

NON-VERBAL COMMUNICATION IN INSTANT MESSAGING

A Capstone Project submitted to Southern Utah University in partial fulfillment of the
requirements for the degree of Master of Arts in Professional Communication

May 2013

By

Michael D. Plumb

Thesis Committee:

L. Paul Hesselbee, Ph.D., Chair

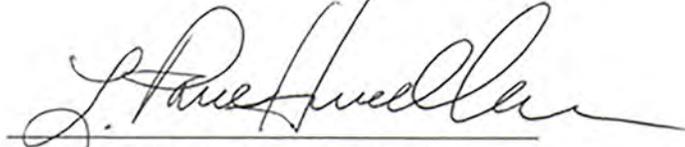
Matthew H. Barton, Ph.D.

Arthur T. Challis Jr., Ed.D.

Approval Page

We certify that we have read this project and that, in our opinion, it is satisfactory in scope and quality as a thesis for the degree of Master of Arts in Professional Communication

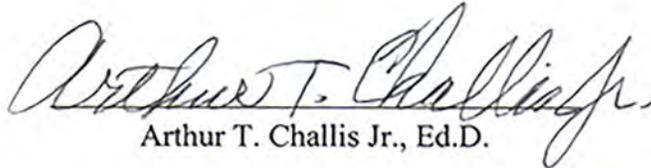
Thesis Committee:

A handwritten signature in cursive script, appearing to read "L. Paul Husselbee", written over a horizontal line.

L. Paul Husselbee, Ph.D., Chair

A handwritten signature in cursive script, appearing to read "Matthew H. Barton", written over a horizontal line.

Matthew H. Barton, Ph.D.

A handwritten signature in cursive script, appearing to read "Arthur T. Challis Jr.", written over a horizontal line.

Arthur T. Challis Jr., Ed.D.

NON-VERBAL COMMUNICATION IN INSTANT MESSAGING

Michael Plumb

L. Paul Hesselbee, Ph.D., Thesis Supervisor

ABSTRACT

With the dramatic increase of technological solutions in the world for basic communication techniques and procedures it is important to understand how a shift from FTF (Face to Face) communication as the primary means of communication to CMC (Computer Mediated Communication) would affect our global society. This study examines several particular issues that arise if CMC were to become the dominate form of communication used throughout the world. In particular, this study investigates the lack of non-verbal cues present in CMC and how this absence can affect communication and message understanding between parties. This study also examines the importance of emotional cues and how CMC and FTF deal with them differently, and in what ways one form of communication is more effective or less effective at using these cues. Finally, this study examines how effective CMC and FTF are at allowing groups to complete complex tasks typical of a small business environment. The subjects for the study reside at a small western college enrolled in communication courses.

ACKNOWLEDGMENTS

It is a great honor to be considered worthy enough to have a network of friends and family who are more than willing to support me in all my endeavors. In particular I need to thank my wife who has somehow managed to put up with the days and weeks that I am rarely home, and the inability to spend as much time with her as I should.

TABLE OF CONTENTS

APPROVAL PAGE	2
ABSTRACT.....	3
ACKNOWLEDGMENTS	4
CHAPTERS	
1. INTRODUCTION.....	6
2. LITERATURE REVIEW	10
Non-verbal Communication.....	10
Facial Expression.....	13
Posture.....	14
Eye Behavior	15
Communication and Technology	17
Online vs. Traditional Relationships	19
Instant Messaging	20
Imagery and Emotion.....	21
Rationale	24
Research Questions.....	26
Hypothesis.....	26
3. METHOD	27
Procedure.....	27
Data Analysis	29
4. ANALYSIS AND RESULTS.....	31
Design	31
Results.....	31
Demographics.....	31
Familiarity with IM and FTF Communication Techniques	32
Emotional Responses.....	33
Non Verbal Cues	34
Completing Complex Tasks	36
5. DISCUSSION	40
Detectable difference between CMC and FTF.....	40
Limitations	42
Future Research.....	43
Final Thoughts.....	44
REFERENCES CITED	47
APPENDIXES	56

Chapter One

Introduction

Within the last century, a remarkable change has taken place in the way people communicate. Once face-to-face communication was the staple for two people to share ideas and thoughts; it now has become less and less the sole method of effective communication. Today, we are surrounded by computers, smart phones, and technological marvels built for the sole purpose of communication. Where once a letter would take weeks or month to travel around the world, we can now email someone and have a response within minutes. In this world where people can speak and communicate with individuals they have never met personally, we need to step back and ask ourselves: In what ways does this increasing lack of FTF communication hinder or benefit our social and professional relationships? How are emotions and ideas conveyed effectively if we rely on computer-mediated communication? How are relationships built and maintained if we deal solely with CMC as our primary means of communication? How much information is lost when people communicate without the ability to observe non-verbal cues?

Text-based CMC, such as email, computer conferencing, and chat systems, differ from FTF communication in several respects, the most apparent of which is that the written medium precludes the exchange of non-verbal cues that accompany FTF exchanges. This lack of non-verbal cues has led some scholars to suggest that impressions and relational development might be thwarted in CMC, rendering it a relatively impersonal medium (e.g., Kiesler, Siegel, & McGuire, 1984; Siegel, Dubrovsky, Kiesler, & McGuire, 1986).

Early research suggested that people using CMC were prevented from gaining communication impressions because of the lack of non-verbal cues in the medium (e.g., Kiesler, 1986; see also Kiesler et al., 1984; Siegel, et al., 1986). Yet it has also been shown that the lack of communication impressions did not mean that close relationships are not possible in CMC. Only that if relationships are to form via CMC they more likely will take longer to achieve the same relational development as FTF communication achieves (Parks & Floyd, 1996).

While it is acknowledged that online communication lacks many of the physical and non-verbal cues made available in face-to-face communication, many theorists reject the idea that this “lack” represents an insurmountable obstacle to the development of close personal relationships. Instead, it is argued that text based cues and the augmentation of computer mediated relating with other forms of communication render online relationships as intimate and personally fulfilling as any other (e.g., Whitty & Gavin, 2001; Walther, 1996). For instance, it has been shown that the Internet provides venues for the initiation of relationships, from friendly to romantic, which fulfill the communication needs of many individuals (e.g., Parks & Floyd, 1996; Parks & Roberts, 1998). It has also been shown that sometimes CMC interaction be just as personal as FTF interaction or even surpassing FTF interaction in some interpersonal aspects (Walther, 1996). For example, numerous relationships have been instigated on dating sites that rely solely on CMC for the beginning of relationships. Some of these relationships never progress beyond CMC due to the satisfaction both parties feel with their current relationship growth.

It is clear that technology and sociality are intertwined in the case of online communication networks, but the socially mediated nature of technology in all its forms is less obvious (Lewis & Fabos, 2000). Literacy has always employed available technologies – stylus, pen, printing press, and now digitized code. However, once a technology becomes commonplace, people tend not to think of it as technological (Lankshear, Snyder, & Green, 2000). As Herring (2004) pointed out, young people with Internet access have come to naturalize IM and chat as an ordinary part of their lives. The only difference is unlike literacy advancements in the past, technology has not changed the primary way people communicate as drastically before. Where books and letters helped to facilitate communication between two parties, it was used much less often as the primary communication means between these parties. Today in certain demographics it is quite common for CMC to entirely replace FTF communication as the primary means of correspondence between two parties.

The biggest difference between FTF communication and CMC is the lack of non-verbal cues in CMC that are readily available in FTF. Whether two participants communicate effectively depends just as much on their sharing an understanding of the non-verbal signs as on their having a common vocabulary of words (Abercrombie, 1972). The absence of non-verbal cues can result in misunderstanding and misinterpretation between communicative participants. (Hightower, Sayeed, Warkentin, & McHaney, 1997). This misunderstanding and lack of cohesiveness begin to break down the communication process and cause problems for participants attempting to converse (Sarbaugh-Thompson & Feldman, 1998; Kiesler, Siegel, & McGuire, 1984).

In summary, technology has played a role in the progress of communication to a global level. Yet it has not been shown whether this shift from using FTF as the primary form of communication to CMC will hold major consequences in how people and societies interact. To determine the extent that the shift to CMC will have on communication this review will begin by exploring the importance of non-verbal communication, particularly Facial Expressions, Posture, and Eye Direction. I will also be detailing CMC and its importance. Finally I will be looking at how important imagery can play in determining emotional responses. To help focus this research, we will limit the experimental research to the use of Instant Messaging in this study.

Chapter Two

Literature Review

Non Verbal Communication

When an individual communicates FTF with another individual, a multitude of signals are sent and interpreted by each party, and those third-party individuals viewing their interaction. These signals can be vocal and intentional, such as speaking to one another in an understood language or by using non-verbal behaviors recognized between both parties. Sometimes these signals are not as easy to identify specifically, but we still process their existence and understand the influence they may have on FTF communication.

Non-verbal communication is a collection of expressions and body language an individual consciously or unconsciously expresses to anyone watching. These behaviors include facial expressions, postures, eye behaviors, tone of voice, and gestures. Non-verbal behaviors are of central importance to the expression of emotions (Bjerregaard, 2010). These non-verbal cues help regulate the flow of conversation, facilitate turn-taking, provide feedback, and convey subtle meanings. As a result, FTF conversation is a remarkably orderly process. In normal FTF conversation, there are few interruptions or long pauses and the distribution of participation is consistent, though skewed toward higher status members (McGrath, 1990). When considering the impact of non-verbal communication in FTF interactions, some would argue that understanding language in the FTF context is impossible without non-verbal communication considered as a factor (Bjerregaard, 2010).

Research shows that the lack of non-verbal communication in purely online media, such as text messaging, emails, and social media, can cause problems for a receiver trying to interpret the message (Sarbaugh-Thompson & Feldman, 1998; Kiesler, Siegel, & McGuire, 1984). These problems may result in a misinterpretation of a message and a loss of cohesive communication between both parties. Using strictly CMC types of communication removes non-verbal communication from the equation and alters the orderliness and effectiveness of communication normally found in FTF information exchange (Hightower, Sayeed, Warkentin, & McHaney, 1997).

The lack of non-verbal cues also impacts the richness of information communicated between individuals. Daft, Lengel, and Trevino (1987) defined media richness as “the ability of information to change understanding within a time interval” (p.560). Rich media allow multiple information cues (the words spoken, tone of voice, body language, etc.) and feedback. It takes more time and effort by group members to achieve the same level of mutual understanding in a non-verbal cue lean medium (a lean medium is defined as having few non-verbal cues to understand), such as CMC, than in a rich one (a rich medium is defined as having numerous non-verbal cues to understand) such as FTF communication (Warkentin, Sayeed, Hightower, 1997).

Sproull and Kiesler (1986) state that CMC reduces “social context cues,” aspects of physical environment and non-verbal hierarchical status cues (Siegel, Dubrovsky, Kiesler, & McGuire, 1986), the absence of which is said to deter interpersonal impression. According to Kiesler (1986), “without non-verbal tools, a sender cannot easily alter the mood of a message, communicate a sense of individuality, or exercise

dominance or charisma. Communicators feel a greater sense of anonymity and detect less individuality in others” (p. 48).

The use of SNS (Social Network Sites) like Facebook could also have an impact on non-verbal decoding skills as well (Ho & McLeod, 2008). In particular, patrons who do most of their social networking online are at a disadvantage when it comes to subtle non-verbal decoding, like what is afforded in FTF interactions (Flaherty, Pearce, & Rubin, 1998, and Chenault, 1998).

Bavelas and Chovil (2000) wrote, “Language in FTF dialogue is composed of both audible and visible acts and although these acts can be separated analytically, they are completely interwoven in performance” (p. 164). Given the importance of non-verbal behaviors to communicate emotions, several researchers have proposed that the ability to interpret non-verbal emotional cues play an important role in maintaining successful relationships (Carton, Kesslet, & Pape, 1999).

The importance of non-verbal communication really shines when using it to not only decode emotions of communication participants, but also communication intent. It has been shown that when people lie they usually expend effort censoring and disguising their non-verbal cues. Yet, some of the involuntary, spontaneous expressions of emotion are not easy to conceal completely (Ekman, & Friesen, 1982). Interest in being able to discover how non-verbal cues might differ when people lie have led to decades of research developing fine-grained and comprehensive measurement techniques to determine emotion and intent in communication (Ekman, & Friesen, 1982). To show the importance that non-verbal communication plays in FTF communication in specific and overall communication in general, I will focus on three groups of non-verbal

communication in particular: Facial Expressions, Posture, and Eye Behavior. These non-verbal cues are commonly used in most cultures and we can derive cues based on their universality.

Facial Expressions

Oatley and Jenkins (1992) observed, “By far the most extensive body of data in the field of human emotions is that on facial expressions of emotion” (p. 67). Other researchers have recognized that certain expressions are universal across cultures and races. As Matsumoto (1990) said, “The universality of facial expressions of emotion is no longer debated in psychology” (p. 195). This is commonly referred to as The Universality Thesis (Russell, 1995).

The Universality Thesis in regards to Facial Expressions examine two assertions: (a) Certain facial expressions are “easily recognized” (Izard, 1977, p. 501); and (b) recognition is in terms of discrete, “specific emotion categories” (Izard, 1977, p. 502) - such as happiness, surprise, fear, anger, disgust, contempt, and sadness (Russell, 1995). If we are able to recognize emotions through facial expressions across cultures then losing this type of non-verbal communication through lack of FTF interactions can be detrimental to overall communication and expressing specific emotions in general.

Facial expressions and the emotions attached to them can be identified even if the subjects are from different cultural backgrounds. Though this recognition is far from perfect, it has been proven to be better than random chance, and thus a viable way of determining an individual’s emotional state. DePaulo (1992) wrote, “The fact that facial expressions of basic emotions are fundamentally the same across cultures (e.g., Ekman, 1982; Izard, 1971) is consistent with the position that there may be automatic links

between the experiencing of the basic emotions and the expression of those emotions” (pp. 205-206).

However, not everyone agrees with the thesis of universality and some argue that there is a difference between recognition in terms of discrete, specific emotion categories and recognition in terms of broad clusters (Russell, 1995). Ekman (1982) argued that interpreting facial expressions is difficult, especially between cultures. Although certain physiological changes seem to be linked to different facial emotions, coming up with set species recognition of what those emotions mean is more difficult. There are certain universal emotions that have been identified by psychologists and anthropologists, such as fear, anger, disgust, sadness, enjoyment, surprise, contempt, interest, shame and guilt, but “little is known about cross-cultural differences in display rules, as a function of sex, role, age, and social context” (p.35). For example, take the smile. Smiling in the face of unpleasant circumstances and with interpersonal deception has led anthropologists to proclaim that facial expressions have different meaning in different cultures, which would suggest the universal emotions are not as universal as once thought (Ekman & Friesen, 1982).

Posture

Along with facial expressions, it has been hypothesized that posture can also help to explain and express emotions within FTF communication. According to Mehrabian and Friar (1969), changes in a person’s affective state (used as a general term for discussing mood, emotion and feeling) are reflected by changes in body posture (Kleinsmith, Silva, & Berthouze, 2006). Studies show that there is a reciprocal relationship between the bodily expression of emotion and the way in which emotional

information is attended to and interpreted (Niedenthal, 2007). Whole body postures are shown to be quite important for conveying emotion; indeed, 55% of non-verbal communication is said to be expressed through body language (Mehrabian & Friar, 1969). Charles Darwin himself defined attitude as a collection of motor behaviors (especially posture) that conveys an organism's emotional response toward an object (Darwin, 1872).

In our natural world, faces are usually encountered not as isolated objects but as an integrated part of a whole body. The role of posture in affect recognition, and the importance of emotion in the development and support of intelligent and social behavior has been accepted and researched within several fields including psychology, neurology, and biology (Kleinsmith, et al., 2006). Recognition of the emotion conveyed by the face is systematically influenced by the emotion expressed by the body. When observers have to make judgments about a facial expression, their perception is biased toward the emotional expression conveyed by the body (Meeren, Heijnsbergen, Gelder, 2005). Rapid detection of inconsistencies is also considered between different postures, and can be beneficial when determining emotions (Meeren, et al., 2005).

Relying on facial expressions alone is not an adequate judge of determining an individual's emotional state, but when taken in conjunction with posture and body language, we can more accurately articulate the correct emotional response in FTF communication (Meeren, et al., 2005).

Eye Behavior

Eye Behavior also plays a crucial role in detecting emotions in FTF communication. The ability to detect the direction of gaze displayed by another is

believed to play a pivotal role in the development of personal and affective construal processes (Baron-Cohen, 1997; Macrae et al., 2002; Perrett & Emery, 1994). A particular direction of gaze, however, can convey multiple social meanings. Direct gaze, for example, can communicate threat (Argyle & Cook, 1976; Redican, 1982) or friendliness (Kleinke, 1986; Van Hoof, 1972). Thus, other contextual cues must be utilized when reading social meaning into the behavior of the eyes. Argyle and Cook (1976) have noted that “if the suitable experimental situations could be devised . . . [subjects] who are exposed to the same gaze, but with different context cues, would react differently, and evaluate the looker and the looker’s intentions quite differently” (p. 96).

Facial expressions can offer critical contextual information that is either consistent or inconsistent with the behavioral intentions communicated by a specific gaze behavior (Adams & Kleck, 2003). Fundamentally, the behavioral intentions to approach and avoid drive biological behavior (e.g., Baron-Cohen, 1997). Both gaze behavior and emotion have been found to be associated with the behavioral motivations to approach or avoid (see Argyle & Cook, 1976; Harmon-Jones & Segilman, 2001). Positive emotions, anger, and direct gaze, for example, are associated with approach motivation. Negative emotions (other than anger) and averted gaze are associated with avoidance motivation. Thus, as a signaling system, facial expressions of emotion and gaze behavior may combine to signal these basic behavioral tendencies. Given the importance of perception of gaze direction in the affective construal process, the perceptual primacy of the eyes over other facial cues, and the shared signal value of gaze direction and facial expressions of emotion (approach-avoidance), there is good reason to believe that gaze direction

might influence how efficiently facial expressions of emotion are processed by perceivers (Adams & Kleck, 2003).

Lacking facial expressions, posture, and eye behavior while communicating is like missing half of a performance (Bevelas & Chovil, 2000). We have the verbal act, but are missing the visual. It is more difficult to detect emotion, intent of the communicator, and can add to overall confusion between communicating participants. Losing non-verbal cues is losing a very important part of the communication act itself.

Communication and Technology

Almost every home in the United States contains a computer actively humming and pinging its way across the Internet. Smart phones are common in pockets, purses, and children's school packs. New toys such as iPads, Nooks, and Kindles are becoming popular among enthusiasts and the tech savvy. It is becoming increasingly difficult to find an office or a residence that is not in some way touched by this advance of technological devices. All aspects of society are affected: businesses, families, governments and individuals.

SNS such as Facebook, CyWorld, and MySpace allow individuals to present themselves, articulate their social networks, and establish or maintain connections with others. These sites can be oriented toward work-related contexts (e.g., LinkedIn.com), romantic relationship initiation (the original goal of Friendster.com), connecting those with shared interests such as music or politics (e.g., MySpace.com), or the college student population (the original incarnation of Facebook.com). Participants may use the sites to interact with people they already know offline or to meet new people (Ellison, Steinfield,

& Lampe, 2007). Online SNS support both the maintenance of existing social ties and the formation of new connections.

According to The Nielsen Company, global consumers spent more than five and a half hours on SNS like Facebook and Twitter in December 2009, an 82% increase from the same time last year when users were spending just over three hours on SNS. In addition, the overall traffic to SNS has grown over the last three years (Wunderlich, 2010). Globally, social networks and blogs are the most popular online category when ranked by average time spent in December, followed by online games and instant messaging. With 206.9 million unique visitors, Facebook was the number one global social networking destination in December 2009 and 67% of global social media users visited the site during the month. Time on site for Facebook has also been on the rise, with global users spending nearly six hours per month on the site (Wunderlich, 2010).

In the family, cell phones and text messaging have become important communication tools, particularly for teens. Virgin Mobile USA reports that more than nine of ten teens with cell phones have text messaging capability; two-thirds use text messaging daily. Indeed, more than half of Virgin's customers ages fifteen to twenty send or receive at least eleven text messages a day, while nearly a fifth text twenty-one times a day or more. From October through December 2006, Verizon Wireless hosted 17.7 billion text messages, more than double the total from the same period in 2005 (Subrahmanyam & Greenfield, 2008).

Online vs. Traditional Relationships

Ongoing academic discussions have focused on the similarities and differences between "online" and "traditional" relationships, with opinion divided over the

importance of available social cues in the creation and maintenance of online relationships (Whitty & Gavin, 2001). Several contend that the relative lack of social cues on the Internet renders online relationships more hostile and less fulfilling than traditional FTF relationships (Kraut, Patterson, Lundmark, Kiesler, Mukopadhyay, & Scherlis, 1998). Theorists such as Slouka argue that electronic communication provides a sense of intimacy without the emotional investment that leads to close and enduring relationships (Slouka, 1995).

Relating via the Internet requires users to focus attention on the linguistic characteristics of such interactions. The social presence theory (Rice & Love, 1997) contends that “social presence” is the feeling that one has that other persons are involved in a communication exchange. Since CMC involves fewer non-verbal cues (such as facial expression, posture, dress, and so forth) and auditory cues in comparison to FTF communication, it is said to be extremely low in social presence (Whitty, & Gavin 2001). This suggests that communication using email, instant messaging, social media, and any other CMC type communication is less personal and intimate than traditional FTF communication.

While it is acknowledged that online communication lacks many of the physical and non-verbal cues made available in FTF communication, many theorists reject the idea that this represents an insurmountable obstacle to the development of close personal relationships (Wright & Bell, 2003). Instead text based cues and the augmentation of CMR with other forms of communication render online relationships as intimate and personally fulfilling as any other. In fact, research conducted by Wright and Bell (2003) suggests, “the removal of non-verbal communication requirements (i.e. they need not

monitor their gestures, facial expressions, voice or physical appearance) allows them to devote greater cognitive resources to the articulation of their desired message” (p. 49). In other words, when delivering a message, a person may be better able to convey their desired meaning through CMC sources (Bjerregaard, 2010).

This idea brings up an equally important question: whether online communication is changing the amount and nature of interactions in FTF communication. Does the idea that online relationships compare and compete with FTF relationships help or hinder our ability to have successful relationships in both realms? Does the lack of non-verbal communication in online communication begin to hinder our ability to read non-verbal cues in a FTF environment?

Instant Messaging

Instant messaging (IM) is near-synchronous computer-based one-on-one communication (Nardi, Whitaker, & Bradner, 2000). With a fast network, transmission times are fractions of a second and the experience is of near-synchronous interaction. IM systems support Internet-based synchronous text chat, with point-to-point communication between users on the same system. A window is dedicated to the conversation, with messages scrolling upward and eventually out of view as the conversation ensues. The benefits of instant messaging are numerous, including the ability to know when personal contacts are available, having access to nearly instantaneous communication, and the ability to carry on several informal conversations at once (Nardi, et al., 2000).

IM came of age in 2000. Although the interactive message tool dates back to the 1970s, when researchers began to send real-time text messages on Unix-based networks, the technology became instantly popular in the 1990s, when America Online (AOL)

engineers introduced the Buddy List (Guernsey, 2001). IM became a communication phenomenon, industry insiders called IM the latest “Killer App” (Weise, 2000), and technology trackers projected that IM had surpassed e-mail as the primary online communication tool by 2005 (Latchford, 2003). Although users typically manage three or more ongoing exchanges at once (Lenhart, Rainie, & Leweing, 2001), each IM exchange is dyadic. Because of this popularity I have chosen to use Instant Messaging as our primary tool in testing the benefits and detriments of communication using CMC.

Imagery and Emotions

Visual Imagery and communication have been used in the past as a way to communicate an individual’s emotions toward communication or anticipated communication with another person or persons (Ayres & Heuett, 1997). This ability for individuals to describe their emotions and non-verbal behaviors in an image helps to solidify expected behaviors when communicating with others. Imagery has played a significant role in the development of the human species, both ontogenetically (the origin and development of an individual organism from embryo to adult) and [phylogenetically](#) (the development or evolution of a particular group of organisms). It has been implied that human beings thought in images long before the development of languages.

Thoughts and ideas are encoded in images, and language was developed in response to the human need to make those thoughts and ideas known to others. Words are merely symbols and do not have intrinsic meaning, whereas imagery itself or its more abstract manifestations, patterns, are the basis of brain function (Korn, 2002).

Kroger and Fezler wrote, “Many believe that once sensations have been experienced, they are retained somewhere within the system and that the ability to recall

and experience the situation and its associated sensations is available to all of us, although we rarely take advantage of these possibilities” (Kroger & Fezler, 1976, p. 61). In 1883, Sir Francis Galton, in his *Inquiries into Human Faculty*, referred to a French educator who trained his students to visualize objects so clearly, that they could draw these images.

“Drawings offer a different kind of glimpse into human sense-making than written or spoken texts do, because they can express that which is not easily put into words: the ineffable, the elusive, the not-yet-thought-through, the subconscious” (Weber & Mitchell, 1995, p. 34). Imagery can “bridge the gap between the apparently individual, private, subjective, and the apparently collective, social, political” (Samuels, 1993, p. 63). Drawing offers a means of non-verbal communication while supporting the ego, according to art therapy pioneers such as Kramer (1971).

Drawings and other visual methods of inquiry have been commonly used in fields such as social anthropology (Collier & Collier, 1986), but in recent years the trend for using drawings in other fields of research has increased. In 1990, Nossiter and Biberman conducted a study specifically for the purpose of examining the usefulness of drawings as a research methodology. They concluded that drawings “focus a person’s response” and lead to “respondent honesty and parsimony” (p. 15). Determining honesty is important in determining true emotional state as well as having drawings simple enough to deduce the actual state of mind of the drawer (Nossiter, & Biberman, 1990). In addition to this study, research available on the use of drawings in organizations has found that drawings may be a more specific or direct route to the emotions and unconscious responses or feelings underlying behaviors during organizational change (Vince, 1995). Mental health

professionals and others have used drawing techniques with children that are not specifically designed to assess, diagnose, or evaluate the child, but to provide a way for the child to communicate issues, feelings, and other experiences and to explore, invent, and problem solve through self-expression (Rollins, 2005).

Although children can use any opportunity to draw as a means of communicating, certain drawing techniques have shown promise in promoting expression and enhancing communication. Illuminative artwork (Spouse, 2000) offers a simple method. In this method, the individual is asked to render a drawing based on a certain topic or theme. The facilitator does not impose his or her analysis of the individual's work but instead encourages the individual to use the artwork as a communication tool. Illuminative artwork can be used in much the same way as metaphors are used to express tacit or preconscious feelings about experiences, followed up by asking the individual to explain their significance (Rollins, 2005). Such techniques allow children to freely express their perceptions and experience, unbiased by right or wrong answers, cultural influences, or the expectations of the researcher or clinician (Welsh, & Instone, 2000; Rollins, 2005). Drawing offers a tool to monitor the child's emotional and developmental state and progress. For example, children who are stressed tend to show more emotional indicators in their drawings than children who are not stressed. These emotional indicators could range from objects to personify their emotional states, to icons they respect to indicate their feelings (Sturner, Rothbaum, Visintainer, & Wolfer, 1980).

Drawing also can bring out mixed, poorly understood feelings, in an attempt to bring them to order and clarity (Dalley, Case, & Schaverien, 1987). Council (1999), an art therapist who works with children with cancer, has found that the following drawing

activities are capable of generating important information from children with cancer: (a) free drawings (drawings with no directive given by the therapist), especially when children reflect their choices of subject and the meaning of artwork; (b) bridge drawings (Hays & Lyons, 1981) to understand the child's expectations of the future and the relative threat or security he or she feels; (c) volcano drawings to help understand how a child manages anxiety (Cox, 1993); and (d) Person Picking an Apple from a Tree (PPAT) drawings to gain understanding of coping ability and resourcefulness (Lowenfeld, 1957; Rollins, 2005).

In this study we will use imagery, specifically the practice of Illuminative artwork, to depict the emotional responses and predictions when sending and receiving instant messages. By categorizing the images produced by the sender of the message, determining their relationship with the receiver, and comparing the sender's image with the image rendered by the receiver, we may be able to determine whether there is significant emotional loss or confusion in the communication process.

Rationale

With the rapid growth of CMC in the modern world, it is important to understand how a shift from FTF communication as the primary means of communication to CMC would affect our global society. Particularly in the business world, where communication is vital to increasing growth and revenue, it is important to understand whether CMC will be as effective a medium as FTF to enhancing profits. To that effect, there are several items we can test to determine have effective CMC can be as a replacement or supplement to FTF communication.

First, the use of IM, texting, emails, and other forms of electronic communication raises some interesting questions about interpersonal processes and how these processes can cause people to alter or adapt their communication behaviors. To determine whether these processes can affect the quality and performance of communication, we must identify the primary differences between CMC and FTF, and how they relate to each other in a practical setting.

Second, I have argued that the lack of non-verbal communication in purely online media, such as text messaging, emails, and social media, may cause problems for a receiver trying to interpret the message. These problems may result in a misinterpretation of a message and a loss of cohesive communication between both parties. It is important to know whether the loss of non-verbal cues actually makes a noticeable difference if any at all between CMC and FTF, or whether behavioral changes can compensate for the lack of non-verbal cues.

Third, an oft-discussed discrepancy is the absence of emotional cues in CMC as opposed to FTF. These emotional cues are important for several lines of communication including deception detection and relationship management. These cues can affect trust between communication participants and determine content of what is communicated (O'Reilly, 1980). Emotions are a key factor when comparing FTF to CMC and it should be noted whether CMC is capable of translating emotions as effectively as FTF.

Finally, when considering a typical business or work environment, employees are often called upon to complete complex tasks as a group. These tasks require individuals with different skill sets to communicate and work effectively together in an efficient manner. Determining how effective groups can complete complex and involved tasks is

a good indicator about how efficient a communication method is being used. This makes us ask whether CMC or FTF communication is more effective in completing complex tasks, and in what ways is it more effective.

Research Questions

The foregoing rationale suggests the following research questions:

RQ1: Which detectable differences, if any, distinguish CMC from FTF?

RQ2: How, if at all, does the loss of non-verbal cues affect CMC?

RQ3: How do emotions translate across CMC in comparison to FTF communication?

RQ4: Is CMC or FTF communication more or less effective in completing complex tasks? If more effective, in what ways?

Hypotheses

In addition to the proposed research questions, the following hypotheses will also be used to draw conclusions about the participants involved in the study:

H1: Participants will be very familiar with IM and FTF communication.

H2: Participants will be better able to predict emotional responses from close family and friends vs. strangers.

Chapter Three

Method

Procedure

Participants were recruited from communication courses at a mid-sized public university in the Mountain West region of the United State. Subjects received extra course credit for participation. Participants were instructed to sign up to partner with someone with whom they were not already acquainted (i.e., a stranger), and told they would engage in one or more conversations taking place either across IM channels or in FTF communication. All participants had IM accounts and were required to know how to use IM in order to participate.

Partners were instructed to report to different sections of a computer lab so they would remain unacquainted before their experimental interaction. A research administrator presented a research consent form and specific instructions in writing and aloud detailing the channels of communication to be used. Half of the dyads then met in a small meeting room for a FTF discussion. Each member from the other half of the dyad went to an individual computer to communicate with his or her partner via an IM system. Using IM accounts established specifically for this research, participants used the IM system to send messages to each other and to read responses as soon as the messages were completed. The IM system was set up to allow easy copying of relayed messages for retrieval and analysis of individuals' responses.

Participants were instructed to a specific task, to work on a solution to a decision-making problem as is common in a work environment. This task was to complete a

section of an origami animal within a specific time period with the goal to be a successful completion of the animal or animal section.

Different time periods were allocated for FTF and CMC conditions. Altman and Taylor (1973, p. 189) assert that “the social penetration process is a time-bound one,” and research also argues strongly that constrained or equal time periods in CMC and CMC/FTF research have dramatic impacts on communicator behaviors and their comparisons (see Walther, Anderson, & Park, 1994). Therefore, it was important to make interaction opportunities equivalent across the two communication conditions. In these cases it was setup that interaction was to allow for 10-, 20-, and 30-minute intervals for equal amounts of FTF and CMC participants. FTF and CMC subjects were told that they could converse for up to 10, 20, or 30 minutes, or until they signaled the administrator that they were finished.

RQ1 dealt with determining the distinguishable differences between CMC from FTF. After the interaction, participants were separated and asked to complete a number of measures relating to their impressions of their partners and their own behaviors. Measures featured 5-point Likert-type scales and the Product Emotion Measurement instrument (Desmet, 2003, pp. 111–123). These measurements assessed participants’ perceptions of conversational effectiveness, emotional understanding, and effectiveness in completing tasks. Additionally, a small number of open-ended questions were utilized to identify conversation cues that aided or hindered participants’ conversation efforts.

RQ2 asked whether the loss of non-verbal cues affected CMC as compared to FTF. To determine the effectiveness of non-verbal cues in a conversation, post-conversation uncertainty about the partner was assessed using a five-item subset of

Clatterbuck's CL7 measure of global uncertainty (Clatterbuck, 1979; Douglas, 1990). High scores represented greater uncertainty, whereas low scores indicated greater levels of attritional confidence (i.e., a high degree of confidence regarding knowledge of another and ability to predict and understand another's behavior). This was done to determine whether the addition or lack of non-verbal cues increased the partner's confidence in relating and understanding one another.

RQ3 sought to determine how emotions translated across CMC in comparison to FTF. To determine how effective emotions were in the communication process, emotions were measured using a set of 14 animated emotions of the Product Emotion Measurement instrument (Desmet, 2003, pp. 111–123). Questions were asked that required partners to assess the emotions of their partners during distinct points of their conversations. In turn appropriate partners would specify what emotions they were actually displaying at the point in time questioned.

RQ4 asked which form of communication was more effective in completing complex tasks, and how it was more effective. Conversational effectiveness when completing tasks was assessed using a four-item subset of the conversational effectiveness scale (Canary & Spitzberg, 1987). This was measured as well as the satisfaction that each partner displayed in the completion of their task.

Data Analysis

Data were collected and recorded according to the participant's group by entering the information in SPSS. All responses were individually scored, and sums or averages were compiled for each individual group and then as a collective audience. Comparisons

were drawn between the different groups based on each section of questions and depending on the aim of the analysis.

Once collected and recorded, the data were analyzed for relationships and differences using descriptive and inferential statistics. Visual conclusions were drawn from these measures, and the results were then analyzed for conclusions that could be drawn.

Chapter Four

Analysis and Results

Design

The results obtained from the two groups responses to the questionnaire were compiled and analyzed using Excel and SPSS. The data were then analyzed with regard to the research questions and hypotheses in mind, in order to determine results that would answer the proposed questions.

Results

Demographics

The questionnaire results that required no analysis and just included subject data for demographic purposes yielded the following results. The total number of participants was 30 and the average age of participants was 26. The number of male subjects was 11 and the number of females was 19. The number of sophomores was 5 (16.6% of participants), the number of juniors was 7 (23% of participants), the number of seniors was 10 (33% of participants), and the number of graduate students was 9 (30% of participants). All participants had IM accounts and were required to know how to use IM in order to participate.

The questionnaire included two items seeking subjects' preferred method of communicating with their friends and family. Some 16.6% said they preferred using IM to communicate with their family; 20% preferred using IM to communicate with their friends; 83.4% preferred to communicate with their family using FTF; 80% preferred to communication with their friends using FTF.

Familiarity with IM and FTF Communication Techniques

The questionnaire results included a number of items regarding experience with FTF Communication and IM. The range of IM experience ranged from 6 months to 218 months with an average of 113.73 months of experience between participants.

Participants' use of IM ranged from 15 minutes to 12 hours daily with an average of 2.6 hour a day of IM communication between participations.

In addition to experience participants were asked their perceived ability to predict the emotions depicted in IM and FTF interactions. Participants were asked to evaluate the items on a scale of 1-5, with 1 being strongly disagree and five being strongly agree.

H1 proposed that participants would be very familiar with IM and FTF communication techniques. It was supported. The research questionnaire had five questions dealing with this, which provided results. Those items were 12 through 14 from the questionnaire and 6 through 7 on the survey.

Item 12 from the questionnaire asked if subjects are able to determine the emotion depicted in an IM. The mean result was 3.46 ($s = 1.04$) on a scale of 1-5 showing an answer of neutral to agree. By comparison, Item 13 asked if participants are able to determine the motion depicted in FTF interactions; the result was a mean of 4.46 ($s = .63$), showing an answer of agree to strongly agree. Item 14 asked if participants had the ability to hide their true identity when communicating on IM; the mean agreement was 3.5 ($s = 1.48$), showing an answer of neutral to agree. These results suggest a correlation that all participants believe they had the communication skills needed for the study.

Item 6 on the survey had the participants assess the speaking/typing rates of their dyad partners. The mean result was 4.2 ($s = .85$) showing an answer of good to excellent.

Item 7 asked the participants to assess the speaking/typing fluency of their dyad partners. The mean result was 3.63 ($s = .81$), showing an answer of adequate to good. This continues to show that not only did the participants self-assess themselves as capable of communicating well in both CMC and FTF environments; their partners rated them as capable of communicating well. Based on these results, we can safely conclude that the speaking and typing fluency and rate were adequate for our experiment, and that participants met the expectations of H1.

Emotional Responses

H2 determined that participants would be better able to predict emotional responses from close family and friends vs. strangers. At the end of the project, the participants were given a survey with a section that displayed a set of 14 animated emotions of the Product Emotion Measurement instrument (Desmet, 2003, pp. 111–123). Questions were asked that required partners to assess the emotions of their partners during distinct points in their conversations. In turn, appropriate partners would specify what emotions they were actually displaying at the point in time questioned. These answers were compared between dyad partners and the number of successes recorded. Item 12 in the survey also asked how well participants knew their dyad partners. This comparison resulted in a very strong positive relationship of $+ .70$ ($p < .01$) using Pearson's r . The data then proves that the more partners know each other, the more successfully they will be able to predict the emotions of their dyad partner.

RQ3 sought to determine how emotions translated across CMC in comparison to FTF. To determine how effective emotions were in the communication process, emotions were again measured using a set of 14 animated emotions of the Product Emotion

Measurement instrument (Desmet, 2003, pp. 111–123). Questions were asked that required partners to assess the emotions of their partners during distinct points of their conversations. In turn, appropriate partners would specify what emotions they were actually displaying at the point in time questioned.

These answers were compared between dyad partners and successes were recorded. An independent *t*-test was conducted to compare ability to predict partner's emotions for FTF and CMC groups. There was not a significant difference in the scores for CMC ($M = 1.5$, $SD = 1.03$) and FTF ($M = 1.21$, $SD = .97$) conditions; $t(28) = .78$, $p = .44$. This means that there was no significant difference between type of communication and the ability of dyad partners to successfully predict their partner's emotions.

It should be noted that participants believed that people are less open and honest in what they say about their personal identity on IM than they do in FTF interactions. Participants also indicated that they were more able to determine the emotion of a person in FTF communication over CMC Communication. An independent *t*-test was conducted to compare perceived ability to predict partner's emotions for FTF and CMC groups. There was a significant difference in the scores for CMC ($M = 2.38$, $SD = 1.2$) and FTF ($M = 4.07$, $SD = .62$) conditions; $t(28) = -4.75$, $p < .01$. These results show that participants believed they could more easily predict emotions depicted in FTF communication over CMC communication, even if in reality they did not have the ability to do so.

Non Verbal Cues

To determine the effectiveness of non-verbal cues in a conversation, post-conversation uncertainty about the partner was assessed using a five-item subset of

Clatterbuck's CL7 measure of global uncertainty (Clatterbuck, 1979; Douglas, 1990). High scores represented greater uncertainty, whereas low scores indicated greater levels of attritional confidence (i.e., a high degree of confidence regarding knowledge of another and ability to predict and understand another's behavior). This was done to determine whether the addition or lack of non-verbal cues increased the partner's confidence in relating to and understanding one another.

When comparing the items between CMC and FTF groups, we noticed some interesting results. In four of the five items, there is no significant difference between the type of communication and its effect. Item 8 asked how confident a participant can predict the partner's behavior. An independent *t*-test was conducted to compare perceived ability to predict partner's behavior for FTF and CMC groups. There was not a significant difference in the scores for CMC ($M = 3.5$, $SD = 1.26$) and FTF ($M = 3.36$, $SD = .84$) conditions; $t(28) = .36$, $p = .72$. Item 9 asked how accurate participants are at predicting the values of their dyad partner. An independent *t*-test was conducted to compare perceived ability to predict partner's values for FTF and CMC groups. There was not a significant difference in the scores for CMC ($M = 3.31$, $SD = 1.14$) and FTF ($M = 3.36$, $SD = .84$) conditions; $t(28) = -.12$, $p = .9$. Item 10 asked how well participants could predict their dyad partners' attitudes. An independent *t*-test was conducted to compare perceived ability to predict partner's attitudes for FTF and CMC groups. There was not a significant difference in the scores for CMC ($M = 3.63$, $SD = 1.09$) and FTF ($M = 3.93$, $SD = .92$) conditions; $t(28) = -.82$, $p = .42$. Finally, Item 12 asked how well the participants knew their partners at the end of the project. An independent *t*-test was conducted to compare how well partners knew each other at the

end of the project for FTF and CMC groups. There was not a significant difference in the scores for CMC ($M = 3.81$, $SD = 1.56$) and FTF ($M = 3.07$, $SD = 1.77$) conditions; $t(28) = 1.22$, $p = .23$.

Of note is that the last question in our subset of Clatterbuck's CL7 measure of global uncertainty dealt with the participants being able to predict the emotion of their dyad partners. An independent t -test was conducted to compare perceived ability to predict partner's emotions for FTF and CMC groups. There was a significant difference in the scores for CMC ($M = 2.38$, $SD = 1.2$) and FTF ($M = 4.07$, $SD = .62$) conditions; $t(28) = -4.75$, $p < .01$.

We can then determine by the failure and success of our results from Clatterbuck's questions that the loss of non-verbal cues is not significantly different between CMC and FTF communication within the time frame we allowed the participants to communicate with each other, except in the instance of participants believing they can more easily predict partner's emotional state in a FTF environment.

Completing Complex Tasks

There were three different task difficulties between the two different groups and three different time allotments allocated for each task. There was also a noticeable success and failure rate between the two groups. The success rate was 100% for all tasks given to FTF groups despite difficulty of the task or time allotted to complete the task: The 10-minute task given to the FTF group averaged success in 5:14; The 20-minute task given to the FTF group averaged success in 6:27; and the 30-minute task given to FTF groups averaged success in 12:45.

By comparison, CMC groups had a success rate of 1 in 8 or 12.5%. The only successful completion of a project was a 10-minute task, which the CMC group completed successfully in 9:37. In all other CMC groups, partners failed to successfully complete their projects in the time allotted.

RQ4 asked which form of communication was more effective in completing complex tasks, and how it was more effective. Conversational effectiveness when completing tasks was assessed using a four-item subset of the conversational effectiveness scale (Canary & Spitzberg, 1987). This was measured, as well as the satisfaction that each partner displayed in the completion of their task.

Item 2 asked whether the task was considered relatively simple to complete in the time frame allotted. An independent *t*-test was conducted to compare perceived difficulty of the project for FTF and CMC groups. There was a significant difference in the scores for CMC ($M = 2.88$, $SD = 1.26$) and FTF ($M = 4.79$, $SD = .43$) conditions; $t(28) = -5.41$, $p < .01$. This means that it is significant that FTF dyads felt the task was relatively simple to complete, and CMC dyads felt the task was not simple to complete in the time frame allotted. This disparity is emulated with the successful completion of the given task, with the FTF groups having a 100% successful completion rate while the CMC groups only had a 12.5% successful completion rate.

For the project, the dyads were separated into two parts, where one was an instructor and the other was a builder. Item 3 asked whether participants believed their tasks were harder to complete than their partner's task. An independent *t*-test was conducted to compare whether participants believed their tasks were harder to complete than their partner's task for FTF and CMC groups. There was not a significant difference

in the scores for CMC ($M = 3.13$, $SD = 1.41$) and FTF ($M = 2.79$, $SD = 1.19$) conditions; $t(28) = .71$, $p = .49$. There is no meaningful relationship between the CMC and FTF group for the task they had to perform for the project. An independent t -test was also conducted to compare whether participants believed their tasks were harder to complete because of the role they played for FTF and CMC groups. There was not a significant difference in the scores for CMC ($M = 4.13$, $SD = 1.06$) and FTF ($M = 3.4$, $SD = 1.55$) conditions; $t(28) = 1.51$, $p = .14$. This means that participants did not believe either task was harder to complete than the other, regardless of being the instructor or builder.

Item 4 asked whether participants believed it was easy to communicate with their partners during this task. An independent t -test was conducted to compare whether participants believed it was easy to communicate with their partners during this task for FTF and CMC groups. There was a significant difference in the scores for CMC ($M = 3.19$, $SD = 1.33$) and FTF ($M = 4.5$, $SD = 1.16$) conditions; $t(28) = -2.86$, $p = .01$. This means that FTF groups felt their partners were much easier to communicate with than their CMC counterparts.

Question 5 asked if participants felt they completed the task as fast as possible given the circumstances of their task. An independent t -test was conducted to compare whether participants believed they completed the task as fast as possible given the circumstances of their task for FTF and CMC groups. There was a significant difference in the scores for CMC ($M = 3.06$, $SD = 1.24$) and FTF ($M = 4.5$, $SD = 1.16$) conditions; $t(28) = -3.27$, $p < .01$. This means that FTF groups felt they completed the task as fast as possible while CMC groups felt they had not completed the task as fast as possible within the given circumstances.

Overall, we can see that completing complex tasks is much easier in FTF situations rather than CMC with the time limit imposed upon the groups for these particular tasks. The success rate was much higher in FTF situations within the timed structure, the participants felt the task was much simpler to complete, they felt it was easier to communicate, and they felt they finished the given tasks as fast as possible.

Chapter Five

Discussion

Detectable differences between CMC and FTF

The loss of non-verbal cues did not play as significant a role as initially perceived by the participants, at least not within the time allotted for dyads to work together. An important item to note is that participants believed they could predict the emotional state of their partner more accurately in FTF communication over CMC communication. This strong belief was not backed up by the partners successfully being able to describe the emotions their partners felt. But it is interesting that despite participants not being able to do so, the FTF dyads felt that their medium was much easier to determine the emotional states of their partners.

It is important to note that there are significant differences between FTF and CMC other than the loss of non-verbal cues which can cause issues when communicating. One problem pertains to the unequal volume of utterances that normally occur between CMC and FTF settings. FTF interactions can generate about four to five times more utterances in the same amount of time as CMC (Walther & Tidwell, 2002). This prompts some troubling issues: First, we have to recognize that something as simple as a 10 minute FTF conversation can take upwards of 40 to 50 minutes to relay the same amount of information verbatim. Second, if dialogue is slowed by a significant amount it can slow the productivity of individuals in their current goals or tasks, Lastly, while some conversationalists may have trouble relaying information in as speedy a manner as others it is much more common for individuals to be slower at typing than speaking, further emphasizing the time difference between FTF and CMC.

It has been shown that when groups are given restricted time periods, CMC groups reach decisions less often than do FTF groups (Hiltz & Turoff, 1978). Research has shown that CMC groups take longer to reach decisions and that more CMC than FTF groups fail to achieve consensus at all within allotted time periods (Hiltz, Johnson, & Turoff, 1986). Some researchers have blamed this outcome on the very process that was hoped to lead to positive results, a process that seemed to boomerang: Failure to achieve consensus was attributed to a lack of personal and socioemotional messages group members summoned in CMC.

The research confirms that there are significant differences between CMC and FTF when it comes to time given to complete the project given. CMC groups felt that they were not given enough time to complete their task while FTF groups felt they had plenty of time to complete the task given them. It was also shown that participants felt it was much harder to communicate with their partner in CMC groups over FTF groups. Participants also show a strong belief that FTF groups preformed their task as fast as possible while CMC groups felt they did not.

Given these facts and the fact that there was a 100% completion success rate for FTF groups and only a 12.5% success rate for CMC groups we can see that time is a crucial factor in determining the effectiveness of communicating as well as determining if a complex project can be completed successfully.

It is important to note that this success and fail rate had little to do with the speaking and typing fluency of the groups. In both groups partners rated each as having stronger than adequate speaking and typing skills. This means that success was

determined by the difficulty of the communication media and not dependent on the skill of the communicators.

Despite these issues there are several very valid reasons to use CMC and IM in particular to convey information between parties. For example when two experts communicate with a common point of reference CMC can be a quick and viable way to exchange information between parties. These dyads will be much more likely to understand communication patterns that would not be available within the context of this particular test which focused on an expert and trainee type environment. In addition CMC is ideal to use in a circumstance where FTF communication is not viable due to time or environment. People are able to communicate for little cost across the world, something not always available for parties wanting to communicate FTF.

Limitations

The time limit was imposed upon both the CMC and FTF groups to simulate a real life environment deadline such as might be expected in an academic or work environment. That being said, had the time limit been increased for the CMC groups or removed all together we might have seen more success and less frustration with attempting to complete the simulated complex tasks. How much the time limit skewed the data to favor the FTF groups is unknown, but it is likely that the time restriction did determine the success and fail rates of the various groups.

The time limit may have also affected the success in determining the emotional and behavior states in the various groups. Had the time limit been increased or removed entirely and the project increased in scope we might have received data showing that one group was able to predict behavior or emotion better than that other. The results which

indicated that there was no difference except that FTF groups thought they could determine emotional states better might be skewed due to the time limit imposed on the groups.

The sample size of 30 students is not a large enough sample size to determine conclusive results from the study. However, the information gathered from this study could be a useful building block for future endeavors in this field. Regardless, it should be noted that it is likely that a sample size this small could have skewed the data one way or the other with significant outliers in the group.

A final consideration is that the students used in this study were recruited primarily from communication courses. Though these students were taken from a broad range of age groups, sophomores to graduate students, we might have had different results if the students were recruited from various schools as well. It is unknown how much students from the same school of thought could affect the outcome of this study, but the data could be skewed as a result of it.

Future Research

Future studies need to look at whether there is a difference in success and fail rate from various types of complex projects. The project I picked required hand to eye coordination and an instructor and builder type relationship. Other categories of projects focusing on various types of communication skills and project outcomes may result in different rates of success and failure. Presumably, projects that require less explanation between groups where both parties are experts in their field could result in more success in a CMC environment, but by how much is unknown. It would be useful to conduct a

series of studies which determine which types of complex projects are most successful in FTF communication environments and which are most successful in CMC environments.

Future research can also be done to show the ideal time restriction that should be imposed upon a CMC and FTF project to determine optimal success for both groups. Time restrictions are an important part of any project. Rarely in a real world scenario are groups able to complete a project with no time restriction imposed. The time restrictions imposed upon my research was chosen based on previous research performed which indicated CMC required a significant amount of time more than FTF to complete the same conversation (Walther & Tidwell, 2002). An accurate representation of how much time should be allocated for each type of task would be useful for future research on this subject.

Emotional decoding is something worthy of more study. However, controlling all the variables that go into emotional decoding is a daunting task. It would be useful to have a controlled quantitative study that is able to isolate how much time it takes to accurately decode emotions in FTF and CMC environments and what factors determines success rates for both groups. Culture would need to be controlled for, as would relationships involved. The increasing volume of CMC used for social and work does pose a need for this type of information.

Final Thoughts

FTF communication used to be the staple means of communication between two parties. It was the ideal medium for the exchanging of ideas, thoughts, and expertise. With the advent of CMC over the last century we have seen an explosion of quick and

responsive communication. CMC communication can be seen as simply adding to our other forms of communication rather than replacing it (Campbell & Park, 2008).

CMC such as email, computer conferencing, and chat systems differ from FTF communication in many respects, one of the most apparent of which is that relying on a written form of communication excludes the exchange of non-verbal cues. Some scholars have determined this loss of non-verbal cues suggests CMC will never be as personal a medium as FTF (e.g., Kiesler, Siegel, & McGuire, 1984; Siegel, Dubrovsky, Kiesler, & McGuire, 1986). It has also been postulated that non-verbal cues form a type of language that can be understood as much as speaking a common vocabulary of words (Abercrombie, 1972). This loss of non-verbal cues can affect the ability of participants to adequately understand one another as effectively in CMC communication versus FTF (Sarbaugh-Thompson & Feldman, 1998; Kiesler, Siegel, & McGuire, 1984).

This study's finding regarding non-verbal cues determined that while the popular belief is that FTF communication is the easier medium to predict the emotional behavior of others, it is not necessarily true. Whether or not these results will be used to bolster one side or the other in this argument is unknown. The continued understanding of the minute differences between FTF and CMC will need to be studied. However, results should be taken with a grain of caution, being careful not to use the results of one particular study to reinforce a particular bias.

The present study was an eye-opener on different levels for me as a researcher. Although hypothesis was proven correct the general ideas that FTF is the better communication method is premature at best. What was learned, however, was that more research needs to be conducted to determine in what ways one form of communication

excels versus another. Rather than being able to take the stance that CMC is a good or bad communication medium, more complex criteria will need to be examined.

In summary, technology has played a role in the progress of communication to a global level. Yet it has not been shown whether this shift from using FTF as the primary form of communication to CMC will hold major consequences in how people and societies interact. Hopefully with further research we can determine the ultimate effectiveness of both forms of communication and how we can integrate both successfully in our society without losing the use and importance of the other. The CMC debate is far from over, and with the continued rise in use of CMC usage we have only touched the tip of where it is best utilized.

References

- Abercrombie, M. L. (1972). Non-verbal communication. *Proceedings of the Royal Society of Medicine*, 65(4), 335.
- Adams, R. B., & Kleck, R. E. (2003). Perceived gaze direction and the processing of facial displays of emotion. *Psychological Science (Wiley-Blackwell)*, 14(6), 644-647. doi:10.1046/j.0956-7976.2003.psci_1479.x
- Altman, I., & Taylor, D. A. (1973). *Social penetration: The development of interpersonal relationships*. New York: Holt, Rinehart, and Winston.
- Argyle, M., & Cook, M. (1976). *Gaze and mutual gaze*. Oxford, England: Cambridge University Press.
- Ayres, J., & Heuett, B. L. (1997). The relationship between visual imagery and public speaking apprehension. *Communication Reports*, 10(1), 87-94.
doi:10.1080/08934219709367662
- Baron-Cohen, S. (1997). *Mindblindness: An essay on autism and theory of mind*. Cambridge, MA: MIT Press.
- Bavelas, J. B., & Chovil, N. (2000). Visible acts of meaning: An integrated message model of language in FTF dialogue. *Journal of Language and Social Psychology*, 19(2), 163-196. doi:10.1177/0261927X00019002001
- Bjerregaard, M. (2010). *Facebook's effects on subtle emotion decoding, academic performance, and identity protection* (Unpublished master's thesis. Southern Utah University, Cedar City, UT). Retrieved from https://www.suu.edu/hss/comm/masters/Capstone/Thesis/Bjerregaard_M.pdf

- Campbell, S. W. & Park, Y. J. (2008). Teaching and learning guild for social implications of mobile telephony: The rise of personal communication society. *Sociology Compass*, 2(6), 2030-2040.
- Canary, D. J., & Spitzberg, B. H. (1987). Appropriateness and effectiveness perceptions of conflict strategies. *Human Communication Research*, 14, 93-118. doi: 10.1111/j.1468-2958.1987.tb00123.x
- Carton, J. S., Kessler, E. A., & Pape, C. L. (1999). Non-verbal decoding skills and relationship well-being in adults. *Journal of Non-verbal Behavior*, 23(1), 91-100. doi: 10.1023/A:1021339410262
- Clatterbuck, G. W. (1979). Attributional confidence and uncertainty in initial interaction. *Human Communication Research*, 5, 147–157. doi: 10.1111/j.1468-2958.1979.tb00630.x
- Collier, J., & Collier, M. (1986) *Visual Anthropology: Photography as a Research Method*. Albuquerque, NM: University of New Mexico.
- Councill, T. (1999). *Art therapy with pediatric cancer patients*. In C. Malchiodi (Ed.), *Medical art therapy with children* (pp. 75-93). London and Philadelphia: Jessica Kingsley.
- Cox, C. (1993). *The volcano drawing: A technique for assessing levels of affective tension* (Cassette Recording No. 16-143). Denver, CO: National Audio-Video.
- Cummings, J. N., Butler, B., & Kraut, R. (2002). The quality of online social relationships. *Communications of the ACM*, 45(7), 103-108. doi:10.1145/514236.514242

- Daft, R. L., Lengel, R. H., & Trevino, L. K. (1987). Message equivocality, media selection and manager performance: Implications for information systems, *MIS Quarterly*, 11, 355-366.
- Dalley, T., Case, C., & Schaverien, J. (1987). *Images of art therapy*. London, England: Routledge.
- Darwin, C. (1872). *The expression of emotions in man and animals*. New York: Philosophical Library.
- DePaulo, B. M. (1992). Non-verbal behavior and self-presentation. *Psychological Bulletin*, 111, 203-243.
- Desmet, P. M. A. (2003). *Measuring emotion: Development and application of an instrument to measure emotional responses to products*. In Blythe, M., Overbeeke, K., Monk, A.F., Wright, P. (Ed.), *Funology: from usability to enjoyment* (pp.111-123). Dordrecht: Kluwer Academic Publishers.
- Douglas, W. (1990). Uncertainty, information seeking, and liking during initial interaction. *Western Journal of Speech Communication*, 54, 66-81.
- Ekman, P., & Friesen, W. V. (1982). Felt, false and miserable smiles. *Journal of Non-verbal Behavior*, 6, 238-252.
- Ellison, N. B., Steinfield, C., & Lampe, C. (2007). The benefits of Facebook "friends": Social capital and college students' use of online social network sites. *Journal of Computer-Mediated Communication*, 12(4), 1143-1168.
doi:10.1111/j.10836101.2007.00367.x
- Flaherty, L. M., Pearce, K. J., & Rubin, R. B. (1998). Internet and FTF communication: Not functional alternatives. *Communication Quarterly*, 46(3), 250-268.

Galton, F. (1883). *Inquiries into human faculty and its development*. London: McMillan.

Guernsey, L. (2001, June 28). Message to marketers: RU4 Real? *The New York Times*, pp. G1.

Harmon-Jones, E., & Segilman, J. (2001). State anger and prefrontal brain activity: Evidence that insult-related relative left prefrontal activation is associated with experienced anger and aggression. *Journal of Personality and Social Psychology*, 80, 797-803.

Herring, C. (2004). Slouching toward the ordinary: Current trends in computer-mediated communication. *New Media and Society*, 6(1), 26-36. doi: 10.1177/1461444804039906

Hightower, R. T., Sayeed, L., Warkentin, M. E., & McHaney, R. (1997). Information exchange in virtual work groups. In M. Igbaria & M. Tan (Eds.), *The virtual workplace* (pp. 199-216). Hershey, PA: Idea Group Publishing.

Hiltz, S. R., Johnson, K., & Turoff, M. (1986). Experiments in group decision making: Communication process and outcome in face-to-face versus computerized conferences. *Human Communication Research*, 13, 225-252.

Hiltz, S. R., & Turoff, M. (1978). *The Network Nation*. Reading, MA: Addison-Wesley.

Ho, S. S., & McLeod, D. M. (2008). Social psychological influences on opinion expression in FTF computer-mediated communication. *Communication Research*, 35(2), 190-207. doi: 10.1177/0093650207313159

Izard, C. E. (1977). *Human emotions*. New York, NY: Plenum Press.

- Kearney, K., & Hyle, A. (2004). Drawing out emotions: the use of participant-produced drawings in qualitative inquiry. *Qualitative Research December, 4*(1), 361-382.
doi: 10.1177/1468794104047234
- Kiesler, S. (1986). The hidden messages in computer networks. *Harvard Business Review, 64*(1), 46–60.
- Kiesler, S., Siegel, J., & McGuire, T. (1984). Social psychological aspects of computer-mediated communication. *American Psychologist, 39*(1), 1123–1134.
- Kleinke, C.L. (1986). Gaze and eye contact: A research review. *Psychological Bulletin, 100*(1), 78–100.
- Kleinsmith, A., Silva, R., & Bianchi-Berthouze, N. (2006) Cross-cultural differences in recognizing affect from body posture. *Interacting with Computers, 18*(6), 1371–1389. doi:10.1016/j.intcom.2006.04.003
- Korn, E. R. (1983). *Visualization: Use of imagery in the health professions*. Homewood, IL: Dow Jones-Irwin.
- Korn, E. R. (2002). Visualization techniques and altered states of consciousness. In A. A. Sheikh (ed.), *Handbook of therapeutic imagery techniques* (pp. 41-49). Amityville, NY: Baywood Publishing.
- Kramer, E. (1971). *Art as therapy with children*. New York: Schocken Books.
- Kraut, R., Patterson, M., Lundmark, V., Kiesler, S., Mukopadhyay, T. & Scherlis, W. (1998). Internet paradox: A social technology that reduced social involvement and psychological well-being? *American Psychologist, 53*(1), 1017–1031. doi: 10.1037/0003-066X.53.9.1017

- Kroger, W. S., & Fezler, W. D. (1976). *Hypnosis and behavior modification: Imagery conditioning*. Philadelphia, PA: Lippincott.
- Lankshear, C., Snyder, I., & Green, B. (2000). *Teachers and technoliteracy: Managing literacy, technology and learning in schools*. St. Leonards, NSW, Australia: Allen & Unwin.
- Latchford, M. (2003, May 20). Instant productivity gain: Instant messaging will revolutionize business comms. *Computer Weekly*, p. 37.
- Lenhart, A., Rainie, L., & Lewis, O. (2001, July). Teenage life online: The rise of the instant-message generation and the Internet's impact on friendships and family relationships. *Washington, DC: Pew Internet & American Life Project*. Retrieved from <http://www.pewinternet.org>
- Lewis, C., & Fabos, B. (2000). But will it work in the heartland? A response to new multiliteracies. *Journal of Adolescent & Adult Literacy*, 43(1), 462-269.
- Lowenfeld, V. (1957). *Creative and mental growth*. New York, NY: Macmillan.
- Macrae, C.N., Hood, B.M., Milne, A.B., Rowe, A.C., & Mason, M.F. (2002). Are you looking at me? Gaze and person perception. *Psychological Science*, 13(1), 460–464. doi:10.1111/1467-9280.00481
- Matsumoto, D. (1990). Cultural similarities and differences in display rules. *Motivation and Emotion*, 14(1), 195-214.
- McGrath, J. E. (1990). Time matters in groups. In J. Galegher, R. E. Kraut & C. Egido (Eds.), *Intellectual teamwork: Social and technological foundations of cooperative work* (pp. 23-62). Hillsdale, NJ: Lawrence Erlbaum Associates.

- Meeren, H. K., van Heijnsbergen, C. C., & de Gelder, B. (2005). Rapid perceptual integration of facial expression and emotional body language. *Proc. Natl. Acad. Sci. U.S.A.* 102, 16518–16523. doi: 10.1073/pnas.0507650102.
- Mehrabian, A., & Friar, J. (1969). Encoding of attitude by a seated communicator via posture and position cues. *Journal of Consulting and Clinical Psychology*, 33(1), 330-336.
- Nardi, A. B., Whitaker, S., & Bradner, E. (2000). Interaction and outeraction: Instant messaging in action. Proceedings of the 2000 ACM conference on Computer supported cooperative work, Philadelphia, PA. 79-88.
doi:10.1145/358916.358975
- Niedenthal, P. M. (2007). Embodying Emotion. *Science*, 316(5827), 1002. doi: 10.1126/science.1136930
- Nossiter, V., & Biberman, G. (1990). Projective drawings and metaphor: Analysis of organizational culture. *Journal of Managerial Psychology* 5(3): 13–16. doi: 10.1108/02683949010136765
- O'Reilly, C. (1980). Individuals and information overload in organizations: Is more necessarily better? *The Academy of Management Journal*, 23(4): 684-696. doi: 10.2307/255556
- Oatley, K., & Jenkins, J. M. (1992). Human emotions: Function and dysfunction. *Annual Review of Psychology*, 43, 55-85. doi: 10.1146/annurev.psych.43.1.55
- Parks, M. R., & Floyd, K. (1996). Making friends in cyberspace. *Journal of Communication*, 46(1), 80–97. doi: 10.1111/j.1460-2466.1996.tb01462.x

- Parks, M. R., & Roberts, L. D. (1998). Making MOOsic: The development of personal relationships on line and a comparison to their off-line counterparts. *Journal of Social and Personal Relationships, 15*, 517–537.
- Patterson, M. L. (1995). Invited article: A parallel process model of non-verbal communication. *Journal of Non-verbal Behavior, 19*(1), 3. Retrieved from EBSCOhost.
- Perrett, D. I., & Emery, N. J. (1994). Understanding the intentions of others from visual signals: Neurophysiological evidence. *Cognitive/Current Psychology of Cognition, 13*, 683–694.
- Redican, W. K. (1982). *An evolutionary perspective on human facial displays*. P. Ekman (Ed.). New York: Cambridge University Press.
- Rice, R. E., & Love, G. (1997). Electronic emotion: Socioemotional content in a computer mediated communication network. *Communication Research, 14*, 85-108. doi: 10.1177/009365087014001005
- Russell, J. A. (1995). Facial expressions of emotion: what lies beyond minimal universality? *Psychol Bull, 118*(3), 379–391. doi: 10.1037//0033-2909.118.3.379
- Rollins, J. A. (2005). Tell me about it: Drawing as a communication tool for children with cancer. *Journal of Pediatric Oncology Nursing, 22*, 203-221. doi: 10.1177/1043454205277103
- Samuels, A. (1993). *The political psyche*. London: Routledge.
- Sarbaugh-Thompson, M., & Feldman, M. S. (1998). Electronic mail and organizational communication: Does saying “hi” really matter? *Organization Science, 9*, 685-698. doi: 10.1287/orsc.9.6.685

- Siegel, J., Dubrovsky, V., Kiesler, S., & McGuire, T. W. (1986). Group processes in computer-mediated communication. *Organizational Behavior and Human Decision Processes*, 37, 157–187. doi: 10.1016/0749-5978(86)90050-6
- Slouka, M. (1995). *War of the worlds: Cyberspace and the high-tech assault on reality*. New York: Basic Books.
- Spouse, J. (2000). Talking pictures: Investigating personal knowledge through illuminative art-work. *Nursing Times Research*, 5(4): 253-262.
- Sproull, L., & Kiesler, S. (1986). Reducing social context cues: Electronic mail in organizational communication. *Management Science*, 32, 1492-1512. doi: 10.1287/mnsc.32.11.1492
- Sturner, R., Rothbaum, F., Visintainer, M., & Wolfer, J. (1980). The effects of stress on children's human figure drawings. *Journal of Clinical Psychology*, 36, 324-331.
- Subrahmanyam, K., & Greenfield, P. (2008). Online communication and adolescent relationships. *Future of Children*, 18(1), 119-146.
- Tidwell, L.C., & Walther, J.B. (2002). Computer-mediated communication effects on disclosure, impressions, and interpersonal evaluations. *Human Communication Research*, 28(3), 317–348. doi: 10.1111/j.1468-2958.2002.tb00811.x
- van Hoof, J.A.R.A.M. (1972). *A comparative approach to the phylogeny of laughter and smiling*. R.A. Hinde (Ed.). New York: Cambridge University Press.
- Vince, R. (1995). Working with emotions in the change process: Using drawings for team diagnosis and development, *Organizations & People* 2(1): 11–17.
- Walther, J. B. (1996). Computer Mediated Communication: Impersonal, Interpersonal, and Hyperpersonal Interaction. *Communication Research*, 21.1, 3-43.

- Walther, J. B., Anderson, J. F., & Park, D. W. (1994). Relational tone in computer-mediated communication: A meta-analysis of social and anti-social communication. *Communication Research, 21*, 460-487.
- Warkentin, M., Sayeed, L., & Hightower, R. (1997). Virtual teams versus face-to face teams: An exploratory study of a web-based conference system. *Decision Sciences, 28*(4): 975-996. doi: 10.1111/j.1540-5915.1997.tb01338.x
- Weber, S., & Mitchell, C. (1995). *That's funny, you don't look like a teacher: Interrogating images and identity in popular culture*. London: Falmer Press.
- Weise, E. (2000, August 28). Instant messaging could change: Incompatibility draws ire, hackers. *USA Today*, pp. 3D.
- Welsh, J., & Instone, S. (2000). *Use of drawings by children in the pediatric office*. S. Dixon & M. Stein (Ed.). St. Louis: Mosby.
- Whitty, M., & Gavin, J. (2001). Age/Sex/Location: Uncovering the social cues in the development of online relationships. *CyberPsychology & Behavior, 4*(5): 623-630. doi: 10.1089/109493101753235223.
- Wright, K., & Bell, S. (2003). Health-related Support Groups on the Internet: Linking Empirical Findings to Social Support and Computer-mediated Communication Theory. *Journal of Health Psychology, 8*(1): 39-54. doi: 10.1177/1359105303008001429
- Wunderlich, S. (2010). Social media use increases 82% worldwide: Nielsen report confirms growing power of bloggerwave's business strategy. Retrieved from: <http://money.cnn.com/news/newsfeeds/articles/marketwire/0589146.htm>

Appendix E

Group A

1. Start with an origami paper color side up. Make a fold from left to right. Crease the fold well and unfold the paper.



2. Make another fold, this time from bottom to top along the dash line as shown. Crease the fold well and unfold the paper.



3. Flip the paper over.



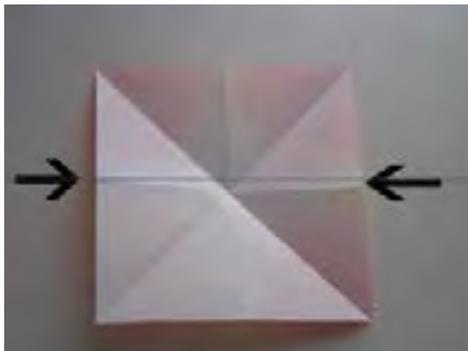
4. Now make a fold along the diagonal line as shown, crease well and unfold paper.



5. Now make a fold along the other diagonal, crease well and unfold paper.

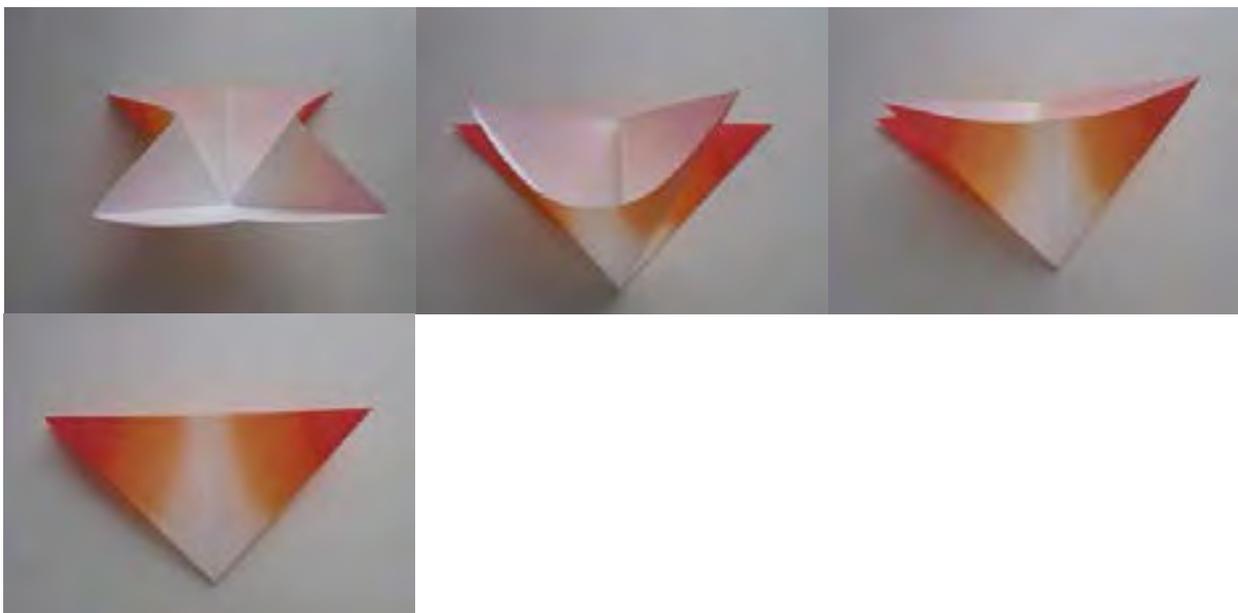


6. Start pushing the paper from both sides as shown by the arrows.



7. As you push the sides in, the background triangle should form. Hold it down as you continue to bring both sides together.

Push the paper down to form the triangle and you're done!



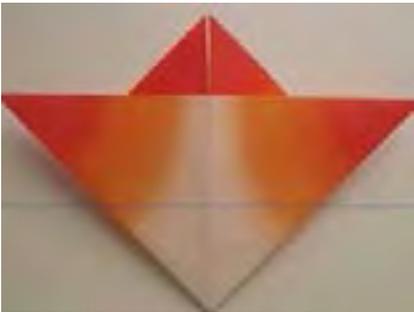
Appendix F

Group B

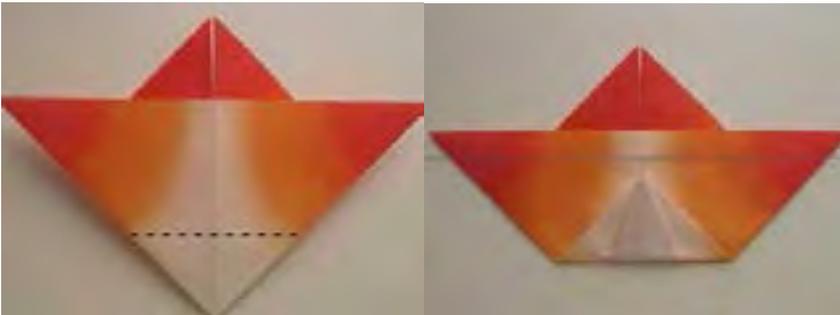
1. Make 2 folds at an angle. Both sides should meet at the center



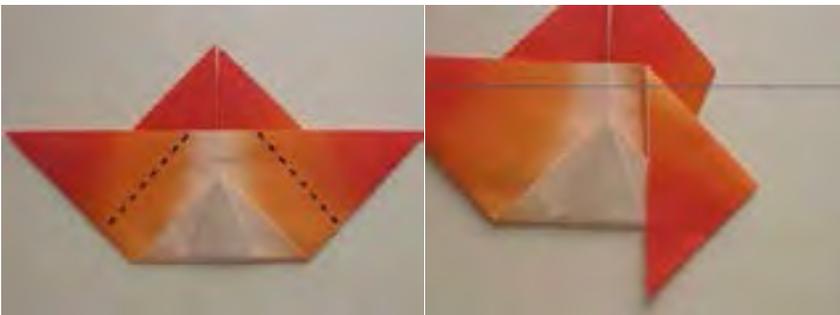
2. Flip paper over.



3. Fold the bottom tip up.



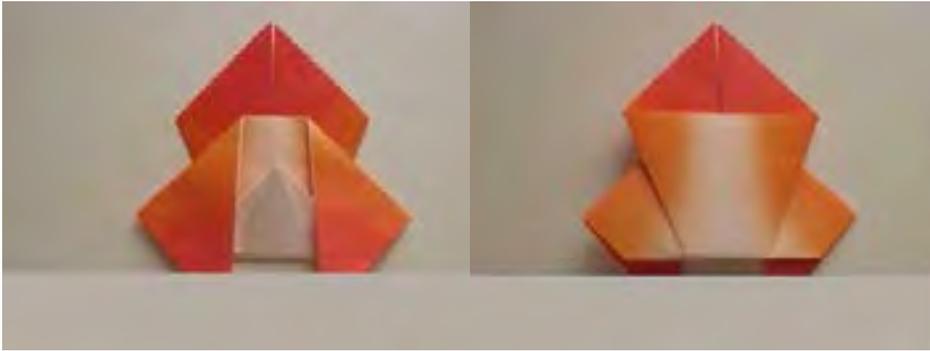
4. Now, fold the right tip down. The edge should be parallel to the center crease.



5. Repeat for the left side



6. FLIP paper over. Here's your origami crab!



Appendix G

Group C

1. Start with an origami paper color side up. Make a fold from left to right. Crease the fold well and unfold the paper.



2. Make another fold, this time from bottom to top along the dash line as shown. Crease the fold well and unfold the paper.



3. Flip the paper over.



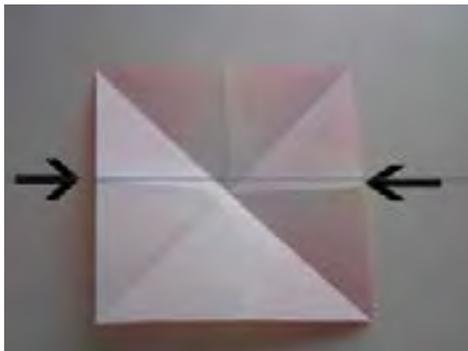
4. Now make a fold along the diagonal line as shown, crease well and unfold paper.



5. Now make a fold along the other diagonal, crease well and unfold paper.

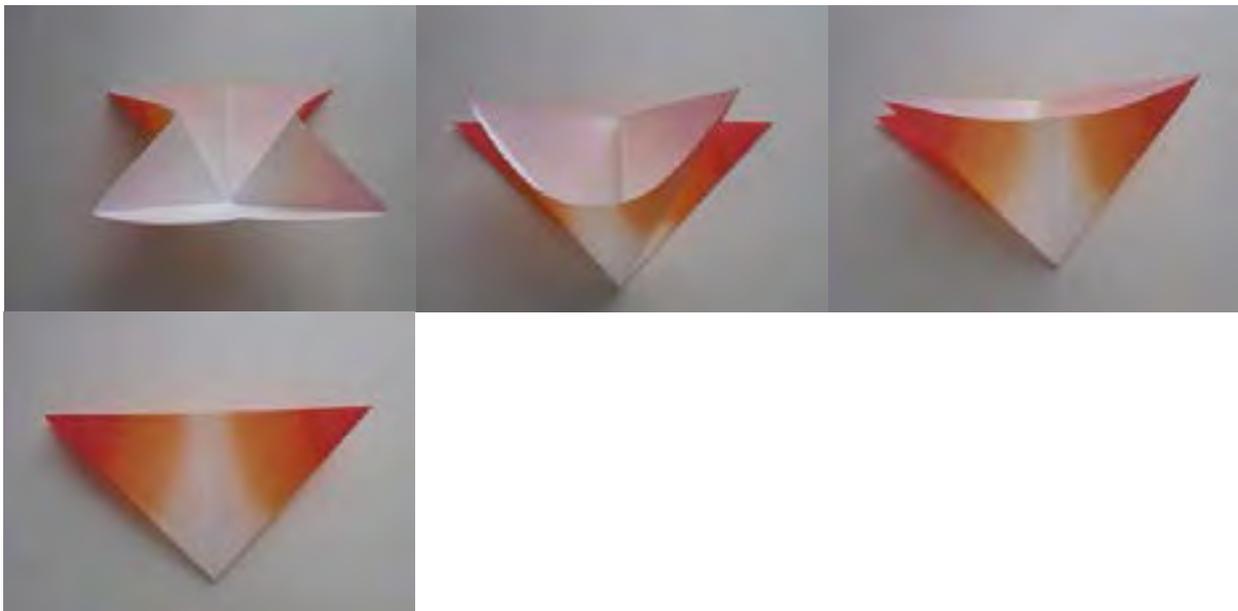


6. Start pushing the paper from both sides as shown by the arrows.



7. As you push the sides in, the background triangle should form. Hold it down as you continue to bring both sides together.

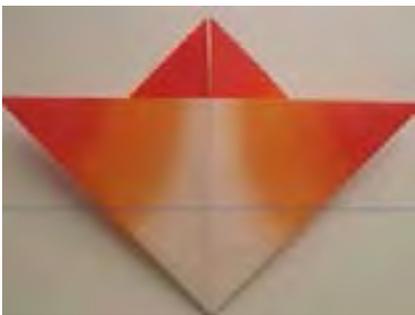
Push the paper down to form the triangle and you're done!



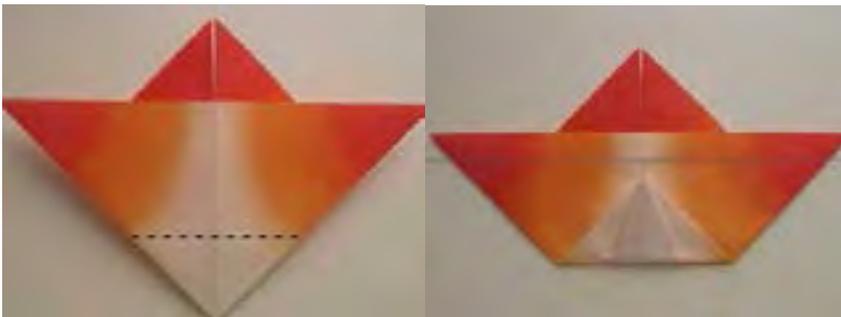
8. Make 2 folds at an angle. Both sides should meet at the center



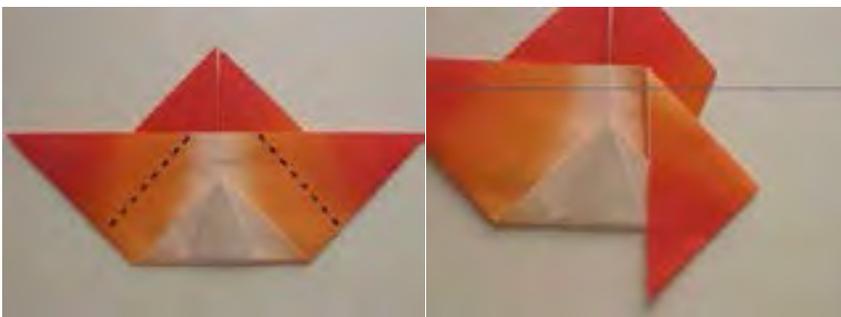
9. Flip paper over.



10. Fold the bottom tip up.



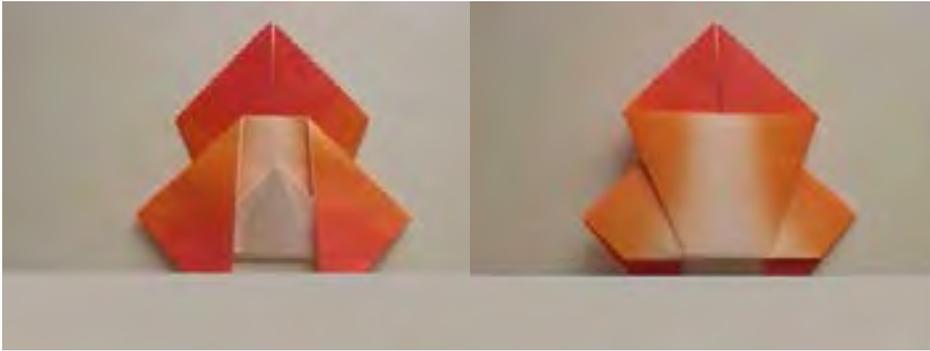
11. Now, fold the right tip down. The edge should be parallel to the center crease.



12. Repeat for the left side



13. FLIP paper over. Here's your origami crab!



Appendix A

Thank you for participating in a brief experiment about Computer Mediated Communication. This study is conducted by Michael Plumb, a graduate student in the Department of Communication at Southern Utah University. The experiment should take either ten, twenty, or thirty minutes depending upon which group you are assigned. You will be asked to complete a task that requires your group to communicate with each other in order to finish. Upon completion of the experiment you will be asked to complete a short survey asking questions regarding your Computer Mediated Communication Use. Sample questions or statements from this survey include the following:

- “Do you have an Instant Message Account?”
- “My Instant Messages adequately represents how I see myself honestly.”
- “I am able to decode the emotional context of a message presented in Face-to-Face interactions.”

You may skip any question you do not wish to answer. Participation is voluntary. You may discontinue at any time for any reason without penalty. You may ask questions at any time. Participation in this survey is anonymous. Data that could identify you as a research subject will not be collected.

If you have any questions about this study, please contact Michael Plumb at Southern Utah University, office phone: (435) 865-8604. Thanks again for your participation and help with this research.

Computer Mediated Communication Survey

1. **Gender: (circle one)** Male Female _____
2. **Age:** _____ _____
3. **Classification: (circle one)** Freshman Sophomore Junior Senior Graduate _____
4. **Do you have an Instant Message Account? (circle one)** Yes No _____
5. **As accurately as you can, how long have you had an Instant Message Account?**
(mm/dd/yy) _____ _____
6. **On average, how many hours(s) a day do you communicate through Instant Messaging?**
(hours per day) _____ (hours per week) _____
7. **If you have an Instant Message account, which would you prefer most, to communicate with family Face to Face or through Instant Message? (circle one)**
Face to Face Instant Message _____
8. **If you have an Instant Message account, which would you prefer most, to communicate with friends Face to Face or through Instant Message? (circle one)**
Face to Face Instant Message _____

Circle the answer that best answers the following questions

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
9. My Instant Messages adequately represents how I see myself honestly.	1	2	3	4	5	_____
10. The way I show myself in Face to Face interactions adequately represents how I see myself honestly.	1	2	3	4	5	_____
11. I think other people are open and honest in what they say about their personal identity on Instant Message.	1	2	3	4	5	_____
12. I am able to determine the emotion depicted in an Instant Message.	1	2	3	4	5	_____
13. I am able to determine the emotion of a person in Face-to-Face interactions.	1	2	3	4	5	_____
14. I can hide my identity easily on Instant Message.	1	2	3	4	5	_____
15. I often hid my identity while using Instant Message.	1	2	3	4	5	_____

Appendix B

Instructions: This is a timed project, you will have 10 minutes to complete the project, if you finish before the 10 minutes is up you may signal the moderator and end.

One member of your group has been given a list of instructions to complete an origami animal. The other member of your group has been given the supplies necessary to complete the origami animal. The group member with the instructions will dictate how to complete the animal without showing the instructions.

1. **I played the following role in this task.**
 (circle one) Instructor Builder

Circle the answer that best answers the following questions

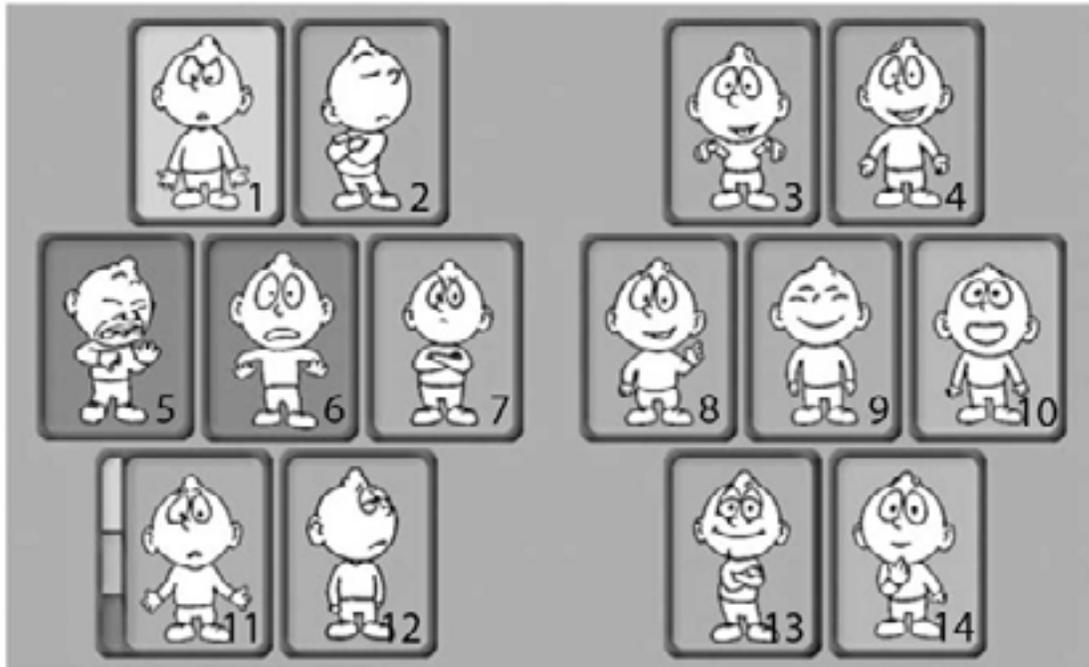
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
2. The task was relatively simple to complete in the time frame given.	1	2	3	4	5	_____
3. I felt my task was harder to complete than my partners.	1	2	3	4	5	_____
4. I felt my partner was easy to communicate with during this task.	1	2	3	4	5	_____
5. I felt we completed the task as fast as was possible given the circumstances.	1	2	3	4	5	_____

Circle the answer that best answers the following questions

	Inadequate	Fair	Adequate	Good	Excellent	
6. Speaking/Typing rate of partner?	1	2	3	4	5	_____
7. Speaking/Typing fluency of partner?	1	2	3	4	5	_____
8. How confident are you of your general ability to predict how your partner will behave?	1	2	3	4	5	_____
9. How accurate are you at predicting the values your partner holds?	1	2	3	4	5	_____
10. How accurate are you at predicting your partner's attitudes?	1	2	3	4	5	_____
11. How well can you predict your partner's emotions?	1	2	3	4	5	_____
12. How well do you know your partner?	1	2	3	4	5	_____

Emotional Analysis:

Answer the following questions using the following chart. Please indicate after each question which image best corresponds to the emotion you felt or perceived.



13. When I started this task I felt the following emotional response. _____
14. After working on the task for 10 minutes I felt the following emotional response. _____
15. Overall my emotional response to the entire task was the following emotional response. _____
16. When we first started the task my partner felt the following emotional response. _____
17. After working on the task for 10 minutes my partner exhibited the following emotional response. _____
18. Overall my partner exhibited the following emotional response. _____

Short Answer:

19. In an ideal situation how would you have accomplished the task provided for you to accomplish? _____

20. Would you have preferred to perform this task in a Face to Face work environment or a Computer Mediated Communication type environment and why? _____

21. What was the most frustrating part of this task? _____

22. What was the best part of this task? _____

Appendix C

Instructions: This is a timed project, you will have 20 minutes to complete the project, if you finish before the 20 minutes is up you may signal the moderator and end.

One member of your group has been given a list of instructions to complete an origami animal. The other member of your group has been given the supplies necessary to complete the origami animal. The group member with the instructions will dictate how to complete the animal without showing the instructions.

1. **I played the following role in this task.**
 (circle one) Instructor Builder

Circle the answer that best answers the following questions

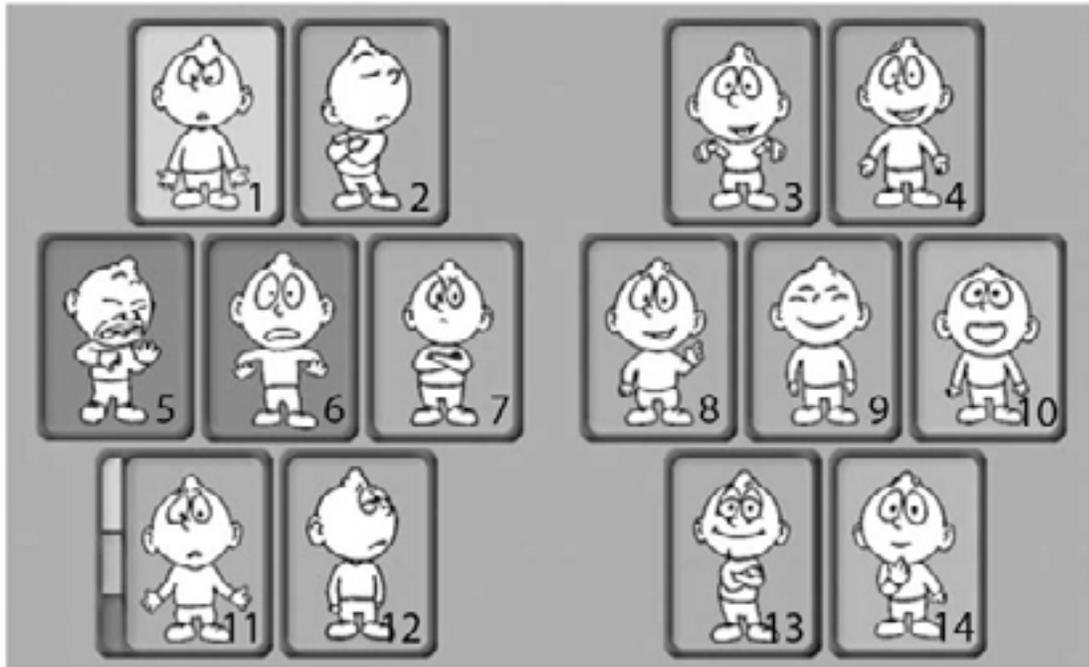
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
2. The task was relatively simple to complete in the time frame given.	1	2	3	4	5	_____
3. I felt my task was harder to complete than my partners.	1	2	3	4	5	_____
4. I felt my partner was easy to communicate with during this task.	1	2	3	4	5	_____
5. I felt we completed the task as fast as was possible given the circumstances.	1	2	3	4	5	_____

Circle the answer that best answers the following questions

	Inadequate	Fair	Adequate	Good	Excellent	
6. Speaking/Typing rate of partner?	1	2	3	4	5	_____
7. Speaking/Typing fluency of partner?	1	2	3	4	5	_____
8. How confident are you of your general ability to predict how your partner will behave?	1	2	3	4	5	_____
9. How accurate are you at predicting the values your partner holds?	1	2	3	4	5	_____
10. How accurate are you at predicting your partner's attitudes?	1	2	3	4	5	_____
11. How well can you predict your partner's emotions?	1	2	3	4	5	_____
12. How well do you know your partner?	1	2	3	4	5	_____

Emotional Analysis:

Answer the following questions using the following chart. Please indicate after each question which image best corresponds to the emotion you felt or perceived.



13. When I started this task I felt the following emotional response. _____
14. After working on the task for 10 minutes I felt the following emotional response. _____
15. Overall my emotional response to the entire task was the following emotional response. _____
16. When we first started the task my partner felt the following emotional response. _____
17. After working on the task for 10 minutes my partner exhibited the following emotional response. _____
18. Overall my partner exhibited the following emotional response. _____

Short Answer:

19. In an ideal situation how would you have accomplished the task provided for you to accomplish? _____

20. Would you have preferred to perform this task in a Face to Face work environment or a Computer Mediated Communication type environment and why? _____

21. What was the most frustrating part of this task? _____

22. What was the best part of this task? _____

Appendix D

Instructions: This is a timed project, you will have 30 minutes to complete the project, if you finish before the 30 minutes is up you may signal the moderator and end.

One member of your group has been given a list of instructions to complete an origami animal. The other member of your group has been given the supplies necessary to complete the origami animal. The group member with the instructions will dictate how to complete the animal without showing the instructions.

1. **I played the following role in this task.**
 (circle one) Instructor Builder

Circle the answer that best answers the following questions

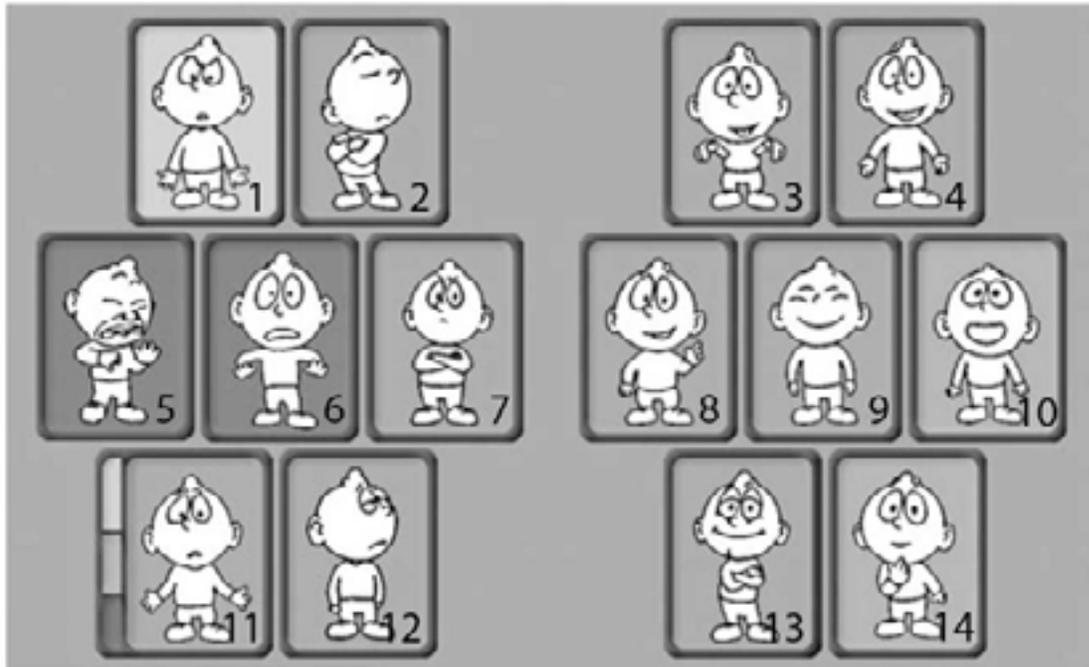
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
2. The task was relatively simple to complete in the time frame given.	1	2	3	4	5	_____
3. I felt my task was harder to complete than my partners.	1	2	3	4	5	_____
4. I felt my partner was easy to communicate with during this task.	1	2	3	4	5	_____
5. I felt we completed the task as fast as was possible given the circumstances.	1	2	3	4	5	_____

Circle the answer that best answers the following questions

	Inadequate	Fair	Adequate	Good	Excellent	
6. Speaking/Typing rate of partner?	1	2	3	4	5	_____
7. Speaking/Typing fluency of partner?	1	2	3	4	5	_____
8. How confident are you of your general ability to predict how your partner will behave?	1	2	3	4	5	_____
9. How accurate are you at predicting the values your partner holds?	1	2	3	4	5	_____
10. How accurate are you at predicting your partner's attitudes?	1	2	3	4	5	_____
11. How well can you predict your partner's emotions?	1	2	3	4	5	_____
12. How well do you know your partner?	1	2	3	4	5	_____

Emotional Analysis:

Answer the following questions using the following chart. Please indicate after each question which image best corresponds to the emotion you felt or perceived.



13. When I started this task I felt the following emotional response. _____
14. After working on the task for 10 minutes I felt the following emotional response. _____
15. Overall my emotional response to the entire task was the following emotional response. _____
16. When we first started the task my partner felt the following emotional response. _____
17. After working on the task for 10 minutes my partner exhibited the following emotional response. _____
18. Overall my partner exhibited the following emotional response. _____

Short Answer:

19. In an ideal situation how would you have accomplished the task provided for you to accomplish? _____

20. Would you have preferred to perform this task in a Face to Face work environment or a Computer Mediated Communication type environment and why? _____

21. What was the most frustrating part of this task? _____

22. What was the best part of this task? _____