Internet tool enabled your team to easily connect after school** to work together on this Assignment?
 Strongly agree
 Somewhat agree
 Neutral
 Somewhat disagree
 Strongly disagree
14. Based on your experience, what are the **positive aspects of group collaboration using PrimaryPad**?
-
15. Based on your experience, what are the **negative aspects of group collaboration using PrimaryPad**?
-

16. What **advice would you give colleagues** who are about to embark on a team project using *PrimaryPad*, so that they have the best possible results?

17. I felt good about working in the group
 Strongly disagree 1 2 3 4 5 Strongly agree
18. I was a supportive and purposeful group member
 Strongly disagree 1 2 3 4 5 Strongly agree
19. I was productive in my group
 Strongly disagree 1 2 3 4 5 Strongly agree
20. I improved learning by repeatedly consulting the learning material
 Strongly disagree 1 2 3 4 5 Strongly agree
21. I connected to the online course from the place I chose
 Strongly disagree 1 2 3 4 5 Strongly agree
22. I made the most of Internet to grasp the learning materials
 Strongly disagree 1 2 3 4 5 Strongly agree
23. I felt anxious because of computer incompetence
 Strongly disagree 1 2 3 4 5 Strongly agree
24. I employed the online information to learn and to motivate learning
 Strongly disagree 1 2 3 4 5 Strongly agree
25. I was satisfied with this learning experience
 Strongly disagree 1 2 3 4 5 Strongly agree

26. A wide variety of learning materials were provided in the course
Strongly disagree 1 2 3 4 5 Strongly agree
27. I was satisfied with the immediate information acquisition
Strongly disagree 1 2 3 4 5 Strongly agree
28. I was satisfied with the learning flexibility and independence of this course
Strongly disagree 1 2 3 4 5 Strongly agree
29. I was satisfied with the instruction model
Strongly disagree 1 2 3 4 5 Strongly agree
30. I was satisfied with the learning environment
Strongly disagree 1 2 3 4 5 Strongly agree
31. I was satisfied with the overall learning effectiveness
Strongly disagree 1 2 3 4 5 Strongly agree
32. The course was interesting
Strongly disagree 1 2 3 4 5 Strongly agree
33. It was important to choose the place to work in collaboration with my team
Strongly disagree 1 2 3 4 5 Strongly agree
34. I felt free to ask questions
Strongly disagree 1 2 3 4 5 Strongly agree
35. I had more interaction and communication with classmates
Strongly disagree 1 2 3 4 5 Strongly agree
36. I had more interaction and communication with the instructor
Strongly disagree 1 2 3 4 5 Strongly agree
37. I think this learning environment was more interesting
Strongly disagree 1 2 3 4 5 Strongly agree

38. I felt less pressure about this learning model
Strongly disagree 1 2 3 4 5 Strongly agree
39. This learning model was boring
Strongly disagree 1 2 3 4 5 Strongly agree
40. The learning climate was relaxing
Strongly disagree 1 2 3 4 5 Strongly agree
41. The learning climate was enjoyable
Strongly disagree 1 2 3 4 5 Strongly agree

APPENDIX C

IM MESSAGE PROCESS INDICATORS

For the purposes of this research project it is only required to analyse messaging to the levels defined by *Tables 15 to 20* and not to break them down to their Indicators and Codes. The full tables, as defined by Murphy (2004) are shown here only for completeness.

Social Presence (Step 1 of 6) is defined by Murphy (2004) as the ability of participants in a community of inquiry to project their personal characteristics into the community, thereby presenting themselves to the other participants as “real people”. Social presence can create group cohesion, enriching interaction. In this instrument it may be defined as illustrated in *Table 13*.

Table 14 - Social Presence

	Specific Indicator	Code	Examples of Indicators
1	Sharing personal information	SP	'I went on to do a B.A. in sociology.'
2	Recognising group presence	SR	'Hi everyone!'
3	Complimenting/expressing appreciation towards other participants	SC	'You've raised a really interesting idea.'
4	Expressing feelings and emotions	SF	'It all seems a little overwhelming for me as a future teacher to know that this is what I am walking into.'
5	Stating goals or purposes related to participation	SG	'During this project, I would like to learn more by sharing and discussing ideas.'
6	Expressing motivation about project or participation	SM	'I think this project will be quite interesting.'

The ***Articulating Individual Perspectives (Step 2 of 6)*** phase may be seen as one of the early steps towards collaboration, but collaboration involves more than peer-to-peer interaction. In an OSD, participants may begin by introducing themselves, and then move on to articulating their individual perspectives. In this stage they are aware of the presence of other participants but do not explicitly reference their perspectives or solicit feedback

from them. Coming before social negotiation, at this stage their articulation may read like a series of monologues (Henri, 1995).

Table 15 - Articulating Individual Perspectives

	Specific Indicator	Code	Examples of Indicators
1	Statement of personal opinion or beliefs making no reference to perspectives of others	IO	'In my opinion, Core French Programs in both Junior High and High Schools need further development and revision, especially the homework component and formative tests.'
2	Summarising or reporting on content without reference to the perspectives of others	IS	'The article compares the confident and less confident students to speak in a French class.'

Accommodating or Reflecting the Perspectives of Others (Step 3 of 6) is the next stage where participants are exposed to each other's viewpoints and may be seen challenging each others' reasoning or mutually influencing each others' reasoning or behaviour. They may begin to accommodate and reflect the perspectives of others (Henri, 1995). Giving and receiving help and assistance; exchanging resource information, and giving and receiving feedback on teamwork and teamwork behaviours are part of this stage which is a prerequisite towards building knowledge and constructing new meanings (Rourke, 2001; Maushak & Ou, 2007).

Table 16 - Accommodating or Reflecting the Perspectives of Others

	Specific Indicator	Code	Examples of Indicators
1	Directly disagreeing with/challenging statements made by another participant	PD	'To comment on a reflection made by another participant stating that there is no room in a classroom for the teacher to make mistakes, I would like to disagree.'
2	Indirectly disagreeing with/challenging statements made by another participant (I)	PI	'While I agree somewhat with participant 3, I think that some students at lower levels may become too frustrated with trying to learn the language when a teacher uses only French.'
3	Introducing new perspectives	PN	'I think an important issue that has not been explored yet is... addressed just yet is....'
4	Coordinating perspectives	PC	'Thus far, most of the focus has been on oral French use by teachers and students in a language arts setting.'
5	Sharing information and resources (I)	PI	'The URL for this site is....'

Co-constructing Shared Perspectives and Meanings (Step 4 of 6) demands that group members not only share, but also challenge and refine perspectives. Participants articulate and externalise their perspectives, challenge and mutually influence each others' reasoning and behaviour, and areas of disagreement or conflict may become explicit. This process of questioning, evaluating and criticising perspectives, beliefs and assumptions, allows participants to restructure their thinking (Steeple et al. 1994). When individuals' perspectives are challenged, they must work together to produce shared meanings (O'Malley, 1995).

Table 17 - Co-constructing Shared Perspectives and Meanings

	Specific Indicator	Code	Examples of Indicators
1	Asking for clarification/elaboration	CA	'Do you really think it will be that easy?'
2	Posing rhetorical questions	CQ	'This would create a very difficult problem for the teachers. How do you keep your students interested and motivated to do well?'
3	Soliciting feedback	CF	'I was wondering if anyone has any suggestions for going about this?'
4	Provoking thought and discussion	CP	'When it comes to the French language, should we only produce students with a very strong understanding? What is important here?'
5	Responding to questions	CR	'I have a suggestion for creating a warm, comfortable atmosphere.'
6	Sharing advice	CS	'Aim to speak solely in French by the end of the semester.'

Building Shared Goals and Purposes (Step 5 of 6) follows only after all the stages up to this point have been reached: developing and establishing social presence; the articulation of individual ideas; the accommodation and inclusion of others' ideas, and the co-construction of shared perspectives and meanings. It is in this stage that the individuals begin to work together and take a common direction towards their shared goal (Murphy, 2004).

Table 18 - Building Shared Goals and Purposes

	Specific Indicator	Code	Examples of Indicators
1	Proposing a shared goal or purpose	BP	'I wonder if we could design a real gap activities in which even the teacher doesn't know the answer?'
2	Working together towards a shared goal	BW	No examples found

Producing Shared Artefacts (Step 6 of 6) is the final step of the six-step processes of the continuum, where sharing goals can lead to the production of a shared artefact, 'an explicit intention to "add value"—to create something new or different through the collaboration' (Kaye, 1992). The success of the collaborative effort can be measured by the creation of 'something new' and collaboration is not complete until this shared artefact is produced.

Table 19 - Producing Shared Artefacts

	Specific Indicator	Code	Examples of Indicators
1	Document or other artefact produced by group members working together	BP	No examples given

APPENDIX D

PERFORMANCE-CRITERIA - BUSINESS CORRESPONDENCE - LETTER/MEMO

Layout and presentation - 32% of the total mark.
Correct format is used and maintained
There are no spelling, punctuation or grammatical errors
LETTER: Addresses, Date, Salutation, Closing, Signature Block - MEMO: From, To, Date, Subject, Closing Initials ONLY - are correct
The layout is well proportioned, balanced and correctly spaced
Clarity and conciseness - 12% of the total mark.
It is focused, well planned, brief (not too brief) and clear.
The facts are simply (not too simply) but effectively presented
Does not use redundant expressions
Message development - 12% of the total mark.
Part 1: the background section states the facts
Part 2: contains facts and the main message
Part 3: contains the outcome or result and closes on a strong note
Brevity and construction - 12% of the total mark.
Paragraphs and sentences are short without being too short.
Correct paragraph structure is maintained
The words and sentences are uncomplicated
Clarity and language - 12% of the total mark.
Conveys information simply and effectively and sufficiently
Subject is developed carefully, giving emphasis where required
Uses good language and is gender neutral
Sincerity and information - 12% of the total mark.
Shows enthusiasm, humanity, directness and definiteness
Facts are correctly quoted
Uses a combination of I and/or We (as appropriate)
Tone - 12% of the total mark.
Avoids words that antagonize.
The writing targets the reader correctly and does not ramble on
Does not use LIC (Low Information Content) words
Totals - 22 items maximum mark 32 + 72 = 104 marks.

APPENDIX E

PERFORMANCE-CRITERIA - THANK-YOU CORRESPONDENCE

Structure tone and length
Opens with enthusiastic appreciation
Writes using polite, deferential and a personal tone
Sufficiently wordy to create adequate length (not over-wordy)
Expands on the initial thank you
Recalls details and says how the gift/boon will be used
Highlights specifics for a personal touch and comments on the generosity of the giver
Expands on previous statements to build a full message
Summarizes in the last paragraph in a courteous tone
Says a final thank you again
Ends on a positive, forward looking, strong or hopeful note
A personal, warm sign-off is used
Totals - 9 items maximum mark 36
Grand total

APPENDIX F

PERFORMANCE-CRITERIA - PERSUASIVE CORRESPONDENCE

Begins with the main idea
Is clear and concise
Identifies the single most important message
Explains and justifies the request
Justifies the request and explains its importance
Explains any potential benefits
Breaks complex requests into individual questions that are limited to only one topic each
Provides necessary details and explanations
Explains the point(s) completely to eliminate any confusion or lingering doubts
Maintains a persuasive and positive tone throughout
Embeds negative statements in positive contexts or balances them with positive alternatives
Talks favourably about the choices
Requests specific action in a courteous tone
Makes it easy to comply, by including appropriate contact information
Tells reader how to proceed if further action is required and encourages them to act promptly
Express gratitude
States clearly any important deadlines and what will happen next
Totals - 13 items maximum mark 52
Grand Total