

**ADOPTION AND USE OF COMPUTER MEDIATED COMMUNICATIONS:  
REACTIONS OF FEMALE SITE COORDINATORS IN A  
DISTRIBUTED EDUCATION SYSTEM**

By

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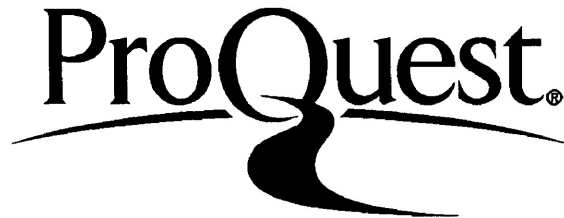
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## ABSTRACT

This study examines women's reactions to the introduction of computer-mediated communications (CMC). The literature suggests women exhibit some reluctance in the use of computer technology. There are, however, computer technologies, such as CMC, which appear conducive to the learning and working conditions preferred by women. This study examined the adoption and use of the CoSy conferencing system by women site coordinators. The Hiltz et al. model of acceptance was used as the conceptual framework for the study. This model views acceptance as a learning process in which computer users require time to learn the skills necessary to become competent users of the CMC system. Hiltz et al. used three major categories of variables, system features, group factors and individual difference measures to describe the various factors that influence the "acceptance" of CMC systems. The acceptance model focuses on how individual difference measures interact with system features and group factor variables of the CMC system. Acceptance is measured by the individual's use of and satisfaction with CMC. Consistent with Hiltz' approach, this study examined the reactions of a group of women site coordinators to the system feature and group factor variables of the CoSy computer conferencing system. Use and perceived satisfaction with the system were used as indicators of the women's acceptance of the CoSy system. The results indicate the women were well satisfied with the cooperative social arrangement of the group. The women were also satisfied with the system features of the CoSy conferencing system.

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## TABLE OF CONTENTS

	Page
ABSTRACT	ii
ACKNOWLEDGEMENTS	iii
LIST OF FIGURES	vi
LIST OF TABLES	vii
CHAPTER	
1. INTRODUCTION	1
Purpose	5
Significance	10
Limitations	10
Definition of Terms	11
REVIEW OF LITERATURE	14
Women and Learning	14
Women and Computer Technology	33
Acceptance	41
METHODOLOGY	57
1. Design	57
1.1 Model	57
1.2 Variables	58
1.3 Instrumentation	63
2. Setting and Sample	65
2.1 Instrumentation	71
2.2 Results	74
3. Data Collection and Analysis	76
3.1 Quantitative Data	76
RESULTS AND DISCUSSION	78
1. Acceptance of the System	81
1.1 Use	81
1.2 Satisfaction	88

	Page
2. Reactions to the System	91
2.1 Problems or Conditions of Acceptance	91
2.2 Self-Assessment of Competence	100
2.3 Experienced and Less Experienced Site Coordinators' reactions to the System	102
3. Reactions to the Social Setting	109
3.1 Participation and Democratic Environment Features	110
3.2 Cooperative Elements	114
CONCLUSIONS AND IMPLICATIONS	118
REFERENCES	125
APPENDIX A Variable Map for the Acceptance Study	135
APPENDIX B CoSy Questionnaire	137
APPENDIX C Contact North Sites in Northwestern Ontario	143
APPENDIX D Site Coordinator Anecdotal Comments	144

LIST OF FIGURES

FIGURE	PAGE
1 Hiltz, Kerr & Johnson (1985) Model of Acceptance.	45

## LIST OF TABLES

TABLE	PAGE
1. Factors Contributing to the Acceptance of CMC.	43
Theoretical Approaches Studying the Acceptance of CMC.	46
Description for Bennett's Stages of Acceptance.	50
Background Information for the Women Site Coordinators.	70
Grasha-Riechmann Learning Styles.	72
Profile of Women Site Coordinators.	75
Use of the CoSy Conferencing System by the Site Coordinators.	82
Time On-line Reported by Various Researchers.	86
Site Coordinators' Satisfaction with the CoSy System.	89
10. Reactions of the Site Coordinators to the System.	92
11. Self-Assessment of Conferencing Competence.	101
12. The Reactions of Experienced and Less Experienced Site Coordinators to the System.	103
13. A Comparison of Experienced and Less Experienced Site Coordinators' Self-Assessment of Competence.	108
14. Reactions of the Site Coordinators to Group Factors.	111



## CHAPTER ONE

### INTRODUCTION

Increasing numbers of women are entering the work force as professionals (Kerr, 1988; Wood, 1987). Many of these women enter into the more traditional professions such as teaching, social work and nursing; however, increasing numbers of women are also entering the administrative, law, medical and engineering professions (Eccles, 1986; Tittle, 1986). Each of these professions has particular skill and knowledge requirements which are subject to change as new concepts, ideas and technologies are researched, developed and implemented. To keep current with these new developments, men and women professionals are required to learn the use of each new technology efficiently and effectively. The introduction of technology into the workplace involves the development of multi-skilled workers who are readily able to adapt to the technological changes occurring in the work environment (Gwilliam, 1989). Often, professionals have some difficulty in keeping up with the rapidly changing skill requirements associated with the new technology (Gwilliam, 1989; Kerr, 1988). Frequently, the learning of new skills has occurred outside the work environment and is often both costly and time consuming for the worker and/or employer. This has necessitated the development of new learning environments which will enable workers to continue training and updating or improving their skills without having to leave the workplace (Kerr, 1988). In addition, long-term planning and the development of training will enable the worker to meet the changing skill requirements in the workplace

instead of struggling to keep up with them (Gwilliam, 1989). The notion of continuing learning in the workplace has contributed to the development of the concept of life-long learning. The increasing demands of technology in the workplace has also emphasized the importance of life-long learning.

Professionals are expected to learn the new skills associated with the introduction of new technologies into the workplace. However, the literature available concerning women and technology indicates women have some difficulty with the adoption and use of technology. This is particularly evident in the area of computer technology. Several authors have documented the difficulties and reluctance women exhibit with respect to the use of computers (Collis, 1986; Fetler, 1985; Hawkins, 1985; Lockheed, 1985; Swadener & Hannefin, 1987). Further, the literature suggests (Coulter, 1988; Faith, 1988; Harasim & Johnson, 1986; Harasim & Smith, 1986) difficulties arise because the learning and working conditions of women are often not addressed in the area of technology. The literature cites the following learning and working preferences of women:

1. cooperation,
2. interaction/participation,
3. non-coercive, non-authoritarian environment,
4. connected learning

(Belenky et al., 1986; Coulter, 1988; Faith, 1988; Harasim & Johnson, 1986; Harasim & Smith, 1986).

There is however, a computer technology which appears conducive to the learning and working conditions preferred by women. The newly developed computer

mediated communications (CMC) technology, including computer conferencing (CC), is of particular interest to women because the features of this medium appear congenial to the learning and working preferences of women. CMC systems offer the following features:

1. convenience (time, place, distance, pace, individualized program)
2. increased interaction among group members
3. democratic environment
4. access to group knowledge and support
5. increased control (pace, content, objectives)

These features are available via several possible applications of computer mediated communications technology. Two of the more well documented applications of a CMC system include the "virtual classroom" (Hiltz, 1986) and the "Computer Supported Collaborative Work" (CSCW) environment (City of Vancouver, 1987). The virtual classroom focuses on the use of CMC for learning and education, while the CSCW focuses on the use of CMC for professional work purposes. The notion of a CSCW environment was developed in response to the increasing use of technology, especially computers, and the need for cooperative goal structures in the professional workplace. The use of computer conferencing technology indicates a strong potential for sustaining cooperative interaction and group problem solving opportunities. The skills involved in cooperation and group problem solving are desirable elements for the working professional, and are encouraged in the workplace (City of Vancouver, 1987). In addition, the elements of cooperation and group participation are seen as skills that are particularly suited to the way in which women learn

(Belenky, Clinchy, Goldberger & Tarule, 1986).

To date, little research has been done with regard to developing the potential of computer conferencing as a cooperative learning/working tool. In addition, little information is available regarding women and their attitude toward and use of computer mediated communications. Further, the available research concerning women and computer conferencing is primarily qualitative in nature and focuses on the barriers to the adoption and use of a CMC system (Dickson, Hill & Franklin, 1987; Harasim, 1987; Harasim & Johnson, 1986; Harasim & Smith, 1986). The barriers approach emphasizes problems and conditions (barriers) as factors contributing to the acceptance or rejection of the system. Rejection of CMC is reflected in the "dropout" rates for a CMC system.

Hiltz, Kerr & Johnson (1985) examined the adoption and use of a CMC system from a learning perspective. The learning approach suggests time is required for the individual to learn the skills necessary to become a competent user of a CMC system. Achieving competence with respect to the new technology or skill also suggests a period of adjustment is necessary. Bennett (1972) proposed a series of stages of "acceptance" individuals progress through when beginning to learn a new skill(s). The novice learner begins the sequence at the uncertainty phase, during which time the individual is primarily concerned with gaining competence in the technical aspects of system use. The sequence continues through the insight and incorporation phases where the

individual's primary concern is using the system to communicate. These stages suggest learning a new skill follows a logical progression to a certain level of competence. The relationships (interactions) in the above concept of acceptance suggests acceptance is also a dynamic process.

Hiltz et al. (1985) developed a preliminary model of acceptance which is an attempt to describe the process of adoption and use of a CMC system. Acceptance has been defined by these authors as, "the degree of willingness of an individual or group to utilize a computer mediated communications system" (p. 57) and may be measured by determining the individual's use of and satisfaction with a computer conferencing system (Kerr & Hiltz, 1982). The theoretical basis for the acceptance model is the general systems approach. This approach suggests several interactions between and among three major variable sets determine the nature of the acceptance process of a computer mediated communications system. The three major categories of variables, **system features, group factors and individual difference** measures are used to describe the various factors that influence the "acceptance" of CMC systems. The acceptance model focuses on how individual difference measures interact with the system feature and group factor variables of the CMC system.

#### PURPOSE

The purpose of this study is to examine the reactions of a group of women to the introduction of computer mediated communications technology. Based on

the preliminary model of acceptance developed by Hiltz et al. (1985), the study will focus on the reactions of the women to the two major factors that influence the acceptance of a computer mediated communications system:

1. system features
2. group factors

This study will examine selected variables from each of the two major variable sets as the basis for the adoption and use of a CMC system. The task-oriented view of cooperative behaviours, not considered in the original Hiltz et al. (1985) research is also examined in this study. The women computer users were selected because they would provide a unique approach to the study of the acceptance of a computer conferencing system.

Consistent with the approach of Hiltz et al. (1985), women's reactions to system features are explored from a learning perspective. The focus is on women's reactions to system features and achieving competence with respect to the use of the CoSy system. The study also considers women's hesitation in the use of computer technology, suggested in the literature. The examination of group factor variables, especially the cooperative elements within the computer conferencing environment are also studied because computer conferencing is seen as a tool for fostering cooperation in group settings (Davie, 1987; Harasim, 1987; Hiltz, 1986; McCreary & Van Duren, 1987). In addition, the literature also suggests cooperation is congenial to the learning and working conditions preferred by women (Belenky et al., 1986; Clinchy et al., 1985; Coulter, 1989; Faith, 1988; Harasim & Johnson,

1986).

The cooperative elements used in the study were derived from the work of Johnson & Johnson (1975; 1987) who have extensively researched this area. These authors included the notion of cooperative goal structures in their research. This represents an extension of the Hiltz et al. (1985) research who were primarily concerned with the basic social structure and interpersonal dynamics of the group. Hiltz et al. (1985) did not include cooperative goal structures in their assessment. This study will include selected cooperative variables from Johnson & Johnson's work (1975; 1987) thereby, extending the work of Hiltz et al. (1985). The acceptance model developed by Hiltz et al. (1985) is used as a framework (basis for acceptance) for the purposes of this study. The focus however, is on the description of the women's reactions to the system features and group factor variables of a computer mediated communications system.

The objectives of this study are to:

**Access the level of acceptance of the CoSy computer conferencing system, by a group of women site coordinators.**

The study will assess the level of acceptance by examining the two major components used by Kerr & Hiltz (1982) to define acceptance. These include:

- a. use of the CoSy conferencing system,
- b. satisfaction with the CoSy conferencing system.

The acceptance of the CoSy computer conferencing system by the women site coordinators, within the definition used by Kerr & Hiltz (1982) is presented in the form of usage data and indices of satisfaction. Usage data are used to establish whether the women participated in the conference (how often they signed-on and the total time on-line) and had adopted the CoSy conferencing system as part of their regular routine. The indices of satisfaction are used to assess two components which reflect the women's overall satisfaction with the system. Specifically, the indicators are used to determine the site coordinators' perceived satisfaction with the usefulness of the system (productivity, efficiency and quality of work), and the social setting (group atmosphere and compatibility) existing on the system.

**2. Examine the reactions of a group of women site coordinators to:**

**2.1 Selected system feature variables of the Cosy computer conferencing system.**

Two aspects of the CoSy conferencing system features are examined. These include:

- a. problems and conditions of acceptance
- b. self-assessment of competence

Problems and conditions of acceptance relate to those items which require experience (time) in order to achieve competence in the use of the system. Items such as accessibility, comprehension, information overload, loss of visual clues, asynchronous messaging, learning sources (on-line help and tutorial) and CoSy conferencing features (modifiability, text editing, forgiveness and



reliability of the system) are included in this list. The self-assessment of competence provides an indication of the individual's self assessed knowledge of and ability to use the CoSy conferencing system features. The self-assessment of competence and reactions to the system items will also be examined in relation to computer conferencing experience. Reactions of the experienced group (seven months or more at Contact North) will be compared to the less experienced (less than seven months at Contact North) group of site coordinators.

## **2.2 The social setting existing within the CoSy system.**

The study will examine selected group factor variables related to the CoSy conferencing system. Three group factor (social) dimensions of the CoSy system are examined and include:

- a. group participation levels
- b. establishment of a democratic environment
- c. cooperative elements.

Cooperative elements provide information regarding the individual's perception of the cooperative behaviours exhibited by the members of the group functioning within the CoSy system. Cooperative elements to be examined include, openness, support, sharing, cooperative intent, acceptance, trust and communication (message clarity and completeness, feedback). This will, to some degree, be reflected in the participation levels of the group and determine whether a democratic environment has been established. In addition, the nature of the democratic environment is defined by several of the cooperative

elements. The cooperative elements are emphasized in this study because the literature suggests cooperation is particularly congenial to the learning and working conditions preferred by women.

#### SIGNIFICANCE

This study contributes to a better understanding in the following ways:

1. Addresses important issues concerning women and technology in the workplace including their reported preferences for a democratic environment and cooperative goal structures.

Recognizes women's reluctance with respect to the use of computer technology suggested in the literature but also notes there are technologies available, such as computer conferencing, that appear congenial to the learning and working conditions preferred by women.

Extends the work of Hiltz et al. (1985), by examining in greater detail the basis for acceptance, with particular attention paid to the collaborative aspects of CMC and the conception of the acceptance process as a learning experience.

#### LIMITATIONS

This study is limited by:

1. using a voluntary group of eleven women site coordinators.

examining reactions to selected components outlined in the preliminary model of acceptance developed by Hiltz et al. (1985).

describing the reactions of the women to system features and group factors (from the Hiltz et

al., 1985 model) of the CoSy system. Relationships between the variables are not examined.

#### DEFINITION OF TERMS

Acceptance - The Hiltz et al. (1985) proposed model of acceptance was used as the conceptual framework for this study. The acceptance model reflects a learning process in which computer users acquire various levels of skill competence, and changes in attitudes and self perceptions with respect to the group setting. These authors defined acceptance as the use of and satisfaction with a CMC system. Use and perceived satisfaction with the system were used as indicators of the site coordinators' acceptance of the CoSy system. Use was determined by computer generated usage data which provided information regarding the number of times a site coordinator signed-on to the CoSy system and the amount of time spent on-line. Hiltz et al. (1985) suggest satisfaction with system utility and the social setting are most closely correlated with acceptance. This study used indicators of satisfaction to examine the site coordinator's satisfaction with system utility and the social setting. Productivity, efficiency (time) and quality of work were used as system utility variables, and group atmosphere and compatibility were used as social setting variables in this study.

Computer Conferencing - refers to the CMC system (CoSy) used by the women site coordinators in this study. The CoSy system uses computers and software to link individuals across time and distance, and was the primary mode of communication for the site coordinators. The women used the CoSy system for professional (collaborative work) and social purposes. The asynchronous nature of the conferencing system provided opportunities for the site coordinators to access, read and respond to private mail and/or conference messages at a time most convenient to them and without the necessity of face-to-face meetings. General features of the CoSy system include, text editing, search capabilities

for conference items, electronic mail, structured communications (by topic), directory and a permanent transcript of the conference exchanges is available. The women were asked to respond to two aspects of the CoSy conferencing system, including system features and group factors.

Computer Mediated Communication (CMC) - refers to a broader spectrum of computer communications features that includes computer conferencing, data bases, bulletin boards and telecommunications networks. In general, a CMC system uses computers and computer networks to compose, store, deliver and process messages. The CoSy conferencing system is one of several CMC systems available on the market and is the focus for this study.

Group Factors - are the factors relating to the social setting on the CoSy system and are consistent with the conceptual framework outlined by Hiltz et al. (1985). This section was expanded to include several cooperative elements not considered in the original Hiltz et al. (1985) work. These authors examined the social structure of the group but did not consider goal oriented, cooperative group structures. This study examined several elements including, trust (openness, sharing, support, cooperative intent and acceptance) and communication skills (message clarity, completeness and feedback) essential to the cooperative goal structures in a group setting. The cooperative elements are consistent with the Johnson & Johnson (1975; 1987) framework.

Problems and Conditions of Acceptance - are the factors that affect the site coordinators' adoption and use of the CoSy conferencing system. For the purposes of this study the Hiltz et al. (1985) approach to the acceptance of a CMC system was used. This approach suggests competence or mastery of the system is a function of experience. Experience (competence) requires time to learn the different features of the system. The women's reactions to several features of the system and potential problems or conditions of acceptance were examined to determine the level of competence achieved by the

site coordinators. In addition, competence and reactions to the system were examined as a function of CoSy conferencing experience. The variables examined included accessibility, asynchronous communication, information overload, lack of nonverbal communication, learning sources, comprehension, text editing, modifiability, forgiveness and reliability. These factors are consistent with the Hiltz et al. (1985) framework.

System Features - refers to the category of variables relating to the technological aspect of the system, within the framework outlined by Hiltz et al. (1985). Specifically, these factors include computer hardware, software, documentation and CMC utility. For the purposes of this study system features include the problems and conditions of acceptance as well.

## CHAPTER TWO

### WOMEN AND LEARNING

Learning, whether in an educational system, at home or in the workplace, is a continuous process. Traditionally, children's learning often begins informally at home and then moves toward a more formal type of learning in an educational institution. Adult learning continues with the responsibilities of work and family, and finally reaches into retirement age (Sweet, 1989). The principle of continuous learning throughout the course of one's life is embedded in the concept of life-long learning (Faure, 1972; Kerr & Hiltz, 1982). Of particular interest is the notion that learning occurs through the active participation in general life and through work experiences. It does not occur through traditional schooling alone where the learner is usually a passive recipient of knowledge.

Many young adults may choose to continue their learning in a formal institution, however, many others will enter into an apprenticeship program or engage in "on the job" training. Still others may choose, or find it necessary, to learn new skills or upgrade or improve skills they have already acquired. All are considered learning situations (Kerr, 1988). The latter phenomenon has become particularly evident in today's modern society where new information and technological advances are being increasingly incorporated into the workplace. This has forced the worker to continue to learn new and upgrade already learned skills in order to keep up with

the technological advances occurring in the workplace. Gwilliam (1989) suggests long-term planning and training development programs are necessary to help workers "meet" the changing skill requirements of the technological workplace rather than struggling to catch up to them. The technological advances in the workplace have also placed demands on the worker to expand his/her repertoire of skills in order to meet the diverse needs of the technological workplace (Gwilliam, 1989; Kerr & Hiltz, 1982). The constantly changing technology in the work environment also necessitates the learning of new skills at relatively frequent intervals. It is quite evident learning is an integral part of work and because of the ever changing technology in the work environment, the worker will continue to learn throughout his/her life, in order to keep up with these changes.

Women form a large part of the workforce and thus, are subject to the technological changes occurring in the workplace. They too must learn the new skills being used in the technological workplace. The extent and diversity of new skills has necessarily increased the learning needs of women. Unfortunately, the literature suggests traditional learning models do not meet the needs of women and hence, necessitates the development of a new model of learning that meets the special needs of women (Belenky, Clinchy, Goldberger & Tarule, 1986). Underlying this premise is the assumption women have a preferred style of learning. According to Gilligan (1982) and Belenky et al. (1986) women and men construct (learn and know) the world differently. In addition,

these authors suggest women solve problems differently than men, in other words, women's thinking and learning patterns are different. A major factor contributing to the above difference arises from the notion of "maternal practice". This type of social experience is what organizes women to know and learn in ways which differ from those of men (Brooke, 1988). Belenky et al. (1986) delineate five styles of learning or knowing with which women are able to construct or make sense of the world. The five ways of knowing include:

SILENCE(voiceless) - these women live in silence and isolation. Women in this category are unaware of language as a medium for the transmission of knowledge. They have difficulty with verbal interactions because they doubt their capacity to hear and understand what others are saying. Action on the part of these women is usually in response to a command from an authority.

RECEIVED KNOWLEDGE(the voice of others) - the women in this group gain their knowledge, including self knowledge, from others. They have no opinion of their own. Learning is achieved by receiving, retaining and returning the words of others. Concepts and issues are all black and white, true or false; there are no grey areas.

SUBJECTIVE KNOWLEDGE(the inner voice) - for these women the only reliable source of truth and knowledge is their own experience. Truth is experienced or felt and not actively pursued or constructed. The source for ideas is mysterious and beyond her control. Truth is an intuitive reaction.

PROCEDURAL KNOWLEDGE(the voice of reason) - women in this category view truth as something to be shared. They also believe knowledge can be acquired without having experienced it. Knowing involves acquiring and applying the



methods required to obtain, reflect on, evaluate and communicate knowledge. Knowing is careful observation, evaluation, and thinking before speaking.

CONSTRUCTED KNOWLEDGE(integrating the voices) - these women construct knowledge from a combination of all the previous voices. They acquire knowledge by considering all aspects of the event including the frame of reference for the knower and the context in which the event occurred. Both rational and emotional thoughts are integrated in the process of knowing.

It may be of some importance to note that "constructed knowledge" also suggests the elements of one particular style of learning (silence, received, subjective or procedural knowledge) may predominate in certain situations, as opposed to the individual remaining in one specific learning mode at all times.

The research study that documented the above styles of learning or "ways of knowing" was also used by the authors to construct a model of learning appropriate for the needs of women. This model called "connected learning" centres on four main features including:

- clarification of the styles of learning and types of knowledge preferred and valued by women;
- the exploration of the features of firsthand experience and observation before moving to the abstract conceptualization of the experience;
- womens' perspective of the definition of their learning tasks and development of their own styles of work;
- the development of egalitarian and cooperative construction of knowledge among instructors and learners.

(Clinchy, Belenky, Goldberger & Tarule, 1985).

The first feature mentioned stresses the importance of a woman's life experiences as being real and valuable. This includes the values, objectives, beliefs and strategies common to all women and with which women can identify themselves (Saarinen, 1988). These particular experiences have provided a different perspective, and are the basis for the connected learning model. The connected learning model uses the "maternal practice" or nurturant experience to explain the type of learning that occurs in this particular model. For example, the expert (or parent) determines the needs and capabilities of the learner (or child) and then "helps" the learner in a way that is non-threatening, patronizing and/or domineering (power struggle). Emphasis is placed on the care for and understanding of the learner's needs rather than the impersonal standards currently imposed by many institutions (Clinchy et al., 1985; Faith, 1988). The model also suggests knowledge should be drawn from life experiences and firsthand observation. It is from these experiences and observations the learner develops theories and concepts. In short, theories are developed from practical experience and not vice versa. Similarly, Coulter (1988) has stated theory development is the next step beyond personal experience.

Another feature of the model focuses on the necessity of the learner defining his/her own learning needs rather than fulfilling the expectations and standards of other individuals or a particular institution. Embedded in this concept is the development of the individual's own working style which takes into

account financial, occupational and family responsibilities as well as, personality traits and interpersonal variables (Coulter, 1988; Faith, 1988; Kember & Harper, 1987). The connected learning model also stresses the importance of the learner constructing knowledge in a cooperative manner. This is similar to Freire's (1971) "problem solving" model which focuses on the construction of knowledge by both the learner and instructor. The interactions occurring in a situation such as this, are a necessary part of learning (Coulter, 1988). As a whole, the basic premise of connected learning emphasizes connection over separation, understanding and acceptance over judgement and evaluation, and cooperation over debate (Belenky et al., 1986; Clinchy et al., 1985; Coulter, 1988; Faith, 1988).

One of the learning or working styles emphasized in the above literature is cooperation. Also, research studies in the area of women and learning supports the notion that women prefer a cooperative and/or participatory type learning style (Allen, 1987; Belenky et al., 1986; Clinchy et al., 1985; Zelazek, 1986). The definition of the term learning style varies with the different perspectives taken for the analysis of learning styles. Several categories or perspectives of learning styles have been identified by various researchers including cognitive, affective and physiological learning styles. These learning styles have one or more instruments to assess the nature of the individual's learning styles from one of the above perspectives (Keefe, 1982). Learning styles are also assessed using

the following dimensions including, interpersonal factors, intrapersonal factors and environmental factors (Grasha, 1984). These learning styles are also associated with particular instruments that assess the nature of an individual's learning style. Within the latter group of learning styles and assessments is the Grasha-Riechmann Learning Style Scale (GRLSS). This instrument is of particular interest because the inventory itself contains a cooperative element in the assessment. Cooperation, as discussed earlier, is a central and valued component to women's learning. It must also be noted this learning style is preferred not only by women but by all adult learners. Both of these groups favour a cooperative learning and working environment (Moore, 1986).

The method of learning and the environment created by using the cooperative learning style is described by Hruska & Grasha (1982) as a group of individuals collaborating and working together by sharing ideas, talents and resources. Usually the individuals in a group are working together with the intent of achieving a common goal or end. Cooperative individuals prefer to work in groups rather than alone. The social interactions occurring in the group are considered part of the learning process (Hruska & Grasha, 1982).

A variety of skills are necessary to develop an effective cooperative learning or working environment. These skills also reflect a cooperative learning style. Johnson & Johnson (1975) have extensively researched the area of cooperation as a form of learning or working.

These authors list three basic skills essential for cooperative interaction to occur. These important skills include:

1. communication skills
2. trust skills
3. controversy skills

The first essential skill mentioned is communication. This skill is absolutely necessary for any cooperative interaction to occur - without communication individuals are unable to cooperate with each other. Communication for the purposes of this paper is defined as the "exchange or sharing of thoughts and/or feelings through the use of symbols which represent similar conceptual experiences for the individuals involved in the interaction" (Johnson & Johnson, 1975). Two major types of communication skills are evident, "sending skills" and "receiving skills". Sending skills involve the ability of the individual to correctly represent his/her ideas, thoughts, feelings, beliefs, opinions, interests, reactions, needs, etc., as a message and send it to another individual or group of individuals. Receiving skills is the ability of the individual to accurately understand the messages another individual is sending concerning his/her own feelings, thoughts, needs, beliefs, ideas, and so on. Through the use of sending and receiving skills individuals can work together toward a common goal, share resources and information, provide assistance and support for each other, identify and/or clarify problems and plan a course of action.

Several elements are central to the concepts of sending and receiving skills and are essential for

effective communication to occur. Sending skills require individuals to:

- communicate their feelings and ideas clearly and unambiguously
- 2. make statements that are complete and specific
- 3. ensure that both verbal and non-verbal messages are congruent and
- 4. ask for feedback to ensure that the messages are being accurately interpreted.

Receiving skills also require some attention. These skills are not meant to judge or evaluate the sender's message but rather the receiver's aim is to understand what the sender is trying to communicate. Thus, receiving skills consists of the following skills:

paraphrasing - restating accurately and nonevaluatively the message communicated by the sender

perception checking - a description of the receiver's perception of the message communicated by the sender

negotiate for meaning - the negotiation between the sender and receiver until an agreement is reached regarding the meaning of the message.

Another component essential to the development of a cooperative environment is trust. Trust is necessary for stable cooperation and effective communication to occur. In a trusting environment individuals will tend to express their thoughts, feelings and ideas more openly. Individuals tend to cooperate and contribute more if trust exists within the group. The reverse is true in a low trust situation. Under these conditions individuals will tend to be evasive, dishonest and inconsiderate when

communicating with others (Johnson, 1972). The important elements of trust include:

openness - the sharing of one's thoughts, ideas, information and feelings with the rest of the group,

sharing - the offering of one's materials and resources to others in the group,

acceptance - the inclusion of another individual(s) into the group, including their thoughts, contributions and behaviours,

support - a recognition of the strengths and capabilities of a group member and his/her capacity to deal with a particular situation,

cooperative intentions - the expectation that all group members will behave in a cooperative manner.

A third essential component necessary to the development of a cooperative learning or working environment are the controversy skills. Controversy skills are necessary in all group situations where individuals share ideas, thoughts, opinions, feelings and information, and the possibility of a dispute or disagreement is likely. These disagreements or controversies should not be regarded in a negative sense. Controversies often function as an avenue for creativity and productivity in a group setting and may be especially useful in a group problem solving situation. In combination with effective communication skills and high trust levels in the group, controversy skills may be used to include various sources of information and ideas from the different group members, and also to expose the

alternative choices and decisions in a given problem solving situation (Johnson, Johnson, Holubec & Roy, 1984). The essential elements of controversy skills include:

to define a controversy as a problem solving situation - individuals work together to clarify their differences; it is not a win/lose situation but rather a search for a solution to a problem by having all members of the group contribute their ideas and suggestions,

to criticize ideas and not people - ideas should be discussed and/or disputed without rejecting the individual who presented them,

to differentiate and integrate - initially all contributions are explored and discussed; then by a process of integration or synthesis a solution to the problem may be found,

to take another person's point of view - this affords an individual an opportunity to view a particular situation from another group member's perspective or frame of reference.

All of these skills contribute to a cooperative learning and working environment which is the preferred environment of women. Cooperation is the desired form of learning and working because the skills involved in cooperation aid in the development of professional skills such as value judgements and decision making skills (Dunn & Hamilton, 1985; Smutz, Crowe & Lindsay, 1986; Tydeman, Lipinski & Spang, 1980). Cooperative skills form part of the repertoire of life long learning skills and are being encouraged in the workplace. These same skills are also encouraged in Continuing Professional



Education (CPE) programs. Of course, CPE programs function, in part, to provide learning opportunities to working professionals and are considered a part of the life long learning process for these individuals.

Women comprise the majority within certain professions including social work, teaching and nursing. Their numbers are steadily increasing in several other professions as well including, medicine, law and engineering. These women together with their male counterparts seek the courses, seminars and workshops provided by Continuing Professional Education programs:

1. to keep apprised of new developments in their respective professional fields,
2. to achieve further accreditation,
3. to upgrade or improve skills,
4. for personal satisfaction and/or interest,
5. for career advancement.

(Harasim & Johnson, 1986; Smutz, Crowe & Lindsay, 1986).

The program may also provide a source for current resource materials, new techniques, research findings and related information pertinent to the profession. Hence, there is an increasing demand for Continuing Professional Education (CPE) programs by the various professions. CPE programs may include graduate studies and extension programs in the various professional fields. CPE programs are required for the reasons stated above but appropriate educational programs that meet the special needs of women are required as well. Clinchy et al. (1985) state that too often research findings, based on male samples, have been applied to the total population including both men and women. In other

instances, the experiences of women have been modified to fit the categories constructed by male-based research and experience. To fully understand the nature of human learning, one must also consider the experiences of women (Belenky et al., 1986; Clinchy et al., 1985). Warren (1987) states that without considering the learning needs of women and making the necessary changes based on these special needs, we will continue to perpetuate the inequities that exist within the current learning system.

In general, CPE programs involve the acquisition of skills and mastery of specific subject matter. The required skills often include the development of professional value judgements and decision-making skills (Dunn & Hamilton, 1985). In view of this, a central instructional component to be included in any CPE program is practical "problem solving" which also often includes a group learning element (Smutz, Crowe & Lindsay, 1986; Tydeman, Lipinski & Spang, 1980). The practical nature of the "problem" is generally derived from the workplace itself, however, more often than not, the instructional design and delivery system to be used are developed elsewhere. In addition to the practical problem solving component is the recent general trend toward the inclusion of collegial learning as a desired form of learning particularly in CPE programs (Garmston, 1987; Glatthorn, 1987; Johnson & Johnson, 1987; Showers, 1985; Wildman & Niles, 1987). In fact, the literature indicates greater achievement is noted with collegial learning formats as compared to the competitive and individualistic styles of learning (Johnson & Johnson,

1987). Both collegial learning and practical problem solving are active learning processes which are necessary and can only be achieved through group participation: the simple transfer of information is insufficient for meaningful learning to occur (Saunders & Heyl, 1988).

Cooperative, collaborative, collective, collegial, group learning, whatever the terminology, each form includes a process of group conversation and activities guided by an expert who structures the tasks and activities. The basic premise for cooperation involves the "active construction" of knowledge by assimilating information, creating new ideas, sharing these thoughts with others and receiving their reactions as well (Bouton & Garth, 1983). Johnson & Johnson (1975) state cooperation focuses on interaction and communication between and among individuals. The interactions are evident when individuals share and pool their ideas, information and resources, provide support and assistance for other members of the group, identify and solve problems and work collaboratively toward a common goal (Slavin, 1987; Sharan & Sharan, 1987). In fact, the various contributions made by the group members are the essence of cooperation (Sharan & Sharan, 1987). Cooperation is said to be the most productive in terms of creating a true working and learning environment, and accomplishing both cognitive and affective outcomes (Johnson & Johnson, 1975; 1987; Sharan & Sharan, 1987; Slavin, 1987).

Currently, however many of the CPE programs/courses available to professionals are presented in a format

similar to that which they received in their pre-service training and education: the knowledge is transferred and assimilated as it is presented. Some authors (Spender, 1981; Rosser, 1986) have suggested the current structure of education and schooling replicates male dominant norms characteristic of the verbal conversations and interactions occurring in the traditional learning format. Unfortunately, when programs are constructed in such a manner (male oriented learning style), women are seen as disadvantaged for career and intellectual growth. The feminist literature further suggests gender differences exist in the way that men and women cognitively construct reality (Belenky, Clinchy, Goldberger & Tarule, 1986; Gilligan, 1982) which in turn affects how men and women learn and work. Tittle (1986) postulated social interactions and social cognitions of individuals influence the expression of gender related behaviours. Social cognitions refer to the attributions, interests, values and attitudes linked to the learning process and learning environment, and ultimately to future learning.

Given the above concerns and the increasing need for CPE programs, there is the additional problem of the availability of these courses, workshops and/or seminars to the working professional. Granted, several institutions offer a variety of CPE courses, however, many professionals are unable to attend these programs due to their geographic location, scheduling conflicts, and/or travel and time limitations. In addition to geographic distance limitations, there is also the

problem of social distance limitations. Social distance limitations exist as a result of one or more of the following factors including financial restrictions, time limitations, physical and/or mental health problems, geographic location (isolated areas) and family responsibilities (Coulter, 1988; Faith, 1988). Both geographic and social distance limitations contribute to the problem of the availability of CPE programs to the professional, particularly when considering the traditional avenues of CPE course delivery.

Currently, various modes of CPE program delivery are being researched and developed especially with respect to providing these types of educational programs at a distance. Recently, it has been suggested distance education is an effective means of CPE course delivery (Dunn & Hamilton, 1985; Houle, 1980). The use of distance education delivery systems increases the availability of CPE courses to the professional and offers an alternative learning mode to the learner. Garrison and Baynton (1987) suggest the availability of alternative learning modes fosters independence. Independence in the learning sense is defined by these authors as the "freedom to choose what, when, how and where to learn" (page 6). Distance education offers not only a choice of learning modes but also allows the learner greater control over the when, where and to some extent the what of learning. Thus, the learner is able to exert a greater control over his/her learning environment (Garrison & Baynton, 1987).

The literature indicates distance education is not only an appropriate vehicle for instruction for the adult learner (Moore, 1986) but it is also especially suited to the learning styles preferred by women in terms of both independent and cooperative group learning (Coulter, 1988; Harasim & Johnson, 1986; Harasim & Smith, 1986). These authors, among others, have outlined the following as characteristics of the learning conditions preferred by women:

- 1. autonomy with regard to time-management and pacing
- 2. non-authoritarian, non-coercive environment
- 3. interactive environment
- 4. cooperative environment
- 5. connected learning.

(these principles also apply to the workplace environment).

Distance education, as it is presently constructed, fosters some but not all of the above learning conditions. The design of most distance education programs exist in a form such that the major curricular decisions are made prior to the learner ever receiving the course. In addition, these programs are primarily print based. They also tend to focus primarily on a one to one type of interaction/communication. Specifically, the focus tends to be on the learner - instructor type interaction, while the learner - learner type interactions are quite rare (Davie, 1987). The most common type of distance education program is the traditional correspondence course. Bray (1988) and Coulter (1988), among others, have suggested some critics

may find this type of learning inappropriate for women because it serves only to further isolate them in the home. On the other hand, this delivery system provides CPE opportunities to individuals who would otherwise not have any educational programs available to them. Bray (1988) points out distance education programs provide educational opportunities for various groups of women (and other individuals) who are unable to attend a traditional university or other similar institution. For example, distance education:

1. removes the dangers travel outside the home - which is a major concern of older women,  
  
provides individual course pacing - which is a major concern of working mothers who have the responsibilities of both the home and the work place to consider,  
  
provides opportunities to learn in the home - which is of benefit to the women who have chosen to remain home to raise a family,  
provide learning opportunities for professional women residing in isolated areas but who wish to further their education.

Unfortunately, this form of home study does not provide the group communication experiences found in traditional learning environments. Group discussion and communication is a desirable element in a learning (and working) system because the participants are able to discuss issues and/or problems at a deeper level (Bray, 1988). Kember & Harper (1987) have suggested there are two levels of learning possible, surface learning and deep learning. The surface approach to learning is often associated with rote learning or memory work, and

generally depends on a quantitative measure of learning outcomes. This type of learning focuses on the number of facts or objective questions that are remembered or answered correctly. Deeper learning is somewhat more qualitative in nature and focuses on whether the learner truly understands the meaning of what he/she is learning. In addition, the learner should be able to make associations with other new or previously learned material. The authors (Kember & Harper, 1987) suggest deep learning is a required element, especially at higher learning levels. As Bray (1988) points out, group interaction and communication encourages the deep level learning necessary for the total education of the learner (Kember & Harper, 1987). Thus, it is essential to incorporate learning styles that foster interaction, communication and discussion, (cooperative learning style) among learners, in all educational systems.

With the advent of micro computers and computer conferencing software, new and significant developments within the field of distance education delivery systems are currently being promoted. One example of this is the current move toward the incorporation of cooperative group problem solving and discussion into the learning environment via a computer conferencing system. The above also suggests the "deep" approach to learning is being encouraged through the use of newly developed technologies. In addition, these same principles are being encouraged in the workplace and fostered through the use of CMC systems.



## WOMEN AND COMPUTERS

The use of computers has become increasingly evident in the education system as well as in the workplace. Two major forms of computer instruction exist including computer assisted learning or instruction (CAL/CAI) and computer mediated communication systems (Bates, 1986). Both of these learning systems free the learner of some of the constraints mentioned previously (travel/time limitations, scheduling conflicts, geographic location).

CAL or CAI is based on a programmed, structured type of learning. The course material is generally preprogrammed and packaged for use by the learner. Essentially, the learner learns from the computer - the computer replaces the instructor (Bates, 1986). As such, CAL/CAI is believed to augment rather than enhance the classroom experience (Kerr & Heimerdinger, 1982). This method of instruction favours several forms of teaching and learning including simulation, tutorial, and drill and practice. The drill and practice method is the form most often used for CAL and CAI (Bates, 1986; Turoff & Hiltz, 1986). These techniques do not however, incorporate the learned skills and concepts into the learner's frame of reference. It has been argued that only through group discussion and collaborative or collegial learning formats can this be done (Bouton & Garth, 1983; Johnson & Johnson, 1987; Turoff & Hiltz, 1986). A similar argument has been applied to the professional work environment as well (City of Vancouver, 1987).

CMC offers several features which promote interaction and discussion between and among learners, colleagues and/or co-workers . This promises much potential for group problem solving and collaborative learning and working. The computer conferencing system which functions within a CMC system, is one of the best facilitators of group communication (Harasim & Smith, 1986). Computer conferencing uses computer hardware/software and communication networks to allow a group of individuals the opportunity to share, discuss and exchange, information, resources, opinions and ideas.

In the computer conferencing system, learners and/or colleagues communicate with each other via a modem and public telephone system connected to a central computer. Conversations within the conference may stretch over several days or even months, with each participants' questions, answers and commentary being stored by the central computer and accessed and responded to by a fellow colleague, at a later date. The asynchronous nature of this form of communication is what distinguishes the computer conference from the more well known audio-teleconference. It is important to note however, that "real time" computer conferencing is also available when necessary. Real time computer conferencing allows individuals to communicate with each other simultaneously, using a computer keyboard. In addition, the processing power of the computer and its conferencing software offer a variety of methods to organize and structure the participants' inputs, outputs and communication patterns.

Most conferencing systems support the following functions:

1. directory - to identify participants on the system and finding addresses where messages may be sent;  
electronic mail - for private messages to be sent and received;  
conferences - for asynchronous group discussions: a permanent transcript of the exchanges are kept;  
private workspaces - for personal files, collecting ideas, developing drafts and projects, setting goals;  
word processing - for composing and modifying messages and/or documents;  
bulletin boards - to access and/or make announcements of general or particular interest;  
newsletter or journal - for course readings, access to articles or papers of general or particular interest to the group;  
data bases - for access to data/information on a variety of topics.

Each computer conferencing software package differs in complexity and degree of sophistication. The differences in design affect the access and ease of operation of the system. Underlying the application of computer communications technology in the workplace is the concept of a "Computer Supported Collaborative Work" environment which was described earlier in chapter one. Computer communications technology has also been used to

create the "virtual classroom" which functions as a learning and teaching environment located within a CMC system (Hiltz et al., 1985; Hiltz, 1986; 1987). Both of these CMC system applications are very similar and in fact, the features of the virtual classroom are identical to those used in the CSCW environment. The focus for the virtual classroom however, is on the student and instructor, whereas in the CSCW environment the focus is on the colleagues and co-workers. In any case, all of these individuals function as learners in their respective CMC environment.

The research findings of Harasim & Smith (1986) indicate women may find computer conferencing especially congenial because the characteristics associated with the "virtual classroom" are consistent with a learning style that emphasizes cooperation, interaction and group support in collaborative type activities. Many of these learning conditions are thought to be conducive to women's learning styles. It has also been suggested that identifying one's learning style can be used as a valuable tool to determine the type of job or work environment an individual will be most satisfied in and perhaps most productive (Cafferty, 1980). The implications of this study has long reaching effects for determining the types of individuals suited to working in a computer conferencing environment.

There is a problem however. The literature indicates women tend to show some reticence with respect to the use of computers and technology in general (Collis, 1986; Tittle, 1986; Linn, 1985). The

literature further indicates these attributes are fostered as early as grade school (Swadener & Hannafin, 1987). Jackson & Yamanaka (1985) state the education of women in the area of computer technology is necessary. Particular attention must be paid to motivation and attitude.

Locus of control is thought to have an impact on user attitudes towards computers and computer technology. The literature suggests learners should exercise control over their own learning which will in turn enable them to more accurately assess and develop their own learning potential. In other words, the individual's performance and "deeper learning" is optimized when learners accept the responsibility for their successes and/or failures (Stipek & Weisz, 1981; Watkins, 1987). However, the literature indicates there are certain subject areas where women tend to attribute their successes more to unstable factors such as effort or a good teacher rather than a stable factor such as ability (Eccles, 1986). In any event, individuals who attribute their success to either ability or effort show higher achievement motivation. The Stipek & Weisz (1981) study suggests women may need to be taught to accept responsibility for their successes and attribute them to internal factors (ability).

The literature has documented several instruments that determine the locus of control of an individual. One of the more popular locus of control instruments is Rotter's internal/external inventory developed by Rotter in the mid 1960's (Rotter, 1966). This instrument

measures the extent to which an individual believes he/she is in control of the events occurring in his/her life. The two bipolar loci of control are represented along a continuum. At one extreme end of the continuum individuals believe most of the events occurring in their lives are attributable to their own behaviours. These individuals believe the events occurring in their life are primarily under their control. Individuals with this belief system are recognized as having an internal locus of control. Individuals at the other extreme of the continuum believe the events in their lives are primarily attributable to forces outside their control. Examples of forces outside the individual's control include luck, fate, chance or powerful others. These individuals are recognized as having an external locus of control. The instrument itself is made up of 29 paired alternatives from which the respondent is asked to select one of the choices. Six of the questions are fillers while the rest assess the nature of the individual's locus of control. A higher score indicates a greater tendency towards an external locus of control while a lower score indicates an internal locus of control.

The literature indicates women score an average of 8.5 on this scale (Harrison, Guy & Lupfer, 1981). This compares with Yoder, Rice, Adams, Priest & Prince (1966) and Kleiber and Hemmer (1981) who score an average of 7.81 and 10.48, respectively. Rotter (1966) reported means of 8.42 and 9.62 for women. The literature also suggests professional women tend to be slightly more internally oriented when compared to their traditional

counterparts and the differences in locus of control between men and women at the professional level are not significant. For example, the findings of one study suggested an internal bias among men rather than an external bias among women (Sweeney et al., 1982). Waddell (1983) studied women from three occupational categories, business owners, managers and secretaries. The women in the business ownership category had significantly higher scores on the locus of internality scale when compared to the secretary group; however, no significant differences in locus of control were found when the business owners were compared to the managers group (Wadell, 1983). The above literature seems to indicate professional women have a tendency toward an internal locus of control.

It must be noted that studies comparing the locus of control of men and women tend to indicate no general differences (Chandler & Dugovics, 1977). Kleiber & Hemmer (1981) point out, it is necessary to consider situational and context variables when assessing the individual's locus of control. For example, a correlation between locus of control and academic achievement has been found in male groups but not in female groups (Chandler & Dugovics, 1977). Kleiber & Hemmer (1981) suggest when behaviours are seen as "unmasculine" and/or female oriented or "unfeminine" and/or male oriented, then a higher internal locus of control may be required to achieve in that context. For example, these authors suggest if academic achievement is oriented toward the female sex-role then males would have to have a higher

internal locus of control than their female counterparts in order to achieve academically. They used the same argument to explain the results of their study in which women who participated in organized sports (unfeminine behaviour) had a higher internal locus of control when compared to males who participated in organized sports and females who did not participate in sports at all. Interestingly enough, no differences were found between the males who participated in sports and those who did not participate at all (Kleiber & Hemmer, 1981). Harrison, Guy & Lupfer (1981), in their research study, also documented a relationship between an internal locus of control and the greater likelihood of non-traditional behaviours occurring (as manifested through career-oriented roles).

If the above hypothesis holds true, then women who tend to view computers and computer technology as "male oriented" or "unfeminine", may require a higher locus of control in order to achieve in this area. The literature has already indicated women show some hesitation in the use of computers (Collis, 1986; Linn, 1985; Tittle, 1986) and at an early age girls view computers and computer activities as male oriented (Swadener & Hannefin, 1987). The literature also indicates both women and girls felt they had the same capabilities as men with respect to performing computer functions. In other words, females feel both men and women are equally capable of performing computer functions (Collis, 1986; Swadener & Hannefin, 1987). With respect to CMC systems, women may need to overcome their reluctance to use



computers and its associated technology (as indicated in the literature) in order to effectively use the system for learning. The literature suggests computer conferencing gives the learner more control over his/her learning patterns which may be of benefit to women by giving them a more positive attitude towards computers. A more positive attitude toward computers has also been linked to the internal locus of control of the learner (Coovert & Goldstein, 1980).

#### ACCEPTANCE

A variety of new technologies have been developed in an effort to improve the delivery system of education courses at a distance and at the same time maintain or facilitate the learning process. Examples of these new technologies include computer assisted instruction or learning (CAI/CAL) audio and video tapes, television networks, teleconferencing and CMC systems. Several of these new technologies have also been incorporated into the work environment. As with any new or relatively new technological innovation, there is the problem of "acceptance" of the new technology. Computer mediated communications may be considered a new technological innovation being introduced into both the work environment (Contact North) and the educational system (Kaye, 1987; Davie & Palmer, 1984; Contact North).

Several factors may influence the acceptance or attitude toward computer mediated communication as a medium for effective learning and working. Attitude consists of three components including a cognitive,

affective and conative component. The cognitive and affective component reflect what a person believes and feels concerning the different aspects of computer mediated communications, including the technology involved, purpose, usefulness and so on. The conative component is reflected by the behaviour the individual exhibits with respect to the CMC system. Acceptance may be defined as an individual's or group's use of and satisfaction with a computer mediated communications system. The acceptance of a conferencing system also reflects a learning process which involves the acquisition of skills and changes in attitudes and self perception behaviours in a group setting (Sweet & Anderson, 1989). Three major categories have been identified by Kerr & Hiltz (1982) as factors contributing to the acceptance of computer mediated communication. The major categories identified by these authors include:

1. system features,
2. individual differences and
3. group differences of the participants.

Each category focuses on a different aspect of the CMC system (see Table 1). System feature factors are concerned primarily with the technology involved in the use of computers and computing. Factors such as computer hardware, software, CMC utility and documentation (learning sources) are considered in this category. Individual difference factors include attitudes (cognitive and affective), attributes, including expectations, beliefs, skills and capabilities of the individual. Group difference factors include the norms and social structure of the group. Factors such as

Table 1 Factors Contributing to the Acceptance of CMC.

SYSTEM FEATURES (system integration)

- a. computer hardware
- b. computer software
- c. CMC utility
- d. documentation (learning sources)

II. INDIVIDUAL CHARACTERISTICS

- a. attitudinal variables
  - cognitive
  - affective
- b. personal skills and characteristics
  - reading
  - typing
  - literacy
  - previous experience
- demographic characteristics
  - age/sex
  - education background
  - race/culture
- c. environmental characteristics
  - resource availability
  - pressure for usage
  - organizational structure
- d. psychological variables
  - locus of control
  - learning styles

III. GROUP CHARACTERISTICS (social integration)

- a. structure
  - size
  - geographic dispersion
  - previous communication ties
- leadership
  - style
  - activity/effort
- cohesiveness
  - sociometric ties
  - trust/openness
  - integration of members
- b. cooperative elements

leadership, cohesiveness, socio-metric ties and organization of the group are considered in this category. Hiltz, Kerr & Johnson (1985) developed a predictive model of acceptance using the three categories listed above. The individual difference variables interact with the group factors and system feature variables of the conferencing system to determine the acceptance of the system. Figure 1, provides a diagrammatic representation of the Hiltz et al. (1985) model. The end result of these interactions are the various levels of competence the learner achieves and the attitudes and self-perceptions the individual holds with respect to the CMC system and related computer conferencing activity.

Hiltz et al. (1985), in a later report, further elaborated on the three categories to include a broader spectrum of variables. All of these variables, including the variables in the three categories (stated above) were incorporated into four possible theoretical approaches to studying the nature of the acceptance of CMC systems. The four theoretical approaches were developed in an attempt to explain and/or predict the nature of the acceptance process. Hiltz et al. (1985) discussed the following four possible theoretical approaches to the acceptance of a CMC system:

1. technical determinism
2. social - psychological
3. human relations and
4. general systems approach.

(see Table 2 for a description of the above theoretical

System Features

Individual  
Differences

Acceptance

Group Factors

Figure 1 Hiltz, Kerr & Johnson (1985) model of acceptance.

Table 2 Theoretical Approaches Studying the Acceptance of CMC

TECHNOLOGICAL DETERMINISM APPROACH

- system features and technology determine user behaviour

- a. hardware/software
- b. CMC utility
- c. cost (time and money)
- d. access
- e. documentation (learning sources)

II. SOCIAL - PSYCHOLOGICAL APPROACH

- characteristics of the individual determine user behaviour

- a. attitudes (cognitive and affective)
- b. attributes
- c. personality type
- d. expectations
- e. skills and capabilities

III. HUMAN RELATIONS APPROACH

- characteristics of individuals working in a group setting determines user behaviour.

- a. sociometric ties
- b. leadership qualities
- c. group structure
- d. cohesiveness

IV. GENERAL SYSTEMS APPROACH

- interaction between all the various subsystems (for example, system features, individual differences and group characteristics) determine user behaviour.

approaches).

Technical determinism includes all of the factors listed in the system features category. This approach posits system features and the technology involved in a CMC system determines user behaviour. More simply stated, the acceptance of a CMC system is directly related to system feature factors. The technical determinism approach also examines the factors which are related to the actual integration of the system. This includes factors such as accessibility, loss of visual cues, asynchronous messaging, information overload, and progression to competence. The social-psychological approach incorporates all of the variables in the individual characteristics category. This approach focuses on how the characteristics of an individual determine his/her behaviour with respect to a CMC system. The human relations approach is concerned primarily with how the characteristics of individuals working in a group setting determines user behaviour. The variables listed in the group factors category are included in this theoretical approach. The human relations approach also examines the factors related to the social integration of the group. This includes factors such as the group participation levels, the establishment of a democratic environment and group cooperation levels. The general systems approach is unique in that it focuses on the interactions between all the various categories of factors (system features, individual differences and group characteristics). The general systems approach attempts to integrate all three approaches and posits the

complexity of all the above possible interactions determines user behaviour. The general systems approach also emphasizes the dynamic nature of the acceptance process.

Numerous computer conferencing software programs are available, each of which differs in degree of complexity and function. Harasim & Smith (1986), Tittle (1986) and Collis (1986), among others, agree the type of computer software selected is an important consideration to the successful implementation of computer technology for all learners, but especially important for women. In any case, these design differences make it necessary for the learner to undergo a period of training to familiarize his/herself with the system. Harasim (1987), McCreary & Van Duren (1987) and Davie (1987) used the barriers approach to learning the use of a CMC system. These researchers focused on the problems and conditions of acceptance and the effect these variables would have with respect to the individual's eventual adoption and use of the conferencing system. Essentially, "barriers" are factors which contribute to the acceptance or rejection of a CMC system. Factors such as accessibility, loss of visual cues, information overload and asynchronous messaging are cited by these researchers, as some of the possible barriers the individual may encounter. Hiltz et al. (1985) and Bennett (1972), on the other hand, used a competence based approach to the use of a CMC system. These researchers describe the acceptance process as a progression to competence and emphasize the need for time to gain experience in the use of the system. Bennett



(1972) has outlined a sequence of stages of acceptance a novice learner progresses through when learning to utilize a new skill system. The sequence of stages includes:

1. uncertainty
2. insight
3. incorporation

(see Table 3 for a list of descriptors for Bennett's stages of acceptance).

During the "uncertainty phase" the learner becomes familiar with the computer system and overcomes his/her nervousness and anxiety to a point where he/she is relaxed and confident in their ability to control the machine. In the "insight phase" the learner becomes concerned with understanding the fundamental principles involved and decides whether or not the system is useful and/or will serve his/her needs. On entering the "incorporation phase" the learner has decided that the system is useful, however, the technical aspects of system use are of secondary importance at this point. The learner is now more concerned with using the system to communicate rather than becoming bogged down with the mechanical and/or technical aspects of learning to use the conferencing system. Hiltz, Kerr & Johnson (1985) have added a fourth stage to this sequence, the "saturation phase", which involves complete mastery of the technology and a high level of expertise in using the system. The individual who enters this phase may also become involved in the creative aspect of the system, such as, software programming and development.

Table 3 Description for Bennett's Stages of Acceptance.

UNCERTAINTY	INSIGHT	INCORPORATION	SATURATION
hesitancy anxiety attitude-system skill development lack of confidence training/mechanics error responses familiarization frustration responses	adjustment understanding attitude limited use comprehension short- communications	second nature efficiency competence self-efficacy familiarity experience satisfaction confidence control increased use & communication quality adoption	elite mastery creativity programming subsystem- development expansion (relatively few people enter this phase).

Relatively few individuals enter this phase in comparison to the rest of Bennett's stages of acceptance.

There are a multitude of factors affecting the acceptance of computer conferencing by a learner. These factors are discussed at great length by Hiltz et al. (1985) and Kerr & Hiltz (1982). Many of the factors deal with system features: the technical aspect of the system and how the learner(s) responds to the technology. This refers to the learners capacity to accept the system and the features associated with it. There is however, another component to the acceptance of a computer conferencing system: the acceptance of computer conferencing as a communication tool which may be incorporated into a learning/working environment. To do this the learner must have within his/her own mind a conceptual model of what a computer conferencing system is and what it is able to do (Bennett, 1972; McCreary & Van Duren, 1987).

As stated previously, the application of computer mediated communications technology in the workplace has led to development of the concept of the "Computer Supported Collaborative Work" (CSCW) environment. Similarly, the application of computer mediated communications technology to create a learning environment has led to the development of the concept of the "virtual classroom". The virtual classroom was first described by Hiltz (1986). Recently, other researchers (Boyd, 1987; Harasim, 1987; Paulsen, 1988) along with Hiltz (1986) have suggested the following features are offered by the above applications:

- increased interaction between and among participants,
2. access to group knowledge and support,
  3. a democratic environment,
  4. convenient 24 hour access,
  5. increased learner control (pace, content).

In addition, the nature of the CMC system environment removes the constraints involving time and travel limitations, scheduling conflicts and geographical locations for the various members of the group, thus, providing more convenient learning and working opportunities (Bates, 1986; Harasim, 1987; Kerr & Heimerdinger, 1982). The potential for interaction and collaborative and group problem solving activities is greater with the use of the computer conferencing system. This is because of the asynchronous nature of the communication system used. Asynchronous communication systems allow the participants more time to formulate questions, answers and comments. In this way, the "talkers" often found in the traditional group situations do not monopolize the discussions (Hiltz, 1986) and the more passive members are afforded equal opportunities for commenting and interaction. Research also indicates that even though it took longer to type a message as opposed to verbalizing it, one nevertheless had ample time to respond in text. In a computer conferencing system one did not have to respond immediately to a question or comment as one is expected to do during a verbal exchange (Harasim, 1987; Hiltz, 1986).

Since the current CMC environment is text based, one is able to share in a greater "pool of knowledge" (Harasim, 1987; Harasim & Smith, 1986; Hiltz, 1986)

because one is able to share in all the interactions on the system. One also has the benefit of providing individual answers and comments, and then sharing and discussing these answers with the rest of the group. This does not normally occur in the traditional group settings (Hiltz, 1986). Research indicates participants feel less inhibited during discussions in this medium (Hiltz, 1986; McCreary & Van Duren, 1987). In fact, participants in the group perceived themselves as being more involved, having learned more and interacting with others to a greater extent (Harasim, 1987; Hiltz, 1986; Kaye, 1987).

It must be pointed out the application of computer mediated communications technology is increasingly being used to enhance or improve the working environment. Workers, including professionals, are frequently asked to learn to use new systems and technology. Consider the following situations. In the traditional workplace many of the assigned duties involved are concerned with routine administration and correspondence functions such as, mail, copying, filing, dictation, typing and retyping, supplies, scheduling and telephone. In the high tech workplace many of these functions are performed by computer technology thus, possibly reducing routine (rote) workloads up to 50 percent (City of Vancouver, 1987). The time saved by the use of computer technology is then channelled into research projects. The features of computer mediated communications systems may also be used for research purposes. For example, database information systems may be accessed for documents or

reports, conferencing may be used for discussion and collaboration, and electronic mail for private access to experts in the profession.

Of course, the skills and functions of the employee/employer are different under these new, primarily research oriented, conditions. The employee/employer relationship will exist more as a partnership rather than as the traditional boss/worker relationship. In other words, the power or authority structures in the traditional workplace tend to be vertical and favour an autocratic type work style. The structure of the high tech workplace on the other hand, is primarily horizontal in nature and favours a participatory work style. Within this new work environment skills such as cooperation and collegiality will be emphasized and participation will be encouraged. These skills are consistent with the concept of a Computer Supported Collaborative Work (CSCW) environment. Workers are regarded as reliable resource persons to be tapped and developed at the same time. Tasks are broad in nature and require the use of multiple skills. The goals and purposes of the organization are the goals of everyone working in the organization. This suggests support and commitment to the shared goals of the organization as well as, development and innovation make the workplace better and more successful (City of Vancouver, 1987).

When comparing the virtual classroom to the high tech workplace, one is able to determine a number of similarities between the two situations. The most obvious

is that both systems emphasize participation and interaction, and provide excellent opportunities for working or learning cooperatively. Cooperation is essential in both environments because professional skills such as value judgements and decision making are encouraged and developed in cooperative settings (Smutz, Crowe & Lindsay, 1986; Tydeman, Lipinski & Spang, 1980). Individuals have access to group resources and other group members at any time. Individualized work schedules and programs are available for each person. All of these features are enhanced by the use of CMC systems. Also, group members are free of geographic, distance, scheduling and time constraints when using a CMC system. Thus, for example, individuals who may have the responsibility of a family or live in isolated areas are still able to "go to work".

Kerr (1988) has taken the concept of learning and working one step further by suggesting the distinction between learning and working has become blurred. The rapidly changing technology in the workplace, brought about by the increasing availability and diversity of information (Morrison & Rubenson 1989), has placed a greater load on the worker who must try to keep up with the changing demands of the workplace. Kerr (1988) suggests the need for the development of a wide variety of learning environments to aid the worker in coping with the new technologies in the workplace. Gwilliam (1989) supports the notion of long-term planning and training development to enable workers to meet the changing demands of the technological workplace. In this way

workers are provided with opportunities to learn new, and update old skills without having to leave the workplace. It also encourages the worker to develop a repertoire of skills to help them to readily adapt to the changing demands of the technological workplace (Gwilliam, 1989). Computer conferencing systems offer opportunities for the type of continuous learning or "life-long" learning workers require today in the ever changing technological workplace.

Overall, the research seems to indicate computer conferencing systems possess the features that promote cooperation, improve the individual's sense of efficacy and reduces the traditional normative "power" constraints in relationships and interactions (Davie, 1987; Harasim, 1987). Many of the features associated with the computer conferencing environment make it a potentially viable vehicle for learning and working that is especially congenial for the learning and working conditions preferred by women. Together with the increased control component advocated by various researchers (Watkins 1987; Garrison & Baynton, 1987), computer conferencing would seem to be a very promising learning/working environment alternative for women.



## CHAPTER THREE

### METHODOLOGY

#### I. DESIGN

##### 1.1 MODEL

This study examined the reactions of a group of women to the introduction of a relatively new technology, computer conferencing. Three main objectives are used to accomplish this purpose. These are to:

1. **assess the level of acceptance of the CoSy computer conferencing system, by a group of women site coordinators.**
2. **examine the reactions of a group of women site coordinators to selected system feature variables of the CoSy computer conferencing system.**  
**examine the reactions of a group of women site coordinators to the social interactions occurring within the CoSy conferencing system.**

The preliminary model of acceptance developed by Hiltz et al. (1985) is used as the conceptual framework for the design and analysis of this study. The model attempts to describe how the learner moves toward the adoption and use of a computer mediated communications system (CMC). The emphasis is on the interaction between three major variable sets, including individual differences, system features and group factors. Specifically, the individual difference variables interact with the system feature and group factor variables of the conferencing system. This study focuses on the system feature and group factor variables of the

acceptance model. The individual difference measures are used primarily, to describe the sample of women who participated in this study. The basic premise of the acceptance model reflects a learning process in which individuals acquire various levels of skill competence, and changes in attitudes and self-perceptions with regard to the group setting.

## 1.2 VARIABLES

The design for this study comprises three major sections related to the stated objectives of this study. The first section focuses on the **acceptance** of the CoSy computer conferencing system. This includes an assessment of the women novice users use of, and overall satisfaction with the CoSy system (system utility and social setting). The second section focuses on the **examination of the reactions of the women novice users to selected system feature variables** of the CoSy system. Items pertaining to the problems and conditions of acceptance, and a self-assessed competence test are discussed. The third section **examines the reactions of the women novice users to the social setting** existing within the CoSy system. The focus for this section is the examination of the site coordinators' satisfaction with the cooperative goal structures (social interactions) of the group. The variables selected for the purposes of this study are listed in Appendix B and are organized according to the categories outlined in the Hiltz et al. (1985) framework.

### 1.2.1 Acceptance

Acceptance is defined as the use of and satisfaction with the computer conferencing system. The study establishes the women community educators adopted the CoSy conferencing system and were using the system as part of their working routine. This is done in two ways. One, usage data is presented to demonstrate the women were using the system on a regular basis. Two, indices of satisfaction are used to assess the women's satisfaction with the usefulness of the system (system utility). System utility variables examined in this study include, productivity, efficiency, and quality of work. Indices of satisfaction are used to assess the women's satisfaction with the social setting existing within the computer conferencing environment. Items in this category include group atmosphere and compatibility.

### 1.2.2 Reactions to the System

The study examines the reactions of the women site coordinators to system feature variables related to the integration of the CoSy conferencing system. Two major aspects of system integration variables are examined:

- a. problems and conditions of acceptance,
- b. self assessment of competence.

System integration variables focus on factors concerned with the operation and use of the computer conferencing system. This includes operation of the computer and accessories (hardware), accessing the conferencing system, communication competence (mechanics of sending, receiving, composing and printing messages - software)

and learning sources (on-line help and tutorial) of the system. In addition, the system integration factors include a number of factors that present a problem or are a condition of the acceptance of a CMC system. Variables such as accessibility, comprehension, information overload, loss of visual cues and asynchronous messaging are representative of this group, and are examined in this study. The system intergration variables selected for this study are consistent with the framework outlined by Hiltz et al. (1985).

The study examines the women's reactions to the system from a learning perspective which is consistent with the Hiltz et al. (1985) conceptual framework. To date, much of the literature (Davie, 1987; Harasim, 1986; 1987; Mason, 1988; McCreary & Van Duren, 1987; Swart, 1985) has focused on the barriers approach to the introduction of the conferencing system. These authors focus on factors (problems and conditions of acceptance) affecting the adoption and use of the CMC system. The problems or "barriers" are cited as possible factors contributing to the acceptance or rejection of a CMC system. The rejection of a CMC system is often reflected in the reported dropout rates for CMC use.

Hiltz et al. (1985), Hiltz (1987) and Bennett (1972) however, examined the acceptance process from a learning perspective. These authors focused on the time required to gain experience and achieve competence in the use of the system.

The site coordinators are divided into two groups based on computer conferencing experience in order to

further explore the reactions of the women to the system as a function of experience. Employment time at Contact North is used as a proxy measure of experience with the CoSy system and is a reflection of the obligatory use of the system (note: computer conferencing is a necessary function of the site coordinator's position). The median of the site coordinators' employment period was calculated and used to divide the women into two groups. The two groups include the experienced (seven months or more at Contact North) and less experienced (less than seven months at Contact North) site coordinators. The reactions of the two groups to the CoSy conferencing system are examined to determine whether any differences exist based on conferencing experience.

### 1.2.3. Reactions to the Social Setting

The study examines the reactions of the women site coordinators to the group factor variables which are related to the social integration of the CoSy conferencing system. Three major areas of social integration examined are:

- a. group participation levels,
- b. establishment of a democratic environment,
- c. cooperative elements.

The social integration variables relate to the interactions occurring between and among group members on the computer conferencing system. These variables also focus on the social structure of the group. Group factor variables that are examined for the purposes of this study emphasize the elements of cooperation. The

cooperative variables include group member openness, support, sharing, cooperative intentions, trust, and communication skills (message clarity, completeness, and feedback). The cooperative variables are consistent with the communication and trust qualities outlined in the "cooperative" framework of Johnson and Johnson (1975; 1987). Two other factors examined in this study, related to the social integration of the CoSy conferencing system, are group participation levels and the democratic environment features. The participation level of the group is a prerequisite for cooperation within a group. The democratic environment is in fact defined by the elements of cooperation. This extends the work of Hiltz et al. (1985) who considered the social structure and interpersonal dynamics of the group situation (sociometric ties, cohesiveness, leadership qualities, moderator style) but did not consider the goal oriented cooperative structure of the group. The cooperative goal structure elements used for the purposes of this study were derived from the work of Johnson & Johnson (1987) and Johnson et al. (1984), and extend the original work of Hiltz et al. (1985).

The variables for this study were selected from the research studies done by Kerr & Hiltz (1982), Hiltz, Kerr & Johnson (1985) and Harasim (1986) and are directly related to the acceptance (use and satisfaction) of computer conferencing. Variables were also selected from the work of Johnson and Johnson (1975; 1987) because these authors would add more depth to the social integration section (cooperative elements) of the study.

Hiltz et al. (1985) in their original research examined the group dynamics and social structure of the group, however, they did not consider the cooperative goal structures of the group. Johnson & Johnson (1975; 1987) were specifically chosen because of their extensive research concerning cooperative goal structures in a group setting.

The above features extend the work of Hiltz et al. (1985), Kerr & Hiltz (1982) and Harasim (1986) with respect to the participants in the study (emphasis on women) and the purpose for which the conferencing system is used (communication and a cooperative learning/working tool). The underlying emphasis of this research study is women and their reactions to the CoSy conferencing system, specifically system integration (system features) and social integration (group factors) variables. The system feature variables and the group factor variables enable the researcher to describe the computer conferencing environment and are consistent with the acceptance model developed by Hiltz et al. (1985). The individual difference variables allow the researcher to view the computer conferencing environment from the women's perspective and is also consistent with the work of Hiltz et al. (1985).

### 1.3 INSTRUMENTATION

#### 1.3.1. Questionnaire

A questionnaire was developed to assess:

- a. the participant's attitudes towards computers and computer technology. The items chosen were

consistent with the framework developed by Hiltz et al. (1985).

the participant's reactions to the CoSy conferencing system. The items chosen were consistent with the framework developed by Hiltz et al. (1985) and Kerr & Hiltz (1982). Additional items were included in the group factors section and were consistent with the framework outlined by Johnson & Johnson (1975; 1987), regarding the elements of a cooperative environment. Items such as support, sharing, openness, trust, acceptance, reliability and communication quality were included in the questionnaire.

the participant's subjective evaluation of the potential of computer conferencing as a viable learning/working tool within a distributed education system.

the participant's self-assessment of progression to competence in the knowledge and actual use of the features of the CoSy conferencing system.

The items for the questionnaire were selected on the basis of the relevance to gender, computer conferencing working environment and the use of computer conferencing as a cooperative learning/working tool in a distributed education system. The variable items for the questionnaire were obtained from the Hiltz et al. (1985) and Johnson & Johnson (1975; 1987) research. Where possible, the items for the different variables were selected from the original Hiltz et al. (1985) questionnaire. Items for the cooperative elements were selected from Johnson & Johnson's (1975; 1987) work and constructed in a similar manner to the Hiltz et al. (1985) questionnaire items. The questionnaire items



relating to the variables in this study are contained in Appendix B (note: Appendix B lists the questionnaire items used for the purposes of this study and does not include all of the items sent to the site coordinators). The site coordinators were asked to respond to the items on the questionnaire using a seven point Likert scale. The responses determined how strongly the individual felt with respect to a particular item (positive or negative connotation).

#### 1.3.2. Anecdotal Records

An open-ended question and comments section was included in the questionnaire. This section was used to gather information regarding the participant's attitudes toward, and evaluation of their experiences with the CoSy computer conferencing system as a cooperative learning/working tool within a distributed education system. These data were used to complement the quantitative data that were collected.

## **II. SETTING AND SAMPLE**

The location for the study is the North West Regional Coordinating Centre for Contact North which is located at Lakehead University, Thunder Bay, Ontario. Contact North is a government of Ontario funded, distributed education network that delivers various education programs (from a variety of educational institutions) and related resources, including student support services, to individuals at a distance. Contact North has several access sites located all across Ontario

each of which functions to provide education programs and resources to the more isolated communities in this province. Many of the access sites are located across northern Ontario, however, this study concentrated on the access sites located in the northwestern region of Contact North, specifically, the access sites situated west of and including Manitouwadge and Marathon and administered by the Northwest Regional Coordinating Centre of Contact North.

A site coordinator is situated at each one of the access site locations (see Appendix C for a list of the communities involved in the Contact North program in northern Ontario). All of the site coordinators reported to the director of the Northwest Regional Coordinating Centre and have the following major responsibilities:

- assist learners and community groups in determining their educational needs and providing feedback regarding these needs to the delivering institutions;

- assist learners in obtaining information and resources to meet their educational needs;

- maintain a library of materials and resources on distance education opportunities that is available to local residents of the community;

- provide assistance in the assessment of the effectiveness of distance education programs in the local communities;

- use the computer conferencing system to maintain contact with the Regional Coordinating Centre and the delivery institutions;

- assist learners in maintaining contact with instructors and other learners through the use

of computer conferencing;

training participants in various distance education classes in the use of communications equipment.

All of the site coordinators were required to learn the use of the CoSy computer conferencing system as part of their job requirement. In fact, all the site coordinators were novice users of the computer conferencing system when they began working at Contact North. In addition, the CoSy conferencing system was the primary mode of communication for these individuals. CoSy is a trademark term used to describe the computer conferencing system software developed by the University of Guelph. The CoSy conferencing system is a computer mediated communications network that allows individuals on the system to communicate messages privately to each other by the electronic mail system, or more openly via the conferencing system. To begin using the system, members must first "log on" to the system by identifying themselves with a "username" and "password". Once in the system, members may use any of the features offered by the system including private mail messages or conferences.

The site coordinators are members of at least two closed conferences which are specifically concerned with any technical, education and/or administration related problems they may have at their particular site. They are also members of several other conferences concerned with social, communication and education issues. Within each conference are several topics that focus on the

to be inappropriate for the purposes of this study. As such, items referring to class, attendance, student, teacher, and/or assignment were replaced with the terms conference, signing-on, group member, moderator, and/or work tasks, respectively. Individuals were requested to respond to the items on a five point Likert scale in terms of how strongly they agreed or disagreed with each statement (as per instructions on the original inventory). Preferences for a particular mode of learning are indicated by a higher total score for a specific learning style. The highest attainable score for each of the learning styles is 75.

#### 2.1.2. Locus of Control Scale

A locus of control instrument was used to assess the site coordinators' locus of control as it relates to the acceptance of computer conferencing. The J.B. Rotter Internal/External Locus of Control Scale was used for this study. The scale is used to measure the degree to which an individual feels in control of the events occurring in his/her life. The test itself consists of 29 items including six filler items and 23 forced choice items. For each item the individual is asked to choose between two general statements concerning causal effects of various life situations. Scores range from zero to twenty three. A score of zero indicates the highest level of internality while a score of 23 indicates the highest level of externality. Individuals with an internal locus of control believe they have some control over their life events. On the other, hand individuals

with an external locus of control attribute their successes and failures to other factors such as luck, fate, chance, powerful others and/or the unpredictable. Reliability data on the instrument report test-retest values of .83 for women over a one month period (Rotter, 1966).

## 2.2 RESULTS

The data collected from the modified version of the GRLSS indicate the women who participated in this study show a strong preference for the cooperative learning style. The scores also indicated a preference for the independent learning style although the mean total scores for this learning style were not as high as with the cooperative learning style (see Table 6 for the results of the opinionaire). These results suggest the site coordinators preferred the cooperative learning style but also required opportunities for individual expression. Logically, a combination of these two learning styles would be of benefit to the site coordinators since they are required to work alone at their respective sites and together as a group sharing and discussing the common problems and goals of a site coordinator.

The data collected from the Rotter IE scale indicated the women who participated in this study had a tendency toward an internal locus of control. Table 6, outlines the results of the Rotter IE scale. A comparison of the experienced and inexperienced groups of site coordinators yielded a slight difference between the two groups. The experienced group was slightly more

Table 6 Profile of Women Site Coordinators.

VARIABLE	MEAN	STANDARD DEVIATION
Age (years)	37.00	7.24
Computer experience (yrs)	3.55	5.59
Conferencing experience (months)	10.55	7.58
-----		
LEARNING STYLE		
Cooperative	60.90	3.99
Individualistic	54.50	5.17
Competitive	32.40	3.98
-----		
Locus of Control	9.30	4.30

internally oriented (8.2) than the inexperienced group (10.4).

### III. DATA COLLECTION AND ANALYSIS

The study involved collecting quantitative data and anecdotal comments from the following sources:

- a. questionnaire
- b. learning styles opinionaire (modified Grasha-Riechmann LSS)
- c. locus of control (Rotter's I-E Scale).
- d. usage statistics

The instruments (questionnaire, Rotter's I/E scale) were mailed to the individuals participating in this study along with instructions on how to respond to the various instruments and questionnaires. A covering letter describing the nature and purposes of the study was also included in the package. The research study was announced to the site coordinators by the Contact North Northwestern Region director via the CoSy computer conferencing system.

#### 3.1. QUANTITATIVE DATA

Quantitative data were gathered from the results of the questionnaire. Medians, means, standard deviations and percentages were calculated using SPSS (Statistical Package for the Social Sciences - Norusis, 1988). The data generated were used to describe this sample of professional women in terms of their reactions to the introduction of the CoSy conferencing system. Two aspects of the Cosy system were examined based on the Hiltz et

al. (1985) proposed model of acceptance. These include, system features and group factors. Usage statistics were used to determine whether the site coordinators were using the system on a regular basis and had adopted the system as part of their regular routine.



## CHAPTER FOUR

### RESULTS AND DISCUSSION

The framework for this study is based on the Hiltz et al. (1985) model of acceptance. The basic premise of the acceptance model reflects a learning process in which computer users develop competence in the use of a CMC system. The model suggests time is required for the computer user to learn the use of the system. The model focuses on three major variable sets (individual differences, system features and group factors) in an attempt to describe the adoption and use of a computer mediated communications system. Specifically, the individual difference measures interact with the system feature and group factor variables to determine the acceptance of the CMC system.

This study focused on the system feature and group factor variables related to the acceptance process within the context of the model of acceptance outlined by Hiltz et al. (1985). Acceptance is defined by these authors as the use of and satisfaction with a CMC system. Thus, this study includes a discussion of the site coordinators use of the system, and satisfaction with the system utility and social setting of the system. In addition, the site coordinators' reactions to the system features and group factors are discussed. The results and discussion of this study are therefore, organized according to the following three major headings:

**acceptance (use and satisfaction) of the system,**

**reactions to the system features of the CoSy conferencing system,**

**reactions to the social setting occurring on the CoSy system.**

In the first section, the acceptance of the CoSy conferencing system is examined using the usage statistics and satisfaction indicators collected during the study period. Two types of usage data were collected, including the number of times the site coordinator signed-on and the total time the individual spent on-line. These two sets of data will illustrate the extent to which the site coordinators had accepted the CoSy conferencing system. Indicators of satisfaction are used to illustrate the site coordinators' overall satisfaction with the system. Two aspects of overall satisfaction with the system are examined and discussed. These include the site coordinators' satisfaction with system utility (productivity, efficiency and quality of work), and the social setting (group atmosphere and compatibility).

In the second section, the reactions of the site coordinators to the system are examined. The women's reactions to the system are discussed from the competence based approach outlined in the Hiltz et al. (1985) conceptual framework. The site coordinators' reactions to selected system features (forgiveness, modifiability, reliability, and text editing), and the problems and conditions of acceptance (comprehension, information

overload, loss of nonverbal communication, learning sources and asynchronous communication) are examined. The discussion will focus on the site coordinators' use of the system as a communication tool. The study also examines the site coordinators' self-assessment of competence with respect to the CoSy system. The self-assessment data provides information regarding the level of competence the individual has achieved. Specifically, one is able to determine the individual's self-reported knowledge (CS-HOW) and actual use (CS-USE) of the various conferencing features.

In addition, the site coordinators were divided into two groups based on experience at Contact North. Dividing the site coordinators into two groups, based on experience, allows a more in depth study of the women's reactions to the system. A median split of the group was employed for this purpose. The less experienced group is represented by the women site coordinators who had worked at Contact North for a period of less than seven months. Those with greater experience are represented by the women site coordinators who had worked for a period of seven months or more at Contact North. The period of employment at Contact North is a proxy measure of CoSy conferencing system experience. The time worked at Contact North is a reflection of the obligatory use of the CoSy conferencing system since this was a necessary function of the site coordinator position.

The third section is primarily concerned with examining the factors associated with the social integration of the CoSy system. These factors include

group participation, the democratic environment and cooperative elements. Group participation is discussed as a logical prerequisite to cooperative interaction. The features of the computer conferencing system are discussed with respect to its contribution to the establishment of a democratic environment. The democratic environment is also defined by several elements of cooperation. Cooperative elements are emphasized in this section and particular attention is paid to the communication (message clarity and completeness, feedback) and trust (openness, group support, acceptance, cooperative intent and sharing) skills outlined by the Johnson & Johnson cooperative framework (1975; 1987).

#### . **ACCEPTANCE OF THE SYSTEM**

Acceptance has been defined by Hiltz, Kerr & Johnson (1985) as the use of and satisfaction with the computer conferencing system. These authors have described acceptance as a process in which computer users adopt and use the conferencing system. Two major areas of acceptance were examined in this study including use and satisfaction. Table 7 and 9, outline the results of the data collected for the above variables. Unless otherwise stated all results are mean values based on a seven point Likert scale.

##### 1.1 Use

For the purposes of this study, data concerning the actual use (number of times signed-on and total time

Table

Use of the CoSy Conferencing System by the  
Site Coordinators.

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VARIABLE	MEAN	STANDARD DEVIATION
<u>USE</u>		
Number of Sign-Ons	22.73	8.77
Total Time On-Line*	363.36	116.45

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\* total time in minutes

on-line) of the conferencing system by the women site coordinators, were collected for the four weeks immediately preceding the administration of the questionnaire and instruments. These data were computer generated and are presented in Table 7. The results indicate the women signed-on an average of 22 times (rounded to the nearest whole number) in the four week period. This would seem to suggest they did not sign-on every day and therefore, use of the conferencing system was not part of their regular routine; however, if one examines the data more closely and takes into account days not worked (days off or sick days) then the average number of sign-ons is approximately once per day. Of course, the individual may have signed-on more than once per day and not necessarily once every day. The range of the number of sign-ons during the four week period was between 7 and 37, inclusive. These data indicate some individuals signed-on more than once per day while others signed-on less than once per day. The low total of seven sign-ons was attributed to the illness of one of the site coordinators during the four week period in which the data were collected. A major proportion of the women (ten of the eleven women who participated in the study) signed-on a total of 17 or more times (median of 19) during the four week period.

The total time on-line was also calculated for each of the site coordinators, in addition to the number of times they signed-on. It is important to note the time on-line is actually the "connect time" for the central computer and the satellite computer. Three major factors

affect the connect time including:

1. the modem baud rate,
2. whether the computer user composes and/or reads messages while on-line, if a microcomputer is used to upload and download messages.

Through the use of a microcomputer, the individual is able to create messages prior to signing-on, thereby shortening the length of time on-line (upload messages or comments). Similarly, the individual could conceivably download and save conference and/or mail messages which could then be retrieved at a more convenient time. In addition, a permanent transcript of the conference proceedings is maintained on the computer and can be retrieved and printed in hardcopy for future reference. When a microcomputer is used to upload/download messages the time spent on the system is greater than the actual "connect time". Thus the "connect time" or time on-line is a somewhat incomplete measure of the actual time spent on-line (Hiltz et al., 1985; Kerr & Hiltz, 1982). The average total time on-line or "connect time" for the site coordinators was 363 minutes (rounded to the nearest minute) or 6.05 hours.

Hiltz et al. (1985) calculated, in their study of several computer mediated communications systems, a mean time on-line of 3.5 hours for a one month period. The figure of 3.5 hours is rather less than the 6.05 hours calculated for the site coordinators in this study. Given the average number of sign-ons in the four week period was 22 and the total time on-line was 363 minutes, it was calculated that, on the average, the site

coordinators spent approximately 16.5 minutes on-line when signed-on. Hiltz et al. (1985) in their research, determined the casual user spent approximately 15 to 30 minutes each week on-line (see Table 8). These authors suggested the above amount of time (15 to 30 minutes per week) allowed sufficient time for the computer user to pick up mail and/or conference messages but was not enough time to make substantial contributions to any group interaction. If the site coordinators, in the CoSy survey, signed-on an average of five times per week (a reasonable assumption given the average for the four week period was 22) and spent approximately 16.5 minute on-line, then the average time on-line per week was 82.5 minutes or approximately one hour and twenty minutes. These figures indicate a substantially greater amount of time spent on-line than the casual user documented in the Hiltz et al. (1985) study.

Harasim (1986; 1987) reported higher rates of participation in her study of graduate and professional development students using the PARTI conferencing system (see Table 8). The PARTI system was used to deliver credit and non-credit courses to geographically dispersed students attending OISE (Ontario Institute for Studies in Education). The mean participation rates for the two different groups of students varied from 3.4 to 4.2 hours per person per week (figures are reported means for a twelve week period). These rates of participation are considerably higher than the rates reported for the site coordinators in the CoSy study. One possible explanation for this is that the participants in the above study were



Table 8      Time On-Line reported by Various Researchers.

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RESEARCHER	Time On-line/week
Harasim (1986)	3.4-4.2 hrs
Hiltz, Kerr & Johnson (1985)	15-30 minutes
Site Coordinators (Contact North)	82.5 minutes

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all novice users of the conferencing system.

Harasim (1986; 1987) and Hiltz & Turoff (1981) have reported higher rates of participation in the initial stages of learning to use the conferencing system. This was evident in the Harasim (1986) study in which the mean participation rates steadily declined as the conferencing period continued. For the latter part of the conference the mean participation rate was approximately two hours per person per week. The latter figures are slightly closer to the results found in the CoSy study. A more likely explanation is the different functions of the conferencing system (work, education, social) which require different participation rates. The participants in the Hiltz et al. (1985) study were primarily professionals "working" on the CMC system (comparable to the site coordinator's use of the CMC system) whereas, the participants in the Harasim (1987) study were using the system for primarily educational purposes. Harasim (1987) did not view the decreased time on-line as necessarily an indication of reduced interest or participation but possibly an indication of increased efficiency in conferencing communication. She suggests strategies such as, selective reading and writing, and uploading/downloading of documents contribute to the reduced time on-line. These suggestions are further supported by the research of Hiltz & Turoff (1981) concerning the evolution of user behaviour in the computer conferencing system.

## 1.2 Satisfaction

Another measure of acceptance is the individual's satisfaction with the utility of the system and the group setting. Table 9, outlines the extent to which the site coordinators were satisfied with the overall system. Two aspects of overall satisfaction were examined. These include, satisfaction with the utility of the system and the social setting. Productivity, efficiency and quality of work were used as indicators of satisfaction with the utility of the system. Atmosphere within the group and compatibility of the group members were used as indicators of the social setting. These results are reported in Table 9.

The results of the data collected indicate the women in this study found the productivity, efficiency (time) and quality of work of the system to be very satisfactory. On a scale of one to seven, the respondents rated productivity, efficiency and quality of work at mean levels of 6.91, 5.82 and 5.73, respectively. The productivity of the system was rated highest which would suggest the function of the conferencing system serves the purposes (job requirements) of the site coordinator very well. Efficiency (time) and quality of work were also rated quite high which would seem to indicate that through the use of the conferencing system the site coordinators were able to complete tasks more quickly and produce quality work at the same time. Hiltz et al. (1985) determined that productivity correlated most strongly with the computer user's overall rating of the system. This was reflected in the site

Table 9 Site Coordinators' Satisfaction with the CoSy Conferencing System.

VARIABLE	MEAN	STANDARD DEVIATION
<u>SATISFACTION</u>		
SOCIAL SETTING		
A. Compatibility of Group	6.18	0.87
B. Group Atmosphere	6.55	0.52
II. UTILITY		
A. Productivity	6.91	0.30
B. Efficiency (time)	5.82	1.83
C. Quality of Work	5.73	1.10
OVERALL SATISFACTION	6.36	0.67

coordinators' overall satisfaction with the system which was also rated quite high (6.36). In addition, the respondents reported the compatibility of the group (6.18) and the atmosphere within the group setting (6.55) were excellent. These results suggested a positive attitude existed among the group members with respect to the group setting in which they functioned and the overall system.

The above data establishes the women in this study were using the conferencing system on a regular basis and were very satisfied with the utility of the system as a whole. The respondents were also well satisfied with respect to the atmosphere and compatibility of the group that existed with their colleagues communicating within the computer conferencing system. The above was reflected in their overall satisfaction with the system which was rated quite high (6.36). The data also indicate that although the literature suggests women are hesitant with respect to the use of computers, these women seem to be satisfied with the CoSy conferencing system and used the system on a regular basis. In other words, the women in this study accepted the CoSy conferencing system technology. To examine the basis for the women's acceptance it was necessary to examine the nature of the women's reactions to the system feature and group factor variables of the CoSy system. The conceptual framework outlined by Hiltz et al. (1985) was used for this purpose.

## REACTIONS TO THE SYSTEM

Two major areas of concern were examined to determine the various reactions of the site coordinators to the system:

- 2.1 barriers and conditions of acceptance,
- 2.2 self-assessment of competence.

Table 10, outlines the responses of the women site coordinators to the above areas of concern. A third section (2.3) compares the responses of the experienced and less experienced site coordinators to the above major areas of concern. Table 12, compares the experienced and less experienced site coordinators' reactions to the various CoSy conferencing features.

### 2.1 Barriers or Conditions of Acceptance

The responses of the site coordinators seem to indicate they all achieved a satisfactory level of competence with respect to the variables related to the problems and conditions of acceptance. In general, the women found the accessibility of the system to be very good. The accessibility of the system is a function of two major components including, the availability of computer terminals (including modems and software) and the degree of difficulty of the sign-on procedure. The accessibility of the system with respect to the availability of computer terminals was not a problem for these women because a computer terminal and accessories was located at each one of the Contact North sites. There were however, some difficulties with the sign-on procedure. Some of the women in this study, reported

Table 10 Reactions of the Site Coordinators to the System.

REACTION	MEAN	STANDARD DEVIATION
<u>Barriers or Conditions of Acceptance</u>		
Accessibility	5.91	1.30
Learning Source - on line help	4.18	1.94
Learning Source - tutorial	4.82	1.99
Comprehension	4.50	2.07
Information Overload	4.46	1.57
Loss of Visual Cues	4.18	1.99
Asynchronous Communication	6.55	0.69
Modifiability	4.27	1.85
Forgiveness	3.82	2.23
Reliability	4.55	2.25
Text Editing	4.00	2.37
<u>Self-Assessment of Competence</u>		
Know how to use features (CS-HOW total)	6.00	1.84
Actually use features (CS-USE total)	5.18	1.40

they had some difficulty with signing-on because of the various technical difficulties, including poor telephone connections, busy telephone lines and/or CoSy system down-times (see Appendix D-1). These difficulties occurred only occasionally and are consistent with the problems documented by Harasim (1986) and Harasim & Johnson (1986) in their study of women teachers and computer conferencing. On the whole however, the women site coordinators in this study did not find the accessibility of the system to be a problem.

Two types of learning sources were available to the site coordinators: a learning tutorial which was set up in a similar format to a CAI program, and on-line help which they received from the RCC staff at Contact North. In general, the women found the learning sources (tutorial and on-line help) to be satisfactory as was their comprehension (model) of the system. The results seem to indicate the women were able to "comprehend" the basic model of computer conferencing however, some of the women were not fully cognizant of the scope of the system. This was evident in the open-ended question section of the questionnaire. One or two of the women were not aware that both private and public messages could be communicated on the system. These women believed all communications were automatically sent to all members of the group all the time. In other words, they believed private communications between group members was not possible (Appendix D-2). This assumption is of course false because group members may send private messages to each other via the mail system. The above



was attributed to the individual's lack of experience on the system and the limitations to their knowledge of the functions of the computer conferencing system.

Hiltz et al. (1985) and Harasim & Smith (1986) have stressed the importance of learning sources for the professional computer user and suggest appropriate learning sources to support the novice CMCS user. Harasim (1986) also discussed the importance of creating more equitable gender access and use of computers through the use of gender neutral software. Harasim & Johnson (1986) have suggested software can inhibit the use of a CMC system, especially where women are concerned, therefore, software must be user-friendly, non-threatening and easily accessible for computer users otherwise they will stop using the system. Jackson & Yamanaka (1985) have emphasized the need for the education of women in the area of computer technology. The above necessitates the development of appropriate learning sources to facilitate the learning process for women in the area of computer technology. Mason (1988) has stated the quality/nature of the initial learning process is an important consideration in the development of confident users of the conferencing system.

Information overload, in a CMC system, is a problem that arises when the delivery of increasing amounts of information are presented too quickly for the individual to process (Hiltz & Turoff, 1985). To complicate matters further, messages are not necessarily delivered in sequential order and several simultaneous discussions are common (Davie, 1988; Kerr & Hiltz, 1982; Kerr &

Heimerdinger, 1982). The site coordinators, as a group, did not feel they were overloaded with information. This seems to indicate the site coordinators were able to adequately handle the information they received while on the conferencing system. There are several possible reasons why information overload was not a problem for the women. One possible reason is that the women signed-on regularly and thus did not allow a backlog of messages to accumulate. The women also had the opportunity to process the information at a time most convenient to them because of the asynchronous nature of the computer conferencing medium. In this way, information may be accessed and processed when the individual is ready and able to do so. In addition, the literature (Hiltz & Turoff, 1981; Harasim & Johnson, 1986) suggests the individual who is able to adequately cope with information overload has spent sufficient time on the system to develop the necessary screening skills, to process the relevant material and discard the unimportant information. The results of the CoSy survey tend to indicate the women had spent sufficient time on the system and were able to cope with information overload. It is also possible however, the number of messages and information delivered on the system was not excessive and therefore, the site coordinators were able to process the information without any difficulty. Hence, the site coordinators would have few problems with information overload.

The literature documents both advantages and disadvantages for the lack of nonverbal communication in

computer conferencing systems. The lack of nonverbal cues presents a problem for those who are accustomed to communicating with others in the person-to-person mode. Under these conditions, the nonverbal cues serve to regulate the interaction (Hiltz, 1986; Swart, 1985). On the other hand, the lack of nonverbal cues provides less opportunity for discrimination on the basis of sex, race, colour, physical appearance, credentials and so on (Bray, 1988; Harasim, 1987). The latter argument would seem to be particularly important where women are concerned because the feminist literature has frequently emphasized the need for a democratic environment. Lack of discrimination is central to the concept of a democratic work environment.

Mason (1988) suggests the lack of nonverbal cues can also be a "liberating" experience for those individuals who do not function well in face-to-face interactions. This author also states that without the distraction of nonverbal cues one tends to concentrate more on the content of the message. The results of the CoSy survey indicate an even split regarding the importance of the loss of non-verbal communication while conferencing. Half the respondents considered the loss of non-verbal cues to be of some importance while the other half regarded the loss of nonverbal cues as relatively unimportant in communicating on the conferencing system. One individual regarded the loss of non-verbal cues as neither important or unimportant. The differences may be attributed to preferences in mode of communication, and/or the development of system "cue loads" which

express nonverbal behaviours in the written text.

Hiltz (1986) suggests time is required for the individual to feel comfortable using the system to the point where social interaction on the system seems "natural". Research further indicates that since computer conferencing is a new medium, users of this system must develop various new skills, attitudes and behaviours (etiquette) in order to function successfully in this new medium (Harasim & Johnson, 1986; Swart, 1985; Mason, 1988). As part of this development process, researchers have recognized the need to become familiar with system "cue loads" (Harasim 1986; Swart, 1985). Cue loads include the various nonverbal behaviours (smile, nod, handshake, voice nuances and so on) expressed in the written word on the conferencing system.

The nature of asynchronous communication provides opportunities for individuals to communicate and interact with others at a time, place and pace that is convenient for them. It allows an individual the time to reflect upon the various topics of discussion and to organize responses to the different questions and issues being raised. Results of several studies (Davie, 1988; Hiltz et al., 1985; Kerr & Hiltz, 1982; Mason, 1988; Swart, 1985) suggest an increased ability of computer users to participate in group exchanges as a result of the asynchronous communication feature of computer conferencing. In addition, several authors (Bray, 1988; Harasim & Johnson, 1986; Warren, 1987) suggest women may find this feature appealing because they are able to communicate and interact with others at a time that is

convenient for them. Asynchronous communication may be an especially attractive feature for the women who have the dual responsibilities of work and home/family.

The results of the CoSy survey indicate the site coordinators responded very favourably to the asynchronous communication feature of the conferencing system (6.55). There are several possible reasons for the positive responses. Asynchronous communication provides opportunities for the site coordinators to interact with each other regardless of time and/or distance (geography). This is a particularly important and useful feature for the site coordinators who are spread across northern Ontario and are in different time zones as well. In addition, the asynchronous communication feature allows the site coordinators to communicate with their colleagues at their convenience. Responses and comments to conference or mail messages can be thought out and organized at the site coordinator's convenience rather than responded to immediately as is the usual procedure in a verbal exchange (Harasim, 1987; Hiltz, 1986; Swart, 1985). Asynchronous communication also ensures all members of the group are provided with equal opportunities for communication and interaction (Harasim, 1986; 1987; Hiltz, 1986; 1987; McCreary & Van Duren, 1987).

Equal opportunities for interaction and participation have been emphasized in the feminist literature (Belenky et al., 1985; 1986; Clinchy et al., 1985). In fact, Mason (1988) suggests many more opportunities to express thoughts and ideas are possible

on-line than are possible in the face-to-face situation. Several studies have supported the statement that higher rates of user participation and group interaction occur on the conferencing system (Davie, 1988; Harasim, 1987; Hiltz, 1986; 1987; Mason, 1988; Swart, 1985).

The site coordinators were asked to respond to various questions regarding the system features of the conferencing system including modifiability, forgiveness, reliability and text editing. The reactions of the women to the various system features of the conferencing system were generally satisfactory. The mean responses to each of the system features was 4.00 or slightly better, except for the forgiveness feature which was rated slightly lower (3.82). Hiltz (1986) has suggested time is required to "feel comfortable" in using the system. This author (1984) divided a group of EIES conferencing system users into three groups based on three levels of learning including, the basics, feeling comfortable and learning advanced features (comparable to Bennett's first three stages of acceptance). She reported on average, the conferencing users spent approximately two and a half to three hours learning the basics. After approximately five hours the computer users "felt comfortable" using the system. To learn the advanced features of the system however, required fifty hours or more. The results of the Cosy survey seem to suggest the site coordinators were relatively comfortable using the CoSy conferencing system features listed above.

## 2.2 Self-Assessment of Competence

A self assessed competence test was issued to each of the site coordinators in an attempt to determine the level of competence they had achieved with respect to the CoSy system. Table 11, outlines the responses of the site coordinators to the self-assessed competence test.

The results of the competence inventory indicate the site coordinators knew how to use slightly more features than they actually used. One would tend to expect the computer user would know how to use (CS-HOW) as many features as were actually used (CS-USE); however, it is quite possible for an individual to have knowledge of the use of a particular system feature but not use it. For example, five individuals knew how to use the create and upload feature but only two individuals reported actually using it. Similar results were found with the edit text, search and start a conference features. Some of the discrepancies between the CS-HOW and CS-USE features may be attributable to the lack of opportunity to use the particular features. For example, an individual may have full knowledge of how to start a conference but not have the opportunity, or find it necessary, to start a conference. The same conditions may apply to the other features (search, create and upload, edit text) where these discrepancies were found. Hiltz & Turoff (1981) state the actual use of a particular feature is related to the computer user's perception of the usefulness of the feature. There are some exceptions however: in some cases the perceived usefulness of a feature is directly related to the time spent on the system. These authors

Table 11 Self - Assessment of CoSy Conferencing Competence.

COMPETENCE SKILL	KNOW HOW TO USE (CS-HOW)	ACTUALLY USE (CS-USE)
Add Comments	1.00	1.00
Add New Items	1.00	1.00
Retrieve Messages	1.00	1.00
Edit Text	0.73	0.64
Create & Upload Files	0.46	0.18
Search	0.55	0.18
Move Text	0.09	0.09
Save & Print	0.73	0.73
Load & Edit using W.P.*	0.36	0.36
Start a Conference	0.09	0.00

\* W.P.      Word Processor

\*\*      Values reported are for the proportion of individuals answering in the affirmative.



suggest early on, novice users are satisfied with relatively few CMC system features; however as they become more experienced, the need for a greater variety of conferencing features is necessary. The results of the CoSy survey suggests the women had learned a sufficient number of conferencing skills to enable them to function satisfactorily in their position as site coordinator.

### 2.3 Experienced and Less Experienced Site Coordinators' Reactions to the System.

The women site coordinators were divided into two groups based on experience with the CoSy conferencing system in order to examine in greater detail the level of competence achieved by these individuals. This extends the work of Hiltz et al. (1985) because these authors emphasized the importance of the time required to achieve competence in the use of the system. Dividing the site coordinators into two groups based on experience (time at Contact North) provides an opportunity to examine the different levels of competence achieved by the two groups. Table 12, outlines the experienced and less experienced site coordinators' reactions to the system.

Similar responses between the two groups were noted with respect to the on-line help (learning source), asynchronous communication, modifiability and text editing features of the CoSy system. Several differences were noted as well. The experienced group of women site coordinators seemed to have slightly greater difficulty with the accessibility of the system in comparison to the

Table 12 The Reactions of Experienced and Less Experienced Site Coordinators to the System.

REACTION	LESS EXPERIENCED		EXPERIENCED	
	MEAN	S.D.	MEAN	S.D.
<u>Barriers or Conditions of Acceptance</u>				
Accessibility	6.40	0.89	5.50	1.52
On-line help	4.00	1.58	4.33	2.34
Tutorial	6.00	1.00	3.83	2.14
Comprehension	5.60	1.95	3.40	1.67
Information Overload	3.60	1.14	5.17	1.60
Loss of Visual Cues	5.00	2.12	3.50	1.76
Asynchronous Communication	6.40	0.89	6.67	0.52
Modifiability	4.60	1.14	4.00	2.37
Forgiveness	3.20	1.64	4.33	2.66
Reliability	3.40	1.67	5.50	2.35
Text Editing	4.00	2.45	4.00	2.53
<u>Self-Assessment of Competence</u>				
Know how to use features (CS-HOW total)	6.20	1.48	5.83	2.23
Actually use features (CS-USE total)	5.20	1.30	5.17	1.60

\* S.D. Standard Deviation

less experienced group. This may provide a partial explanation for the slightly lower frequency of sign-ons for the experienced group during the four week data collection period. Some differences in the attitudes toward the learning sources were discovered when the less experienced and experienced groups were compared. Both groups were similarly satisfied with the on-line help they received; however, the less experienced group was considerably more satisfied (6.00) with the tutorial learning source than the experienced group (3.83). In addition, the less experienced group also seemed to have a better comprehension of the model (5.60) of the system when compared to the experienced group (3.40). The results of the CoSy survey indicate that regardless of the differences in the perceptions of the learning sources between the two groups of site coordinators, both groups were able to function as relatively competent users of the CoSy system (actual competence of the site coordinators is discussed later in this section). These data suggest the learning source was adequate for both groups even though the less experienced group's attitudes toward the learning sources were more favourable than the experienced group. It is also possible, the experienced group achieved competence with the system (despite the negative attitude to the learning sources) because they had spent enough time on the system. The latter comment is consistent with the Hiltz et al. (1985) model which suggests achieved competence is a function of time.

A slight difference in the perception of information overload was noted when the less experienced and

experienced groups were compared. The experienced group perceived themselves as subject to information overload to a greater extent (5.17) than the less experienced group (3.60). This may have been because the experienced users had been on the conferencing system for a longer period of time and were in contact with a greater number of people. In addition, the experienced group may have been members of more conferences than the less experienced group, thus more information and messages would be available to them and could contribute to their perception of information overload.

Hiltz & Turoff (1981) state information overload occurs in all regular users of the system at some point in time. These authors suggest information overload peaks at the intermediate level of CMCS use. At the intermediate level, the computer user has not yet had the opportunity to develop screening skills which function to sift out the unimportant and/or irrelevant material for the individual. Hiltz & Turoff (1985) in their study of EIES (Electronic Information Exchange System) users, determined that 90 percent of computer users who spent a total of 20 to 49 hours on-line were always or almost always subject to information overload. On the other hand, individuals who had spent in excess of 100 hours on-line experienced almost no information overload at all. Information overload is thought to occur because of the tendency of beginning computer users to overextend themselves in an effort to be fully informed with respect to the various activities occurring on the system (Hiltz & Turoff, 1985). The results of the CoSy study, seemed

to indicate the experienced group of site coordinators had reached the intermediate level of use and were experiencing more information overload than the less experienced group. Presumably, the less experienced group had not yet reached the intermediate level of CMCS use. These results also suggest a longer total time on-line is required to reach the intermediate level of use for the CoSy system comparable to the intermediate level for the EIES system.

Differences were noted when the experienced and less experienced groups were compared with respect to the lack of nonverbal communication on the system. The less experienced group (5.00) tended to regard the loss of non-verbal communication as more important than did the experienced group (3.50). It may be the less experienced group favoured, or were more accustomed to the person-to-person type interaction and were not yet totally comfortable using the system for communication. These individuals may have felt uncomfortable in communicating without the associated nonverbal cues that facilitate the face-to-face interaction. As Hiltz (1986) suggests, time is required to feel "comfortable" communicating in this medium. Evidently, the less experienced group were not yet totally comfortable with the loss of visual cues. The experienced group in the CoSy study, having spent more time on the conferencing system, would tend to feel more comfortable using the system for communication (social interaction), and be less dependent or conscious of the nonverbal aspect when communicating with others on the system. It is also

possible that because of their experience they were better able to attune themselves to the cue loads on the system. Thus, the importance of the loss of nonverbal communication would be minimized or compensated for in the cue loads.

A comparison of the less experienced and experienced groups yielded various results with respect to the reactions to the system features (modifiability, forgiveness, reliability and text editing). Both groups indicated they were similarly satisfied with the modifiability and text editing features of the system, however, differences were noted between the two groups regarding their reactions to the forgiveness and reliability features of the system. In both instances, the less experienced group tended to be less than satisfied with the forgiveness and reliability features of the system. Possibly, the experienced group were somewhat more familiar with the system and could therefore utilize the system more fully (to their advantage or to cope with arising problems with the various features). A greater familiarity with the features of the system could reduce the problems associated with the reliability and forgiveness features of the system. As a result, the individual may develop a less negative attitude toward certain features.

When the less experienced and experienced groups were compared with respect to their knowledge and actual use of the various system features very few differences were found (see Table 13). A very slight difference was found in favour of the less experienced group in the

Table 13 A Comparison of Experienced and Less Experienced Site Coordinators' Self-Assessment of Competence.

SKILL VARIABLE	LESS EXPERIENCED SC*		EXPERIENCED SC*	
	Know How	Use	Know How	Use
Add Comments	1.00	1.00	1.00	1.00
Add New Items	1.00	1.00	1.00	1.00
Retrieve Messages	1.00	1.00	1.00	1.00
Save & Print	0.80	0.80	0.67	0.67
Edit Text	0.80	0.80	0.67	0.50
Search	0.80	0.20	0.33	0.17
Create & Upload Files	0.60	0.20	0.33	0.17
Load & Edit with W.P.**	0.20	0.20	0.50	0.50
Move Text	0.17	0.00	0.17	0.00
Start a Conference	0.00	0.00	0.17	0.00

\* SC = site coordinator

\*\* W.P. = word processor

-- Values reported are for the proportion of individuals answering in the affirmative.

total number of CS-HOW features. No differences between the two groups were found for the CS-USE features. The small differences between the total scores for both the CS-HOW and CS-USE features seems to indicate both groups of women (less experienced and experienced) had achieved the level of conferencing ability they require to function satisfactorily in their jobs as site coordinators.

#### **REACTIONS TO THE SOCIAL SETTING**

The site coordinators were asked to respond to questions regarding the various aspects of their social integration of the computer conferencing system. Hiltz et al. (1985) and Harasim & Johnson (1986) have stressed the importance of group and social considerations in the adoption of a particular innovation. The importance of social interaction, collaborative exchange, discussion and support in the process of adoption and use of a new innovation has also been emphasized in the literature (Fullan, 1982). Research strongly suggests social and not technical factors are the primary determinants of computer mediated communications acceptance (Hiltz, 1984; Hiltz, Kerr & Johnson, 1985; Lucas, 1975). Hiltz et al. (1985) examined the social structure and interpersonal dynamics of the group but did not consider the cooperative goal structures in a group setting.

Several factors central to cooperative social interaction (Johnson & Johnson, 1975; 1987; Johnson et al., 1984), such as communication and trust skills, are emphasized in this study and serve to extend the work of



Hiltz et al. (1985). The major components examined in this study include, group member participation, democratic environment features and several elements of cooperation. The reactions of the site coordinators to the various group factors listed above are reported in Table 14.

### 3.1 Participation and Democratic Environment Features

Of primary importance in any group interaction, cooperative or otherwise, is the participation of all members in the group. The site coordinators were asked to rate their perception of the group's participation on the CoSy system. Their responses indicate group member participation was good. The literature suggests group member participation rates are higher in the computer conferencing environment than in the face to face interaction (Harasim, 1987; Hiltz, 1986), and as Johnson & Johnson (1975; 1987) point out, participation is necessary for group interaction to occur. The usage statistics, presented earlier in this chapter, support the site coordinators' perceptions that the participation of the group members was satisfactory.

A second component essential to cooperative group interaction is the opportunity for all of the members of the group to interact with each other on an equal basis. In other words, there is the opportunity for equal distribution of communication within the group. Implicit in this statement is the notion of a democratic environment existing within the group structure. Several researchers have commented on the potential of computer

Table 14 Reactions of the Site Coordinators to Group Factors.

VARIABLE	MEAN	STANDARD DEVIATION
Group Member Participation	5.36	1.12
Democratic Environment	6.46	0.93
<u>Cooperative Elements</u>		
Degree of group cooperation	6.46	0.93
Openness	5.82	1.47
Support	6.36	0.92
Acceptance	5.91	1.30
Cooperative Intent	6.36	0.92
Sharing	6.27	1.19
Group Communication	6.33	1.00
Message Clarity	5.89	0.78
Message Completeness	5.22	1.72
Feedback	6.44	0.73

conferencing as a democratic environment (Harasim, 1987; Hiltz, Kerr & Johnson, 1985; Mason, 1988; McCreary & Van Duren, 1987; Kiesler, Siegel & McGuire, 1984; Siegel, Dubrovsky, Kiesler & McGuire, 1986). These authors have pointed out the non-verbal cues, normally evident in the face-to-face interaction, are not present in the conferencing environment; thus, participants in a computer conference tend to concentrate on the content of the messages rather than being distracted by the nonverbal cues (such as physical appearance, sex, race, credentials and so on) as is often the case in a face-to-face situation. Siegel et al. (1986) state that group member participation rates are often unequal in the face-to-face situation. She attributes the differences in participation levels to the influences of nonverbal communication. Computer conferencing minimizes the influences of non-verbal communication and the associated stereotyping that occurs along with it. Kiesler et al. (1984) reported more evenly distributed participation rates and a less hierarchical structure among group members in a cooperative computer conferencing environment.

The asynchronous nature of computer conferencing ensures all individuals have the opportunity to interact with the other group members. Harasim (1987), Mason (1988), Hiltz (1986) and others report computer conferencing reduces the competition for "air-time". This is particularly important for individuals who do not respond well in the face-to-face situation. Hence, individuals who are less assertive or who are

self-conscious in the face-to-face situation find the computer conferencing environment conducive to communication and/or self expression (Harasim, 1986). In addition, there is less opportunity for the more outgoing and/or vocal members of the group to dominate the discussion in a computer conference (Harasim, 1987; Hiltz, 1986; Swart, 1985; Mason, 1988). Each individual is afforded the same opportunities to respond and contribute to the discussions in the conference. These authors did note however, the possible limitations for individuals with poor literacy skills. Equal opportunity for participation is further enhanced by the removal of distance and time constraints. Access to the group is available 24 hours per day, thus, participants may log-on to the system at any time. Individuals are not limited by where they live or work since geographic distance is no longer a barrier either.

The site coordinators in this study were asked to rate their perception of the democratic environment with respect to the CoSy conferencing system. Their responses indicate very positive attitudes as they rated the democratic environment as very good to excellent. These findings are not surprising considering the number of "democratizing" features (mentioned above) that provide favourable conditions and advantages for the site coordinators. In addition, the removal of the barriers to access (time and distance) is of importance because the site coordinators are spread across northern Ontario and have various responsibilities particularly in terms of their work schedule (the site coordinators did not

always work regular hours). Over half of the women in this study commented on the convenience of the conferencing system in the open-ended question section of the questionnaire. They specifically referred to the convenient access of other group members in terms of time and distance (see Appendix D-3).

Several of the democratic type features of the conferencing system also meet the special needs of women. Equal opportunities for participation are available via the computer conferencing medium. This may have proved to be an important factor for the women in the CoSy survey, since they were functioning as part of a mixed gender conference (although the majority of the participants in this conference were women). Research (Rosser, 1986; Spender, 1981) indicates male dominant norms prevail in verbal conversations and interactions, particularly in education systems. However, the literature also suggests computer conferencing environments provide diminished opportunities for dominant personalities to flourish because of the asynchronous nature of the medium (Harasim, 1987; Hiltz, 1986; Swart; 1986), thus, group interaction of all participants is facilitated. In addition, the lack of nonverbal communication provides fewer opportunities for discrimination on the basis of gender, race, colour, religion, and so on.

### 3.2 Cooperative Elements

A number of researchers have indicated computer conferencing promotes group cooperation and interaction

(Harasim, 1986; 1987; Hiltz, 1986; Mason, 1988). Cooperation has been identified as a central component of the learning and working styles preferred by women (Bray, 1988; Coulter, 1988; Clinchy, Belenky, Goldberger & Tarule, 1985; Zelazek, 1986). Effective cooperation, as outlined by Johnson et al. (1984), requires three basic skills. These include communication, trust and controversy skills. This study examined the reactions of the site coordinators to the various components that comprise the communication and trust skills. The results indicate overall the site coordinators were satisfied with the social structure of the CoSy conferencing system within which they were functioning. Several indicators of their satisfaction with the cooperative group structure were rated as good or better. These indicators are described in more detail below.

Communication skills are essential for any cooperative interaction to occur. Johnson & Johnson (1975) have defined communication as the:

"exchange or sharing of thoughts and/or feelings through the use of symbols which represent similar conceptual experiences for the individuals involved in the interaction."

Two basic types of communication skills are necessary for interaction to occur. These include sending and receiving skills. These skills enable the individual to accurately represent his/her thoughts to others, and also to accurately interpret the messages communicated by others. Computer conferencing adds a third dimension which involves the actual mechanics of

sending and receiving messages via a computer medium. The above skills enhance the ability of group members to share resources and information, assist and support each other, identify problems, structure a plan of action, work toward a common goal(s) and/or socialize with each other (Johnson et al., 1984).

The results of the competence test indicate all of the site coordinators were familiar with (CS-HOW), and used (CS-USE) the basic sending and receiving commands on the CoSy system. The site coordinators were also asked to rate their perception of the essential elements of sending and receiving skills including, message clarity, message completeness and feedback on the CoSy system. Specifically, the respondents were asked to rate the extent to which message clarity, completeness, and feedback occurred on the system (always or never). The site coordinators felt they almost always received feedback (6.44) for the messages they sent on the CoSy system. These results suggest interaction between and among the group members was occurring on a regular basis. The participants in the study did not rate message clarity (5.89) and completeness (5.22) as high as the feedback variable but still found these aspects of communication to be quite good. As an overall check, the site coordinators were asked to rate their perception of group communication on the conferencing system. The results indicate group communication on the system was very good (6.33). This suggests the participants were able to communicate with each other relatively effectively.

Trust is another essential component of cooperation. Trust is necessary for stable cooperation and effective communication to occur (Johnson et al. 1984; Johnson & Johnson, 1975; 1987). Trust skills incorporate the elements of openness, sharing, support, cooperative intent and acceptance. These skills are described in greater detail in chapter two. Basically, trust skills encourage individuals to: share their thoughts, ideas, information, resources and feelings with other members of the group (openness and sharing); recognize the strengths and abilities of other group members (support); accept individuals in the group as they are (acceptance) and expect all group members to work in a collaborative manner (cooperative intentions). The site coordinators were asked to rate their satisfaction with the above elements of trust in relation to the computer conferencing environment they were working in. The results indicate the women were very satisfied with the trust elements exhibited in the group. The highest rated elements were cooperative intent (6.36), support (6.36) and sharing (6.27) in the group. Openness (5.82) and acceptance (5.91) within the group were also quite good. As an overall indicator the site coordinators were asked to rate the degree of trust within the group. Again, the respondents seemed to be well satisfied (5.77) with this element. Several of the women commented on the trust and communication features in the open-ended question section of the questionnaire (see Appendix D-4). Their responses indicated very positive reactions to the feedback they received, their ability to communicate with people in the



conference and the accessibility of information.

The degree of cooperation within the group was used as an indicator of the group's overall perception of cooperation including both communication and trust components. The respondents felt very strongly there was a high degree of cooperation within the group (6.46). It would seem the women in this study were working in a cooperative environment and were satisfied in doing so. The results of the modified GRLSS opinionnaire indicate these women preferred the cooperative learning and working style (see chapter three). As stated earlier, computer conferencing enhances cooperative interaction (Harasim, 1986; 1987; Harasim & Johnson, 1986; Hiltz, 1986). The site coordinator's preference for cooperative learning and working probably contributed to their overall satisfaction with the computer conferencing system and ultimately to their acceptance of the system.

#### **CONCLUSIONS AND IMPLICATIONS**

This study examines the reactions of women to the introduction of a relatively new technology, computer conferencing. Based on the preliminary model of acceptance developed by Hiltz et al. (1985) the study focuses on the two major factors that influence the acceptance of a CMC system, system features and group factors. Hiltz et al. (1985) developed the model of acceptance in an attempt to describe the process in which computer users adopt and use computer mediated communications. The model examines acceptance from a learning perspective and suggests time is required to

achieve the various levels of competence in the use of the system. This study focused on the learning approach to the adoption and use of a CMC system. The above perspective differs from the "barriers" approach to acceptance which emphasizes problems and conditions as barriers to the adoption and use of a CMC system.

Acceptance was defined by Hiltz et al. (1985) as the use of and satisfaction with a CMC system. The proposed model of acceptance (Hiltz et al., 1985) centres on the interaction between and among three major variable sets, system features, group factors and individual difference measures. Specifically, the model examines the relationship between individual difference measures, and how these variables interact with the different system feature and group factor variables. System feature variables reflect the technical aspect (hardware, software, CMC utility and documentation) of the system and group factor variables reflect the social aspect (sociometric ties, cooperative elements, cohesiveness, leadership style) of working on the system.

As an extension of the above research, this study examined women site coordinators' use of and satisfaction with the CoSy conferencing system. Computer generated usage statistics were used as indicators of the women's use of the CoSy conferencing system. These data provided information regarding the number of times an individual signed-on and the total time on-line during a four week period. Indicators of satisfaction were used to measure the women's satisfaction with the utility of the system (productivity, efficiency and quality of work) and social

setting (group atmosphere and compatibility). The study also included an examination of the women site coordinators' reactions to selected system features and group factors, as outlined by the Hiltz et al. (1985) acceptance model. In addition, the women were divided into two groups based on a proxy measure of experience with the CoSy conferencing system. The reactions of the women to the system were then examined as a function of experience.

The group factors segment of the study was expanded to include several cooperative elements because cooperation is seen as congenial to the learning and working conditions preferred by women. Hiltz et al. (1985), in their original research, examined the social structure and interpersonal dynamics of a group but did not consider task oriented, cooperative goal structures in a group setting. This study extended the work of Hiltz et al. (1985) by including the cooperative skill dimensions essential for collaborative work. The selected cooperative elements, including communication and trust skills, were consistent with the framework outlined by Johnson & Johnson (1975; 1987) and Johnson et al. (1984).

This study examined the women site coordinators' use of and satisfaction with the CoSy conferencing system within the conceptual framework outlined by Hiltz et al. (1985). Data were gathered concerning the number of times the site coordinators signed-on and the total time on-line. The data collected indicated the women were using the system on a regular basis and were on-line long

enough to contribute to the interactions and exchanges occurring on the system (as opposed to just reading mail and conference messages). In addition, the results of the self-assessment of competence test indicated the women had achieved a level of competence that was adequate for their purposes and needs as a site coordinator. The focus then turned to the question of what factors could have contributed to the women's adoption and use of the system.

Perceived satisfaction with the utility of the system and the social setting on the system have been positively linked to the acceptance of a CMC system (Kerr & Hiltz, 1982; Hiltz et al., 1985; Harasim & Johnson, 1986). Several indicators of satisfaction were used in this study to examine the reactions of the site coordinators to the various components of system utility and the social setting. Productivity, efficiency (time) and quality of work were used as indicators of the utility of the system. Group atmosphere and compatibility were used as indicators of the social setting within which the women functioned. The results indicated the sample of women in this study were very well satisfied with the utility of the system and the social setting occurring on the system. These results were further supported by the women's high overall satisfaction with the system.

The above results provided a basis for the acceptance of the CoSy system. The study then examined the women's reactions to the system features and group factors of the CoSy system. As a group, the women's

reactions to the technology were generally favourable. Differences were found when the women were split into two groups based on computer conferencing experience. The results of the experienced and less experienced split indicated the women were at different stages of competence with respect to the use of the system. This was particularly true of their reactions to information overload and loss of nonverbal communication.

Recognizing the limitations of conducting research with a small sample and the necessity of conducting further research in this area, the following conclusions were reached.

The women used the system regularly and were quite satisfied with the usefulness (utility) of the conferencing system. These results tend to confirm the suggestion in the literature that perceived satisfaction with the utility features of the system are positive indicators of the successful adoption and use of a CMC system. The results also indicate the women reacted positively to the CoSy technology.

The women in this study were also well satisfied with the cooperative social arrangement of the group. The facilitation of cooperative interaction through the use of the computer conferencing medium, and the notion that cooperation is the preferred learning and working style of women (indicated in the literature) are logically the major contributors to the acceptance of this technology by the women site coordinators in this study. Further research is required however, to determine the extent to which these factors are necessary

for the acceptance of the computer conferencing system. In particular, research is necessary to determine the extent to which various factors (both system feature and group factor variables) contribute to the development of successful and confident users of the system. The results of this study tend to indicate a combination of factors including cooperative goal structures of the group, satisfaction with the utility of the system and possibly the initial obligatory use of the system contributed to the successful acceptance of the CoSy conferencing system by the women site coordinators. Research is necessary to determine whether these factors/conditions are required in all successful computer conferencing environments or does it perhaps, depend on the different purposes for which computer mediated communications are used (education, work, social). In other words, do different factors play a more important role in the acceptance process when the purpose for which the CMC system is intended is different. There may be situations where CMC is not an appropriate application.

Overall, the results of this study indicate the women site coordinators reacted favourably to the introduction of computer conferencing technology. This occurred despite the suggestion in the literature that women have some difficulty in the area of computer technology. Of considerable interest and importance to women is the notion that group interaction and cooperative exchanges are enhanced in a computer conferencing environment. Cooperation and group

interaction are cited as the preferred learning and working conditions of women. In addition, the facilitation of cooperative exchanges and group interaction, through CMC technology, contributes to a democratic work environment.

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APPENDIX A

VARIABLE MAP FOR ACCEPTANCE STUDY

**ACCEPTANCE DECISION PROCESS**

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Use

- 1.1 Number of times signed on
- 1.2 Duration of on-line communication

Satisfaction

- 1.1 Compatibility with the group
- 1.2 Group atmosphere

Utility

- 1.1 Productivity
- 1.2 Time efficiencies
- 1.3 Quality of work

**SOCIAL INTEGRATION**

-----

Group participation levels

Democratic Environment Established

Cooperative Elements

- 1.1 degree of group cooperation
- 1.2 openness
- 1.3 group support
- 1.4 acceptance
- 1.5 cooperative intent
- 1.6 sharing
- 1.7 within group communication
- 1.8 message clarity
- 1.9 message completeness
- 1.10 feedback

**SYSTEM INTEGRATION****PROBLEMS AND CONDITIONS OF ACCEPTANCE**

- 1.1 accessibility
- 1.2 learning sources
  - a. on-line help
  - b. tutorial
- 1.3 comprehension
- 1.4 information overload
- 1.5 asynchronous messages
- 1.6 loss of visual cues
- 1.7 modifiability
- 1.8 reliability
- 1.9 forgiveness
- 1.10 text editing

**Self-Assessment of Progression to Competence**

- 1.1 Know how to use
- 1.2 Actually use

APPENDIX B

COSY QUESTIONNAIRE

GENDER: \_\_\_\_\_

AGE: \_\_\_\_\_

Years of experience with computers: \_\_\_\_\_

Years of experience with a conferencing system: \_\_\_\_\_

Education Background: \_\_\_\_\_

User ID \_\_\_\_\_

**SYSTEM FEATURES**

1 ACCESSIBILITY - the knowledge and effort required by the learner to gain access to the system.

DIFFICULT 1 2 3 4 5 6 7 EASY

COMPREHENSION - the ability of the user to understand as a whole what the system is capable of accomplishing, before having to learn how to do it.

DIFFICULT 1 2 3 4 5 6 7 EASY

GUIDANCE AND SELF-DOCUMENTATION (on-line help) - the ability of the system to provide guidance or training to the user as and when required.

POOR 1 2 3 4 5 6 7 EXCELLENT

ON-LINE TRAINING - the capacity of the system to train users on-line, via tutorials and learn conferences.

POOR 1 2 EXCELLENT

MODIFIABILITY - the ability of users to adapt the system to serve their needs.

POOR 1 2 3 4 5 EXCELLENT

FORGIVENESS AND RECOVERY - the ability of the system not to penalize users unnecessarily for mistakes and to provide mechanisms to easily recover from errors.

POOR            1       2       3       4       5       6                    EXCELLENT

RELIABILITY - the ability of the system to function without error or loss of data.

POOR            1       2       3       4       5       6                    EXCELLENT

TEXT EDITING - the ability to directly modify text during the composition process.

POOR            1       2       3       4       5       6                    EXCELLENT

#### REACTIONS TO THE SYSTEM

The following questions are concerned with your overall reaction to the system as a means of communication and work.

1. Overall the system is:

POOR            1       2       3       4                    EXCELLENT

2. Using the system is:

a. UNPRODUCTIVE    1       2                    PRODUCTIVE

b. TIME WASTING    TIME SAVING

3. Quality of work and system use.

POOR            1       2       3       4       5       6                    EXCELLENT

**GROUP CHARACTERISTICS**

Please indicate your impressions of your on-line group.

1. Degree of cooperation within the group.

NON EXISTENT    1    2    3    4    5    6    7            VERY STRONG

2. Compatibility of group members.

POOR            1    2    3    4    5    6            EXCELLENT

3. Atmosphere within the group.

POOR            1    2    3    4    5            EXCELLENT

Please indicate your feeling in regard to the following as it relates to your group and computer conferencing environment.

1    OPENNESS - free expression of thoughts, feelings, opinions, ideas, information and reactions to the issues pursued by the group.

Group member openness.

POOR            1    2    3            EXCELLENT

SUPPORT - recognition of strengths and abilities of other group members and their capacity to productively manage the various situations that may arise.

Support by other members.

POOR            1    2    3    4            EXCELLENT

ACCEPTANCE - the communication of high regard for a group member(s) and his/her contribution (both social and intellectual) to the group.

Your acceptance of others into the group.

NONE      1      2      3      4      5      6      7      ALL MEMBERS

COOPERATIVE INTENTIONS - the expectation that group members will behave in a cooperative manner, i.e., members will work together toward a common goal.

Behaviour of other group members.

NEVER      1      2      3      4      5      ALWAYS

SHARING - the offering of one's materials and resources to others in an effort to achieve common goals.

Behaviour of other group members.

NEVER      1      2      3      4      5      ALWAYS

COMMUNICATION - the exchange or sharing of thoughts and feelings through symbols that represent approximately the same conceptual experience for everyone involved.

a. message clarity and interpretation.

NEVER      1      2      3      4      5      6      7      ALWAYS

b. message completeness.

NEVER      1      2      3      4      5      6      7      ALWAYS

c. feedback received for messages sent (where applicable).

NEVER      1      2      ALWAYS

**SOCIOMETRIC TIES**

1. BEFORE you began computer conferencing:

a. did you have any experience with computers in general?

YES NO

IF yes how many years of experience? \_\_\_\_\_

did you have any experience with computer conferencing before you started this job?

YES NO

IF yes how many years of experience? \_\_\_\_\_

How long have you been computer conferencing at your current job (as a site coordinator).

YEARS \_\_\_\_\_ MONTHS \_\_\_\_\_

**DISTRIBUTED EDUCATION SYSTEM**

Please indicate your impressions of the following features of computer conferencing.

1. Active participation of group members.

POOR 1 2 3 4 5 6 - EXCELLENT

2. Information overload.

LOW 1 2 3 4 HIGH

Asynchronous communication - the ability to work in an environment independent of time or distance.

NEGATIVE 1 2 3 4 5 6 - POSITIVE



4. Loss of nonverbal communication - e.g. visual cues.

UNIMPORTANT 1 2 3 4 5 6 7 IMPORTANT

Democratic environment established - influences of gender, race, ethnic background, etc. are minimized.

DISAGREE 1 2 3 4 5 6 7 AGREE

### GENERAL QUESTIONS

Please comment on the following questions:

- 1 What do you think are the advantages and disadvantages to using the CoSy conferencing system as a medium/tool in a cooperative setting?

Do you feel MORE INHIBITED / LESS INHIBITED (please circle) when communicating with other members of your group via the computer conferencing system (as compared to other media such as phone, mail, or face-to-face interaction). Please explain.

Are you able to communicate better (e.g., in terms of content, presentation, thought organization, etc.) via the computer conferencing system than you would using any other medium? Please explain.

Are there any other aspects/features/characteristics of computer conferencing that you may want to comment on?

## APPENDIX C

## CONTACT NORTH ACCESS SITES FOR NORTHWESTERN ONTARIO.

Armstrong  
Atikokan  
Big Trout Lake  
Dryden  
Fort Frances  
Geraldton  
Ignace  
Kenora  
Manitouwadge  
Marathon  
Nipigon  
Red Lake  
Sioux Lookout  
Terrace Bay  
Thunder Bay

Mine Centre  
Sandy Lake

## APPENDIX D

## SITE COORDINATOR ANECDOTAL COMMENTS

- 1 "I have had an unusual number of technical difficulties with CoSy, likely caused by Fort Frances antique phone lines".
- "Sometimes hard to get on-line".
- "Poor telephone lines result in many attempts to log-on".
- "Cannot always get on the system".
- "I do prefer computer conferencing to using the mail (postal service) and certainly prefer it to face-to-face interaction. However, I do fear lack of privacy, re: delicate matters (and personal ones).
- "I could understand some users feeling apprehensive about expressing their ideas on CoSy".
- "Great access to information for isolated sites".
- "One does not have to play telephone tag. Many people can participate in the discussion at their leisure".
- "No limit on time when I can use it. The greatest advantage is being able to communicate with all co-workers everyday and at a time convenient to me".
- "The greatest asset is that the student can participate at their convenience provided they have free access to a computer".
- "Obliterates the isolation of site coordinators (especially those in remote sites) - time/distance independent".
- "Many issues can be dealt with at once, at a time convenient to the user".

"Convenience - nomail, stamps, copying - fast".

"Can communicate to people at times appropriate to personal hours".

"Excellent support network".

"Feedback is fast".

"Communication with co-workers is enhanced".

"Feeling of unity/bonding in (the) group".

"Great information sharing opportunities. Great feedback system - good support system".

"Sharing of experiences, problems, questions to help other site coordinators - brainstorming for new ideas".

"Helps you to communicate with different facets of the community".

"The advantage of computer conferencing is that I have time to read my comments and ensure that they communicate what I wish".

"...able to receive input from many co-workers on a particular topic".

"Sharpens writing skills and develops students' ability to to express themselves through the written word - develops communication skills".

"Forces one to organize thoughts in order to articulate them".