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**ROLE OF COMPUTER-MEDIATED COMMUNICATION
TECHNOLOGIES IN INTERNATIONAL STUDENTS'
CROSS-CULTURAL TRANSITION**

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by

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Role of Computer-Mediated Communication Technologies in International Students' Cross-Cultural Transition

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The present study investigates the role of CMC in international students' adjustment to the U.S. It is divided into two parts. The first part tests a structural equation model (SEM) in which international students' adaptation to the new culture during is predicted by CMC use, home and host national identification, and perceived social support. Psychological, socio-cultural, and academic adaptations are measured as the outcomes of acculturation. Two-hundred-eighty first year international students attending the University of Texas at Austin responded to a web survey after they had moved to the U.S. The results of the SEM analysis confirm that the model developed and tested in this study is plausible in explaining adaptation of the international students. The findings suggested that international students frequently use computers as tools for sustaining contact with family and friends at home as well as the native social and culture life. Continuous contact with home affects the sojourning individuals'

maintenance of home identity and the acquisition of host identity, and their perceptions of available social support. All of these factors combine to affect the students' adaptation to the new culture. Further comparisons of high and low CMC users indicated that CMC use has diverse effects on the adaptation of the international students. Likewise, the acculturation strategy adopted by students influences the three adaptation processes differently. Biculturalism and integration emerged to be more effective acculturation strategies than separatism and marginalism. The second part of the study makes comparisons between pre-arrival and post-arrival measures to detect the changes students go through during the initial phase of cross-cultural transition. Ninety international students from the same population responded to a series of questionnaires first before their move and again two months after their arrival to the U.S. Results of repeated measures of analyses of variance tests supported the notion that cross-cultural transitions result in behavioral and psychological changes in international students. In the post arrival phase, international students' frequency of CMC use significantly increases whereas their psychological well-being significantly diminishes relative to the pre-arrival phase. The findings of this study are also supported by the qualitative data collected from another group of international students of the University of Texas at Austin in a pilot study.

TABLE OF CONTENTS

List of Tables.....	x
List of Figures.....	xii
Introduction.....	1
Review of the Literature.....	6
Computer-Mediated Communication.....	6
Research on Acculturation.....	8
Berry's Acculturation Model.....	9
Factors Influencing Acculturation	14
Social support.....	18
Social contact:: Co-nationals and host nationals.....	19
Role of existing relationships: Groundedness.....	22
Role of Communication and Mass Media in Acculturation.....	24
Computer-Mediated Communication and Acculturation.....	27
Adaptation.....	30
Statement of the Problem.....	34
The Present study.....	36
Model and Hypotheses.....	37
Part One: Structural equation model.....	37
Part Two: Pre- and post- arrival comparisons.....	41
Method.....	43
Participants.....	43
Pilot Study.....	43
Main Study.....	43
Sample for the pre-post analyses.....	44
Sample for the post-only analyses.....	46
Instruments.....	47
Demographics.....	48

General CMC Use: Pre-Arrival Phase.....	48
CMC Use to Contact Home: Post-Arrival Phase.....	48
Acculturation Index.....	48
Perceived Social Support.....	49
Psychological Adaptation.....	50
Socio-Cultural Adaptation.....	51
Academic Adaptation.....	52
Procedure.....	53
Pilot Study.....	53
Main Study.....	53
Results.....	56
Pilot Study.....	56
Sample Characteristics.....	56
Findings.....	57
Main Study.....	64
Sample Characteristics.....	64
Sample for the pre-post analyses.....	64
Sample for the post-only analyses.....	65
Psychometric Properties of the Instruments.....	70
Reliability of the scales.....	71
Further confirmation of scale construction.....	75
Testing the Structural Equation Model.....	82
Step One.....	82
Step Two.....	83
The measurement model.....	85
The structural equation model.....	87
An alternative model	91
A Detailed Look at the Adaptation Scores.....	92
Pre-Post Arrival Comparisons.....	95

Discussion.....	99
A Structural Equation Model of Acculturation.....	101
Effect of CMC use on Home and Host Identification and Social Support.....	102
Effect Home and Host Identification and Social Support on Adaptation.....	106
Relationships between the Three Adaptation Scores.....	112
Effects of CMC use and Acculturation Strategies on Adaptation.....	113
Pre- and Post- Arrival Comparisons.....	117
Conclusion.....	123
Limitations and Implications.....	124
Limitations of the Study and Suggestions.....	124
Procedural issues.....	124
Measurement issues.....	126
Potential Applications.....	130
Appendix A 1: Demographics Questions.....	133
Appendix A 2: General CMC Use Questions.....	137
Appendix A 3: CMC Use Scale (Post arrival phase).....	139
Appendix A 4: Acculturation Index.....	144
Appendix A 5: Perceived Social Support Scale.....	146
Appendix A 6: Generalized Contentment Scale.....	148
Appendix A 7: Socio-Cultural Adaptation Scale.....	150
Appendix A 8: Academic Adaptation Scale.....	152
Appendix B 1: Pilot Questionnaire.....	154
Appendix B 2: Pilot Interview Questions.....	164
Appendix C : Confirmatory Factor Analyses EQS Representation	168
References.....	170
Vita.....	188

LIST OF TABLES

Table 1.	Acculturation Strategies.....	10
Table 2.	Five Types of Acculturating Groups.....	12
Table 3.	Data Collection in the Two Phases.....	54
Table 4.	Demographics of the Four Interviewees.....	57
Table 5.	Demographics Characteristics of the Sample for Pre-Post Comparisons.....	65
Table 6.	Demographics Characteristics of the Sample for Post-Only Comparisons.....	66
Table 7.	Pearson Correlation Coefficients Between Demographics Variables and Adaptation Variables.....	69
Table 8.	Descriptive Statistics for the Scales	75
Table 9.	Summary of Goodness of Fit Indices for the Confirmatory Factor Analyses.....	78
Table 10.	Use of Computer-Mediated Communication Tools and Traditional Communication Tools During Cross-Cultural Transition	83
Table 11.	Correlation Matrix and Descriptive Statistics for the Eight Constructs.....	84
Table 12.	Covariance Matrix.....	85
Table 13.	Summary of Goodness of Fit Indices for the Structural Equation Model.....	87
Table 14.	Effects Decomposition of the Structural Equation Model	90
Table 15.	Means and Standard Deviations of Adaptation Scores as Function of CMC Use.....	93
Table 16.	Means and Standard Deviations of Adaptation Scores as a Function of Acculturation Strategies.....	94

Table 17.	Descriptive Statistics of the CMC Use and Acculturation Strategies in the Pre-Arrival Phase.....	96
Table 18.	Comparisons of Pre- and Post- Arrival Phase Variables.....	97

LIST OF FIGURES

Figure 1.	A framework for acculturation research.....	15
Figure 2.	A structural equation model of international students cross-cultural acculturation.....	37
Figure 3.	Path values of the confirmatory factor analyses model.....	81
Figure 4.	Path values of the structural equation model	88

Introduction

Today with the ease of traveling and the globalization of business, countless opportunities for cross-cultural contacts have been created. As a result, everyday, more and more people start living in environments where the language and the culture are not their own. The process of psychological and behavioral changes that an individual experiences as a result of sustained contact with members of other cultural group is called “psychological acculturation” (Berry, 1989). Numerous factors influence this cross-cultural transition. Yet, one common aspect of this practice is that people, who start living in a new culture need to acquire additional cultural skills, learn the language spoken, and go through an adaptation phase. The consequences of this transition vary, ranging from success defined as adjustment to the new culture and a satisfactory life, to failure or maladjustment, bringing various psychological and physical problems with it (Ward, 1996).

Acculturation has been the subject of numerous studies. Various researchers have approached this issue from different perspectives. Some investigated the factors that affect the adaptation process (e.g. cultural distance, language, age), some focused on the patterns of adjustment over time (e.g. U-curve, culture shock theories), still some others studied how different populations (e.g. immigrants, refugees, native peoples, ethnic groups, and sojourners) may be influenced by this transition (e.g. Kim, 1978; Lysgaard, 1955; Oberg, 1960; Furnham & Bochner, 1982; Berry 1989; Kagan, 1990; Black et al., 1991; LaFromboise et al., 1993). Yet, they all have a

common objective: to identify ways to improve the process and make cross-cultural transition a better experience.

The goal of the present study was to examine the role of computer-mediated-communications in the early stages of cross-cultural transition for international students in the U.S.

International students grow up in one cultural context and go through a transition period re-establish their lives in another culture. They volunteer to cross national boundaries in order to earn educational degree. International education is not new; since the time of Greeks, scholars and students have traveled to the intellectually dominant countries in search for knowledge (Pruitt, 1978). Currently, the U.S. stands out as the country that receives the largest proportion of the world's students (Chiu, 1995). Students from other countries have been coming to the U.S. since 1780s and the number has increased dramatically since the end of World War II (Marion, 1986). According to a report by the Institute of International Education, the United States experienced a record number of international students in the 2001-2002 academic year. Over 582,996 foreign students were enrolled in American colleges and universities, an increase of 6.4% over the previous year. International students comprise over 4% of America's total higher education population and they contribute nearly \$12 billion dollars to the U.S. economy in money spent on tuition, living expenses, and related costs.

As suggested by various researchers, problems in acculturation interfere with international students' academic success and diminish their psychological well-being and general life satisfaction (Chiu, 1995; DeVerthelyi, 1995; Ryan & Twibell, 2000). Thus, an awareness of the acculturation process of international students is useful to counselors, faculty, and student support services personnel who work with these students as well as the students themselves. By knowing how to improve the transition, foreign students can take the steps necessary to make their transition as painless and enriching as possible.

Once in the U.S., international students start learning the new culture and building relationships with local people. During this learning process, while they are trying to find out how they can fit into this new society, they need help from people who will provide support. Research has shown that, one of the factors that affects the welfare of sojourners is the *social network* available to them (Brett & Werbel, 1980; Furnham & Bochner, 1982; Albrecht & Adelman, 1984; Ataca & Berry, 2002.) *Social support* is thought to be vital for a successful acculturation. Adelman (1988) asserts the social landscape of human assistance to be crucial to the process of cross-cultural adaptation. She further claims that, leaving old friends and disrupting old ties are the most difficult aspects of relocation. Recent developments in communication technologies reduce the time and space barriers associated with communicating long distances, thus facilitating the maintenance of home culture for sojourners. Today, with the means of computer-mediated communication (CMC), such as e-mails,

Internet, chat-rooms, list serves and bulletin board systems, contact between physically proximate and long distance friendships is easier, faster and less expensive (even free). In this sense, CMC facilitates increased contact, and contributes to the solidarity of relationships by bridging spatial and temporal divides. Besides enabling users to keep in touch with family and friends, CMC is also a great source for the individuals to keep up with social, political and cultural life of their home culture. Accordingly, the primary purpose of this study is to determine whether CMC use can be a form of social support for international students.

CMC can also be used to acquire information about American life and values and make new relationships within the host community. Being able to communicate with home enables sojourners to connect their past and present, giving a sense of identity and belonging that gradually helps them to make room for acquired aspects of the host culture and encourage them to interact with the host people. According to a well-accepted acculturation model by Berry and his colleagues (Berry, 1980; Berry et al., 1987; Berry & Kim, 1988; Berry & Sam, 1997) contact with the home culture facilitates sojourners' acquisition of both home and host culture values. Individuals who value both home and host cultures will be more likely to attain a bicultural acculturation strategy. Several researchers have suggested that encouraging biculturalism could ameliorate detrimental effects of acculturation (e.g. Johnson - Powell, et al., 1997; LaFromboise et al., 1993; Root, 2002). Individuals, who have the ability to alternate effectively their use of culturally appropriate behavior exhibit

higher cognitive functioning and mental health status, and eventually demonstrate superior academic achievement than people who are mono-cultural or assimilated. Accordingly, the present research investigated whether CMC use is effective in maintaining ties with the home culture and facilitating access to the host culture and thus resulting in a smoother cross-cultural transition and a successful adjustment.

The following section provides an overview of the literature related to the role of communication technologies in the acculturation of sojourners. The first part is an introduction to the changes in computer-mediated communication technologies. Next, an overview of research on acculturation is given, followed by a more detailed description of the acculturation model developed by Berry and his colleagues. Subsequently, the factors that have been verified to be influencing acculturation during cross-cultural transitions are summarized. The role of social support in cross-cultural transitions is discussed to a great extent, with a special focus on the source of such support, comparing co-nationals, host nationals and also the possible effects of having access to existing relationships via CMC on the acculturation process. Next, some examples of recent research regarding the role of CMC in social life are listed. After reviewing the literature on acculturation outcomes, I will explain the present study which investigated whether the use of new communication technologies would aid international students in their adaptation to the host cultures.

Review of the Literature

Computer-Mediated Communication

Technological changes in the last few decades have made long distance communication between people less expensive, faster, and easier. *Computer-mediated communication (CMC)* is broadly defined as the communication that occurs between two or more people, with the aid of computer software and via a computer interface (Goldman, 1999). It includes text, audio, and video exchanges that people can control using computers. Possible communications on-line include private chat rooms, private e-mail exchange, news-groups and the World Wide Web, which acts as a broadcast medium (Goldman, 1999). Only recently have researchers begun to examine the nature of the Internet as a form of communication (Gackenbach & Ellerman, 1998). Because CMC was regarded as an informal medium available at first only to a limited number of people, few psychologists have studied it. Furthermore, its manifestation as “high technology” was of little interest to most scholars in the humanities and other areas in the social sciences (Morris & Ogan, 1996).

The role of the Internet in today’s world cannot be ignored. A comprehensive study by Kraut et al., (1998) found that individuals with Internet connections in their homes used the Internet for interpersonal communication more than any other reasons such as entertainment, education, shopping etc. Recently, numerous researchers examined various aspects of the effect of the Internet on social and psychological life (e.g. McCormick & McCormick, 1992; Morris & Mogan,

1996; Morohan-Martin, 1998, Hampton & Wellman, 2001; LaRose et al., 2001; Nie, 2001; Kraut et al., 1998, 2002; Shaw & Gant, 2002). Although there are controversies about the consequences of an elevated use of Internet, in general, researchers agree that as long as consumers are conscientious in using it, they benefit immensely from this kind of communication. In one such study, Katz and Aspen (1996) demonstrated that individuals using computer-based communications have more accurate political, professional, and work-related organizational information than peers without access. In the 1997 American Internet User survey, 87% of Internet users said that the Internet provides them with more efficient access to the information they need everyday. A report by Pew Internet & American Life project indicated that during a typical day in 2000, over 90% of people who used the Internet sent or received e-mail. Additionally, in a survey of 1,001 respondents, D'Amico (1998) found that 94% said Internet facilitated keeping in touch with friends and family. The growth of technology to support human communication creates an increasingly effective loop of interaction and collaboration (Gackenbach, 1998). Consequently, more research about the effects of using this media is warranted.

Research on Acculturation

The term “acculturation” was originally defined by Redfield, Linton and Herskovits (1936) as “the cultural changes that results from continuous, first hand contact between two distinct cultural groups” (p.149). As an individual level phenomenon, it refers to changes in an acculturating individual’s overt behavior and covert traits.

Starting in 1960s, researchers from various disciplines such as psychology, education, sociology, and ethnology began studying the process of change that occurs in transitions within, between, and among cultures. Different researchers and theorists studied the phenomenon of cultural interactions from various perspectives and developed various models such as *the assimilation model*, which assumes an ongoing process of absorption into a culture perceived as dominant or more desirable (Gordon, 1964); *the acculturation model*, which implies that the individual, while becoming a competent participant in the majority culture, will always be identified as a member of the minority culture (Smither, 1982, Kim, 1979); *the alternation model* which assumes that an individual can alter his/her behavior to fit a particular social context (LaFrombise & Rowe, 1983); *the multicultural model*, which promotes a pluralistic approach and proposes that an individual can maintain a positive identity as a member of his/her own culture of origin and at the same time developing a positive identity by engaging in institutional activities with members from other groups (Berry, 1984); and *the fusion model*, which assumes a melting pot

theory (Gleason, 1979). It should be noted that, in the acculturation literature, different concepts such as acculturation, alternation, multiculturalism, biculturalism, dualism or pluralism have been commonly used almost interchangeably.

“The acculturation framework” developed by Berry and his colleagues have integrated and largely synthesized the growing literature on cultural transition and adjustment (e.g. Berry, 1984, 1990, 1992; Berry & Kim, 1988; Berry, Kim, Minder & Mok, 1987; Berry & Sam, 1997). This model of acculturation is highly regarded and widely recognized as exerting a predominant influence on theory and research in this field (Ward & Rana-Deuba, 1999). Bourhis et al., (1997) states that, “this [Berry’s acculturation] framework remains the most useful bi-dimensional model of immigrant acculturation from a Social Psychological perspective” (p.377). The present study is based on Berry’s acculturation framework.

Berry’s Acculturation Model

According to Berry (1987), individuals involved in the acculturation process have to confront two basic issues: (a) whether or not they consider it to be of value to maintain their original cultural identity and characteristics and (b) whether or not they consider it to be of value to maintain relationships and contacts with the dominant group. When evaluative (yes, no) responses to each of these dimensions are dichotomized, a fourfold model can be generated (see Table 1). Each cell in this fourfold classification is considered to be an acculturation strategy available to

individuals and groups in pluralistic societies. These four options are: Assimilation, Integration (biculturalism), Separation, and Marginalization.

Table 1

Acculturation Strategies

		Is it considered to be of value to maintain cultural identity and characteristics? (heritage/ home culture)?	
		YES	NO
Is it considered to be of value to maintain relationships with other cultures (host culture)?	YES	Integration (biculturalism)	Assimilation
	NO	Separation	Marginalization

Note. Adopted from Berry, J. W. (1987). *Acculturation and psychological adaptation: A conceptual Overview*, p.45.

Those who value inter group relations but are relatively unconcerned with cultural maintenance are classified as “assimilated.” Those who cherish cultural maintenance but do not value inter group relations are defined as adopting a “separatist” position, in which there are no substantial relations with the host culture, but the traditional way of life is maintained. Individuals who value both cultural maintenance and inter group relations endorse an “integration” approach, which implies some maintenance of their cultural integrity, as well as the movement to become an integral part of the larger societal framework. Finally, those individuals

who value neither cultural maintenance nor inter group relations are called “marginalized”, which is characterized by feelings of alienation and loss of identity. Marginalized individuals lose cultural and psychological contact with both their traditional culture and the larger society (Berry, 1997).

The process of acculturation has been largely interpreted within a stress and coping framework with emphasis on the negative psychological and psychosomatic consequences of cross-cultural contact and change (Acevedo, 2000; Landale, et al., 1999). The quantity of acculturative stress and the adaptational problems subsequently experienced assumed to be influenced by a number of factors that operate both on the personal and societal levels such as; self-esteem and cognitive style, personality sex and ethnicity, and even macro social and political factors such as the degree of cultural pluralism extant in the wider society, attitudes toward acculturation (Berry 1987). The four acculturation strategies have been found to relate in a predictable fashion to other features of the acculturation process such as changes in socioeconomic status, education, friendship patterns and language use (Berry et al., 1989). In this regard, comparative research, in general, has demonstrated that marginalization and separation are associated with higher levels of acculturative stress, integration is associated with a low level of stress, and assimilation is linked with intermediate stress level (e.g. Berry et al., 1989; LaFromboise et al., 1993; Black et al., 1991).

Contemporary research on cross-cultural adjustment indicates that the nature of a person's adjustment depends on specific features of the group level factors and of the moderating influence of individual factors that exist prior to or that arise during acculturation (Ward & Kennedy, 1993). Thus, it is anticipated that people who acculturate for different reasons, under different conditions will experience the process differently. Although most of the studies about the effects of acculturation in the literature are based on a single type of group (immigrants), it is clear that there are many different kinds of acculturating groups, and adaptation may vary depending upon this factor. In this direction, Berry and Kim (1988) identified five main groups based on the variations in the degree of voluntariness, mobility and permanence of contact (see Table 2). These five groups are: immigrants, refugees, native peoples, ethnic groups, and sojourners.

Table 2

Five Types of Acculturating Groups

<u>Voluntariness of Contact</u>		
<u>Mobility</u>	<u>Voluntary</u>	<u>Involuntary</u>
Sedentary	Ethnic Groups	Native peoples
Migrant	Immigrants (relatively permanent) Sojourners (temporary)	Refugees

Note. Adopted from Berry, J. (1987). *Acculturation and psychological adaptation: A conceptual overview*, p.47.

Each of these different groups goes through diverse experiences, directly influencing the style and outcome of their acculturation. More specifically, according to Berry and Kim (1988), those who are voluntarily involved in the acculturation process (e.g. immigrants) may experience less difficulty than those with little choice in the matter (e.g. refugees and native people), since their initial attitudes toward contact and change may be more positive. On the other hand, those who are only temporarily in contact and who are without permanent social supports (e.g. sojourners such as international students, expatriates, and guest workers) may experience more problems than those more permanently settled and established (e.g. ethnic groups). Berry and Sam (1996) suggest that even though the basic process of adaptation appears to be common across all these groups, the course, the level of difficulty, and the eventual outcome of acculturation may be different based on these factors.

By definition, sojourners have some characteristics that separate them from other acculturating groups. First, their stay is temporary (usually ranging from 6 months to 5 years), they move voluntarily, usually intend to return “home,” and their purpose for moving is basically task related, e.g. study, teach/advice, guide, represent their country/company, or engage in business (Furnham, 1987). Their common motivating factor is the expectation to be successful in their mission. As Aycan and Kanungo (1997) point out, their success is largely contingent upon the extent to which they adapt to the circumstances of the host country. Included in this category

are international students and scholars, guest workers, diplomats, business and technical aid personnel, troops situated in another country, and missionaries (Berry & Sam, 1997).

The focus of the present study is “International Students.” They have some specific characteristics that make their experiences different from other migrating groups, including other sojourners. They comprise a more homogenous group in that they are typically young and well educated. In general, they arrive in the host country more prepared to adjust to their culture and have a purpose for their sojourn here that presses them to acculturate to host culture, at least to the extent that they can be successful academically. They are generally pre-trained in the host language and have a high motivation for acculturation. Their success is generally measured in terms of a satisfactory completion of their academic program and is largely contingent upon the extent that they adapt to the circumstances in the host country. As Church (1982) declared, most research on sojourners has been done on international students. Yet, most of the theories on cross-cultural transition are conceptualized in terms of the experiences of immigrants. Hence, it is not clear whether theories of acculturation apply as well to sojourners as they do to immigrants.

Factors Influencing Acculturation

Contemporary research on the process of acculturation shows that the nature of a person's acculturation depends on specific features of group and individual factors that exist prior to or arise during acculturation. Berry (1997) proposes that a model of such key variables should be considered when carrying out studies of psychological acculturation (see Figure 1.)

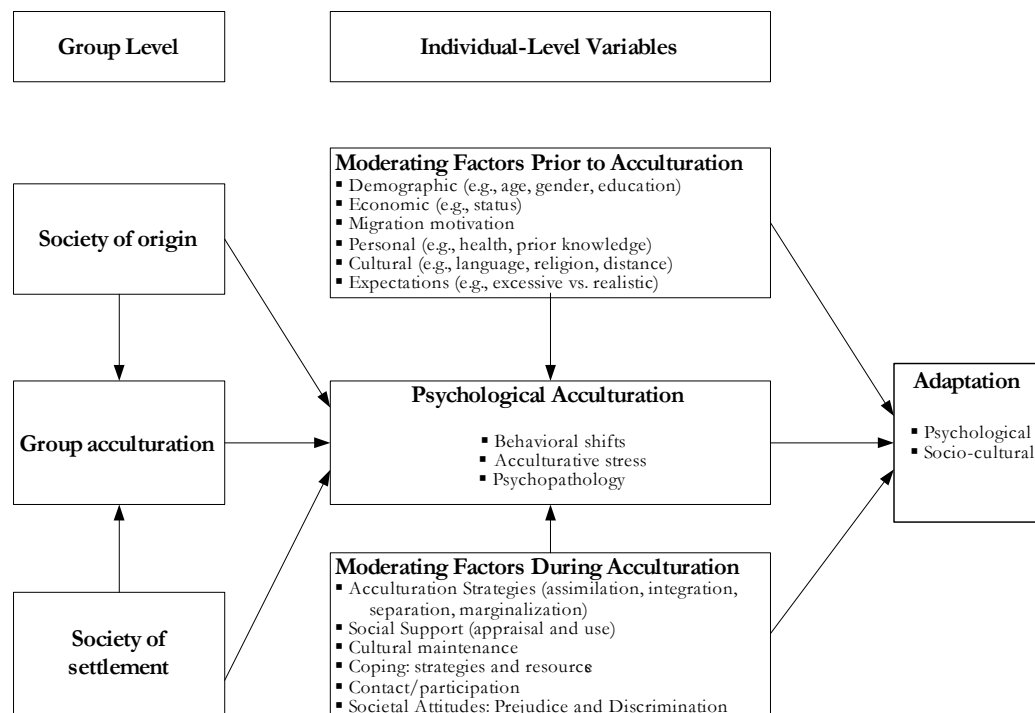


Figure 1. A framework for acculturation research (Berry, 1992).

This framework explains immigration both at the group and individual levels. The variables at the top exist prior to the acculturation and the ones at the bottom arise during the acculturation. The main group- and psychological-level acculturation

phenomena are placed through the middle of the framework. Some of the variables in this model may serve as both moderators and mediators. For example coping strategies may serve as a mediator when they link stressors to the stress reaction but also as moderator when they affect the degree of relationship between stressors and stress (Frese, 1986). This main point of the framework is to show the key variables that should be considered when carrying out studies of psychological acculturation (Berry & Sam, 1997).

Various researchers have investigated the effect of one or some of these factors on the acculturation process in various populations (e.g. Ward & Kennedy, 1993); homesickness, personality, life changes, cultural distance (Cui, van den Berg & Jiang, 1998); communication competence, cultural empathy, social interaction (Piontkowski et al., 2000); similarity, in-group bias, contact, self-efficacy (Searle & Ward, 1990); expected difficulty, cultural distance, interpersonal relations, extraversion/introversion (Ataca & Berry, 2002); hardiness, social support, acculturation attitudes, and discrimination. There have been various conceptual and empirical studies on *sojourner adjustment* in relation to its antecedents, correlates, and consequences (Ady, 1995). Among those variables that have been investigated are: age, marital status (spouse/children present or not), gender, personality traits, competency in English, cultural distance between the original and host culture, quantity and quality of social contact (both with host and co-nationals), presence,

source and quality of social support (Kagitcibasi, 1978; Kealey & Ruben, 1983; Kealey, 1989).

International students come from distinctly different cultures with particular languages, values, personalities and expectations, and experience the cross-cultural transition phase differently (Church, 1982). In the literature, the most common problems international students face are cited as homesickness, finances, housing and food, host language proficiency, understanding lectures and participating in class discussion, preparing written and oral reports, understanding host social customs, and making friends and acceptance in social groups (Meloni, 1986). In one of the earliest studies on international student acculturation, Hull (1978) came up with the conclusion that younger students are more amenable to change and cross-cultural adjustment. Age- related differences in acculturation have been supported in other studies. For example, Fong and Peskin (1996) have stated that younger students reported more contact with host nationals, whereas graduate students reported greater academic satisfaction and less contact with host nationals. It has also been demonstrated by various studies that female students have greater acculturation problems than males (Marville, 1981). One other common finding is that married students, with their spouse present, have fewer problems than single students (Klineberg & Hull, 1979). Besides, the cultural distance between the original and the host culture is also found to be a determining factor in acculturation (Furnham & Bochner, 1982; Ward & Kennedy, 1993).

The temporary nature of their stay and the lack of permanent social support present locally might cause some additional problems during international students' transition to a new culture. Compared to more permanently settled and established groups such as ethnic groups or immigrants, it might be more of an issue for these groups to keep in touch with their own culture and society and also maintain their existing relationships. In some cases, adaptation concerns may give rise to various psychological and physical problems interfering with the daily social functioning of the individual as well as the academic performance. So far, institutions have adopted various programs to ease the adjustment process by making available host language instruction, orientation programs, counseling, and host-family programs. The present research is designed to investigate whether encouraging the use of CMC and facilitating a continuous contact with home culture can be another tool that contributes to the acculturation of sojourners.

Social support. Our ability to cope with daily stressors, critical life transitions, and environmental or cultural change is inextricably tied to the social ecology in which we are embedded (Adelman, 1988). The extensive literature on stress and coping has shown that social support is linked to psychological well-being (Lazarus & Folkman, 1984). Albrecht and Adelman (1987) define social support as “verbal and nonverbal communication between recipients and providers that reduces uncertainty about the situation, the self, the other, or the relationship, and functions to enhance a perception of personal control in one’s life experience” (p.19).

Empirical evidence has consistently shown that, social support diminishes psychological distress during cross-cultural transition (Adelman, 1988; Fontaine, 1986). Immigrants who receive significant amounts of social support are better able to manage adverse effects of acculturation stress- and career-related outcomes than those who are more isolated and who do not receive such support (Landis & Bhagat, 1996). According to Cobb (1976), social support provides a person with three sorts of information that he or she is cared for and loved; esteemed and valued; and that he or she belongs to a network of communication and mutual obligation. Hence it may be predicted that international students with a strong and supportive friendship network would be happier, and better adjusted than those without such a network.

Social contact: co-nationals or host nationals. Even though it has been commonly accepted that social support plays a moderating role in the development of acculturating stress (e.g. Golding & Burnam, 1990; Hammer 1987), determining the most effective *source of social support* for immigrants and sojourners remains a controversial issue (Ward & Rana-Dueba, 2000). Various studies have investigated whether co-nationals or host nationals were predominant in facilitating positive acculturation outcomes. In general, this literature has yielded contradictory results (e.g. Kleinberg & Hull, 1979; Inglis & Gudykunst, 1982; Furnham & Alibhai, 1985; Berry et al., 1987; Myambo & O’Cuneen, 1988; Zheng & Berry, 1991; Ward & Kennedy, 1993; Cui et al., 1998; and Ward & Rana-Dueba 2000). On the one hand, it is suggested that co-national network rather than the local network provides the

most salient and powerful social support for immigrants and sojourners by providing a sense of security and facilitating the transition, particularly during the initial stages (Becker, 1971; Kim, 1977; Sykes & Eden, 1987; Ying & Liese, 1991; Ward & Kennedy, 1994). Inglis and Gudykunst (1982) claimed that the degree of *institutional completeness* of an immigrant community such as ethnic newspapers, churches, and other ethnic organizations contributed to acculturation. Cui et al. (1998) also mentioned the importance of co-ethnic communication in cross-cultural adaptation; arguing that for many sojourners, interactions with their own fellow nationals remain an indispensable part of their lives in the host culture. The overwhelming and even stressful experience of acculturation often results in sojourners' reliance on contact with their co-nationals for emotional and social support. Bond and Cheung (1984) introduced the term *ethnic affirmation*, defined as tendency for sojourners to retain their ethnic identity through continuous communication and ethnic fellows, and show that it often positively affects sojourners' experience in the host society.

On the other hand, it has also been argued by some other researchers that remaining close to one's culture of origin may retard adjustment to the new culture in the long run by emphasizing the sense of one's difference and separateness from the majority (Klineberg, 1980, Kim, 1988, Ying & Liese, 1990). They suggested that positive contact with locals is associated with more positive outcomes. For example, Kleinberg and Hull (1979) found that satisfactory contact and established relationships with local people resulted in broader and more general satisfaction with

overseas academic experiences. Berry et al., (1987) have also established that more contact with host nationals leads to general adjustment and satisfaction. In two consecutive studies, Ward and Rana-Dueba (1999, 2000) demonstrated that sojourners with strong host national identification experienced less socio-cultural adjustment difficulties; whereas, those with strong co-national identification experienced less psychological adjustment problems.

Furnham and Alibhei (1985) were among the first researchers to claim that actually *both sources* of social support, co-nationals and host nationals, affect international students' well-being. More recently, Ward and Rana-Dueba (2000) also demonstrated that both group are capable of affecting the psychological adjustment of sojourners among foreign aid workers in Nepal. They examined the effect of actual and desired contact with host and co-nationals, satisfaction with the quality and quantity of such contact and identification with both cultures on various psychological adjustment measures. Their findings indicated that the actual influence of social support is more likely to be dependent upon sojourners' access to both home and host nationals as well as the *quality* of their interactions with each of these groups.

Role of existing relationships: Groundedness. Another aspect of the cross-cultural transition is the disruption of existing social support networks and necessity of building new relationships. As Rogler (1994) states, the loss of social contact is stressful in itself. When the individual first encounters a new culture, forming accurate or functional attributions of self may be difficult because the sojourner often encounters unfamiliar behaviors and demands in the new environment. Such conditions are the impetus for individuals to communicate with those who can clarify the situation or remove self-doubts (Adelman, 1988). Furnham and Bochner (1982) state that for sojourners threatened by the demands of the new culture, compatriot support networks can reaffirm the home values and decrease the possible homesickness and disorientation that accompanies the adjustment process. They describe this kind of emotional support in terms of validation of self worth, affirmation of personal relationships and creating a sense of belonging.

As Adler (1975) remarks, every culture provides the individual some sense of identity, some regulation or belonging, and some sense of personal place in the school of things. LaFramboise et al., (1997) label this experience of having a well-developed social support system as “a sense of being grounded” (p. 407). They argue that the person most successful at managing a bicultural existence will be the one who establishes some form of stable social networks in both cultures. In return, this sense of being grounded in an extensive social network in both cultures enhances an individual’s ability to cope with the pressures of living in a bicultural environment.

Research has indicated that this sense of being grounded within one's culture functions as a coping mechanism for dealing with the psychological impact of entering a new culture and has positive effects on the outcome of acculturation (Murphy, 1977; Fraser & Pecora, 1985; Beiser, 1987; Porte & Torney-Purta, 1987). For example, Palinkas (1982) examined the impact of participating in the Chinese church on the identity and mental health of Chinese immigrants. Findings of this study reinforce the perspective that a solid social network that simultaneously grounds an individual in parts of his/her home culture facilitates the acquisition of a new culture and sharply reduces the negative impact of acculturation. In another study in which 140 foreign students were asked to specify various aspects of their three best friends as well as their preferred companion for each of a range of everyday situations, Furnham and Bochner (1982) confirmed a strong preference for co-national friendship network defined as people from the same, similar, or neighboring countries. Bochner and colleagues (Bochner, Buker & McLeod, 1976; Bochner & Orr, 1979) argued that the main function of co-national network is to provide a setting in which the sojourners can rehearse and express their culture of origin. They claim that these mono-cultural (co-national) bonds are of vital importance to foreign students, and should therefore not be administratively interfered with, regulated against, obstructed, or sneered at. Furnham and Bochner (1982) further proposed that such bonds should be encouraged, and if possible, shaped to become more open to bi- or multi-cultural influences. In particular,

mediating individuals who function as links between different cultural networks should be identified and supported. Bi-cultural (foreign student –host national) bonds should also be expanded to reach beyond their initial task-oriented and instrumental function.

Role of Communication and Mass Media in Acculturation

Being at the heart of all social interactions, communication is naturally accepted as one of the fundamental processes of acculturation by which individuals and the social cultural systems interact.

Kim (1978) was one of the first researchers to investigate the role of communication in immigrants' acculturation process. In her communication/acculturation model, she argues that positive social interaction with host people is a necessary condition for the effective adjustment of sojourners. She defines cross-cultural adaptation as the process of learning communication skills necessary for effective social interaction within people in the new culture (Kim, 1988). In several studies, Kim and colleagues (e.g. Kim, 1978; Kim, 1988; Kim, Y., Lujan, P., & Dixon, L. D., 1998) illustrated that communication plays a significant role as a medium for social interaction and facilitates acculturation. For example Kim (1988) found that use of mass communication in the early phases of cross-cultural transition reduces the uncertainty and anxiety of interpersonal communication and helps sojourners adapt to their new environment. Various other studies also demonstrated considerable evidence regarding the positive contribution of communication with

host nationals to specific outcomes like identity integration, personal engagement with host culture, functional fitness and psychological health during the sojourn (e.g. Dawson et al., 1996; Noels & Clement, 1996).

Few researchers have explored how communication with people at home in addition to contact with host nationals influences acculturation. In an autobiographical article, Keshishian (2000) talked about using the media of communication as a means to communicate with her family and friends back home and as a tool in the acculturation process. She says, as a young Iranian student in New York in the 70s, when she felt that she could not fit in with the American culture, she needed something that would connect her past with the present, something that could give her a sense of *identity* and *belonging*. She, like other students, used various ethnic groups, such as Iranian students' organizations, Iranian restaurants, grocery stores or bookstores as a source of moral support which helped her feel safe and secure and not completely out of place. However, besides these two "quasi Irans", she says, she also needed a family tie. Thus, she constantly tried to be in contact with her family back at home through telephone, letters, and even audio cassettes they sent to each other. She further asserts that this commonplace media of communication indeed helped her create the family tie she needed to survive and gave her the strength to "gradually give up some aspects of her past culture to make room for acquired aspects of the U.S. culture" (p.96). Like many other sojourners, she says, in time she learned to live with the reality of displacement, depended less

on the ethnic groups until she stopped going to them altogether, and made American friends. This autobiographical work is an example of the immigrants' need to feel "a sense of being grounded" as also proposed by LaFromboise et al. (1993).

Besides one-to-one contact with either home or host nationals, other researchers investigating the effect of communication on acculturation also considered mass media as a significant source of cultural information for newly arriving immigrants and sojourners (Johnson, 1996). Of the various types of mass communication experiences, exposure to information-oriented mass media such as newspapers, magazines, and television news is considered to be more strongly associated with adaptation than entertainment oriented media (Kim, 1978). For example, in a related study, Berry et al., (1987) suggested that compared to other forms of newspaper readership, respondents reading only host newspapers have higher assimilation scores; respondents reading only ethnic newspapers have higher separation score; those reading both ethnic and host newspapers have higher integration score and those not reading any newspaper have a higher marginalization score.

More recently, Reece and Palmgreen (2000) revealed new information technologies as possible means of communication used by sojourners. Primarily they proposed that those Indian students who wanted to adapt to the U.S. culture would be more involved with the host media. However, their findings distinguished the Internet as the mass media most frequently used by these students, followed by

Indian cassettes, American newspapers and magazines, American cassettes, and cable TV. Furthermore, these students indicated that they used the Internet to access native sites, such as newspapers or radios, as much as American websites. The findings of these studies suggest that acculturating individuals utilize both host and home mass media during their sojourn.

Computer-Mediated Communication and Acculturation

Recent developments in information technology has placed computers as frequently used communication tools. Various large-scale studies on Internet use have indicated that it is most often used to maintain existing relationships (Kraut et al., 1998; D'Amico, 1998; Garrett, 2000; Pew Internet & American Life, 2000). For example, in a survey of 1,001 respondents, D'Amico (1998) found that 94% said the Internet facilitated keeping in touch with friends and family. In another study 58% of those surveyed said the Internet had made them feel more connected to family members (Garrett, 2000).

One of the most commonly studied aspects of information technologies is how CMC use influences social networks, and its social and psychological impacts compared to face-to-face relationships. For example, Boneva et al., (2001) explored how women and men used the Internet, specifically e-mail, to sustain their personal relationships. Qualitative data based on 41 interviews revealed that, in general, more women (91% of all women) than men (50 % of men) reported using e-mail for personal relationships. Not much difference was found between men and women in

terms of their communication with local friends; however, e-mail was found to be more central to distant relationships for women. The authors reasoned that this kind of communication fits better with women's expressive style of relationship maintenance. Men, on the other hand, mostly use computer communication for instrumental purposes such as e-mailing local friends to plan activities. These findings implied a persistence of preexisting differences between men and women in beliefs and behaviors of maintaining personal relationships in the electronic communication. In another study, Kraut et al., (2000) determined that through its use for communication, the Internet has important positive social effects on the individual. Internet use permits social contact across time, distance, and personal circumstances. Their findings of a 3-year longitudinal study indicated that it allowed people to contact with their distant as well as local family and friends, with co-workers, with business contacts, and even with strangers who share the same interest as theirs. In an interesting study, Hampton and Wellman (2001) investigated how technology affected the amount of contact and support exchanged with members of their distant social networks. As part of an extensive research project, they spent several years studying a 190-home newly built community filled with state-of-the-art Internet technology in a suburb of Toronto. In exchange for free access to these advanced services, the residents agreed to participate in a study by the organization that was responsible for developing the suburb's local network for two years. Part of the study focused extensively on changes in social contact and exchange of support

with friends and relatives at various distances. Their findings supported that, living in a wired neighborhood with access to free, high-speed, always-on Internet access increased social contact with distant network members. After moving to a new, remote suburban home, those on high-speed networks gained much more companionship and social support from the members of their social network than did those without high-speed networks. These studies support the conclusion that computers are frequently used as communication tools enhancing social contact and enriching social support.

Several researchers exclusively focused on the use of computer-mediated communication in mobile populations. For example, in a 1995 study, Croft demonstrated that technology was often used as a communication tool by expatriates. The respondents revealed that they used electronic mail, voicemail, videoconferencing, and online newsletters to communicate with colleagues and home and this habit kept their link to their home culture and contributed to their psychological well-being during the sojourn. Haupt (2000) also studied expatriates and reasoned that the use of CMC technology to communicate with family and colleagues at home positively affected their adjustment as well as enhancing their business and personal relationships with local nationals. Ender and Segal (1998) interviewed U.S. sailors who served on an e-mail satellite equipped warship. These sailors revealed that even though they would prefer telephone over e-mail to communicate with their families if they had equal access to both aboard their ship,

they were highly satisfied with the availability of this technology onboard. They indicated that, because of the rapidity of interchange, e-mail enabled them to maintain contact with and participation in their families when spending months on shipboard duty. Finally, LaRosa, Eastin, and Gregg (2001) studied a sample of college students whom they described to have little social support due to being mobile. Their findings confirmed that Internet use was positively associated with receiving emails from known others, which in turn was significantly associated with greater social support. Consequently, they suggested that for socially isolated individuals, such as colleges students, the most meaningful sources of social support is available by using social technologies to maintain ties with family and pre-existing relationships. The present study focused on yet another mobile population, international students, and investigated their CMC use and how it affects their sojourn.

Adaptation

The outcome of acculturation is *adaptation*, that is changes that take place in individuals or groups in response to environmental demands (Berry, 1997). Depending on the experiences of the individual with members from both home and host cultures, as well as other personal and situational factors, acculturation strategies affect the degree of an individual's adaptation (Bourish et. al, 1997). The results of these adaptation processes vary, ranging from success to failure. Those who succeed develop a satisfactory life in the new culture and adjust well both psychologically and

socially. In contrast others may experience loneliness, homesickness, depression, vulnerability, helplessness, or maladjustment in general (Ward, 1996).

Researchers have studied various aspects of adaptationsuch as psychological health (Berry, 1997), acquiring communication skills of the host culture (Kim, 1979), economic adaptation (Aycan & Berry, 1996) and academic performance (Hull, 1978). Ward and his colleagues (Searle & Ward, 1990; Ward & Kennedy, 1993; Ward, 1996; Ward & Rana-Dueba, 2000) attempted to integrate various processes observed in cross-cultural transition and came up with two big categories of adaptation, namely psychological adaptation and socio-cultural adaptation. *Psychological adaptation* refers to a psychological/ emotional well-being and satisfaction with the new cultural context, whereas *socio-cultural adaptation* refers to the ability to fit in or negotiate interactive aspects of the new culture. Numerous studies on these two categories of adaptation indicate that, although they are interrelated, they are conceptually distinct (Ward & Rana-Deuba, 1999). First, they tend to be predicted by different variables. Psychological adaptation is operationalized in terms of depression or global mood disturbance, and is strongly influenced by personality, life changes and social support. Sociocultural adaptation, on the other hand, is measured in relation to the amount of difficulty experienced in the performance of daily tasks, and found to be more dependent on variables such as length of residence in the new culture, language ability, cultural distance, and the quantity of contact with host nations. Second, these two kinds of adaptation tend to exhibit different patterns of fluctuation over time.

The greatest adjustment difficulties occur at the point of entry in both cases; however sociocultural problems steadily decrease and gradually level off, whereas psychological distress is more variable over time. Third, although the two adjustment domains are interrelated, the magnitude of relationship between psychological and sociocultural adaptation is variable, and findings suggest that it increases with greater integration and cultural proximity. This relation is also observed to increase over time.

In further research Ward and colleagues tried to merge these concepts with Berry's fourfold acculturation model, suggesting that these two types of adaptation are differentially related to the four modes of acculturation styles (Ward & Kennedy, 1994). For example, in one study they demonstrated that, in term of psychological adaptation, integrated sojourners exhibited less psychological distress than the assimilated ones, whereas no other difference was found across the four groups. As for socio-cultural adaptation, on the other hand, the greatest difficulty was experienced by the separated group and the least was experienced by assimilated and integrated groups.

Various studies on acculturation suggest that lower health status is a frequent outcome for individuals undergoing acculturation (e.g. Berry, et al., 1987; Chataway & Berry, 1989). Furthermore, it is suggested that decreasing health status appeared mainly as lower psychological health (Zheng & Berry, 1991). As with other acculturating groups, psychological well-being is an important component of

international students' cross-cultural transition (Ying & Liese, 1990). In a longitudinal analysis where they studied psychological adaptation of Chinese sojourners, Zheng and Berry (1991) demonstrated that acculturative stress increased from the last months of pre-departure to the fourth month after arrival resulting in more mood disturbances.

Another issue that has been investigated in the context of international students' acculturation is the relationship of *academic success* to adaptation (e.g. Raaheim, 1987; Carlson & Widaman, 1988; Frisch 1990 & Zorn, 1996). As Ryan and Twibell (2000) propose, outcomes of international education experiences of university students have been mostly investigated in terms of changes in the attitudes, cognition, and international understanding the sojourners. However, as Marion (1986) indicates the academic achievement of foreign students both *affects* and *is affected by* their acculturation strategies and psychological adaptation. For example, Furnham and Bochner (1982) list academic problems and worries about academic achievement as one of the most important problems international students face, besides loneliness, home-sickness, food difficulties, and worries about domestic problems back at home. The academic difficulties these students tackle are mainly due to language problems and also the difference between educational systems these students are accustomed to and the new systems they have to adapt. Ying and Liese (1991) consider academic problems mediating the increased depression of foreign students following their arrival in the U.S. Moreover, Schiller (1987) demonstrated

that bicultural Native American students were better adjusted, particularly in the academic and cultural domains, than were their non-bicultural counterparts; they had higher GPAs, more effective study habits, and demonstrated a stronger commitment to using resources for academic success.

Research on acculturation has demonstrated that adaptation is a multifaceted phenomenon (Moghaddam, Taylor, & Wright, 1993). Aycan and Berry (1996) suggest that the final component of adaptation can be viewed as task efficiency. Demonstration of behavior that results in successful completion of one's requires task signifies task efficiency (Hawes & Kealey, 1981). As for the international students, academic success is the most important task they are to accomplish. Thus, in this population, academic adaptation in addition to psychological and socio-cultural adaptations constitute three important facets of acculturation outcome.

Statement of the Problem

In terms of the role of communication in the acculturation process, researchers so far, have mostly focused on two topics: comparing the communication styles of foreigners with host nationals and describing the positive effects of acquiring communication practices of the host culture, often via information – oriented media (Kim, 1979; Kim, et al., 1998; Reece & Palmgreen, 2000). Yet, with the recent developments in the information and communication technologies, already existing relationships at home became accessible as a constant social support supply to acculturating individuals. Internet and related

communication technologies are also a great source for sojourners to be in touch with the social, political, and cultural life in their home countries.

Continuous contact with people at home is important because it contributes immensely to the maintenance of cultural values during the sojourn. Even though Berry and many other researchers following him have stated maintenance of home (original) culture values to be one of the two fundamental dimensions of acculturation, this aspect has not been studied much. The present study has aimed to fill in this gap by exploring the role of computer-mediated communication technologies in international students' acculturation.

The Present Study

The present study investigates the role of CMC in international students' adjustment to the U.S. The study is divided into two parts. The first part tests a structural equation model (SEM) in which international students' adaptation to the new culture during the initial phases of transition is predicted by CMC use, home and host identification, and perceived social support. The second part makes comparisons between pre- arrival and post-arrival measures to detect changes students go through during the initial phase of cross-cultural transition. Data were collected from two groups of first year international students attending the University of Texas at Austin during the 2002 – 2003 academic year, using on-line surveys prepared in English. One group responded to a series of questionnaires first before their move to the U.S. and again two months after their arrival. The second group responded to an identical set of questions only in the post-arrival phase.

Three months before the actual data collection, a pilot study was conducted with a group of international students at the same university in order to get a better understanding of how these students used CMC to contact people at home. The pilot served two additional goals: One goal was to determine if the author could successfully create and use an on-line web form to be used in the data collection for the main study, and the second goal, was to benefit from information gathered from this sample of students in creating scales to be used in the actual study.

Model and Hypotheses

Part One: A structural equation model. The first group of hypotheses deals with the general influence of CMC use to communicate home on the post arrival outcomes of cross-cultural transition. Based on previous research on acculturation, a model supporting the notion of the CMC as a communication tool and a social support source is developed. Structural equation models provide a pictorial presentation of the relationships between constructs to give a clear understanding of the theory on which the equations are based (Byrne, 1994). Figure 2 presents an illustration of the model tested in this research.

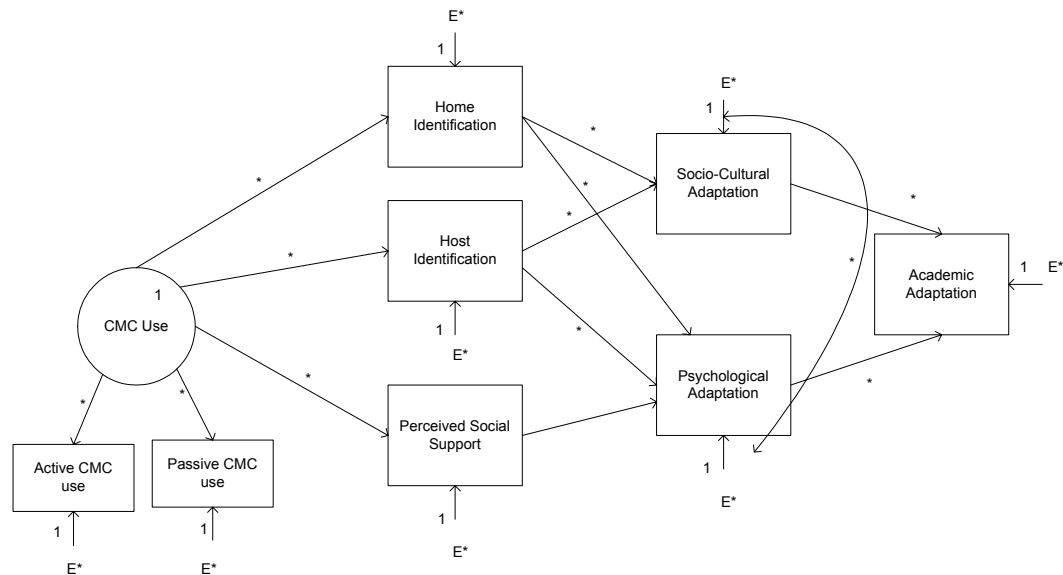


Figure 2. A structural equation model of international students' cross-cultural acculturation.

The central research question investigated in this model is whether use of computer-mediated technologies by international students operates to foster identification with the two cultures they belong to, and provide a social support that contributes to the psychological well being of the sojourner, thus contributing the overall adaptation process.

First, it is predicted that continuous contact with home culture will have a direct effect on the maintenance of original (home) cultural values, enabling these students to preserve their national identity. Moreover, contact with home culture will also facilitate the acquisition of the new (host) culture by providing the necessary moral support for these sojourners to feel safe and secure in the new context, encouraging them to participate in the host society.

Another positive effect of continuous communication with home is predicted to be an elevated feeling of social support. Ying and Liese (1991) suggest that the support network sojourners had prior to coming to a new culture best provides the support they need in the process of building new relationships and trying to fit into the new society. As Krishnan and Berry (2000) and La Fromboise (2000) proposed, this feeling of social support sustains a continued sense of belongingness, thus fostering the sojourning individual's emotional and psychological well-being. Using a path-analysis, LaRose, Eastin, and Gregg (2001) demonstrated that in a sample of college students, Internet usage was positively related to e-mail

use, which in turn was positively related to social support. Social support, then, had a significant and negative direct relationship to depression.

Research has supported that both the psychological and socio-cultural adaptation of sojourners depend on the acculturation strategies they use (Ward & Kennedy, 1994). Biculturalism is associated with better adaptation and intermediate levels of acculturation stress. Individuals who have the ability to effectively alternate their use of culturally appropriate behavior exhibit higher cognitive functioning and mental health status than people who are mono-cultural (Garcia, 1982; Rogler et al., 1991; Martinez, 1987). Thus, it is anticipated that identification with both home and host cultures will facilitate better psychological and socio-cultural adaptation at least during the initial phases of cross-cultural transition. Since these two adjustment outcomes are defined to be interrelated but conceptually distinct (Ward & Rana-Deuba, 1999), they are allowed to co-vary in this model.

The specific sojourning group in this study is the international students at the University of Texas at Austin. This model proposes that the ultimate outcome of a successful acculturation will be measurable in terms of academic performance in addition to their psychological and socio-cultural adaptation.

In this model, the effect of CMC use on cross-cultural adaptation is measured through the mediating effects of home – host identifications and perceived social support. Thus, no specific direct effect of CMC use on the three adaptation variables is expected.

The foremost hypothesis tested by this model is:

1. Is the model presented in Figure 2 a plausible model in explaining earlier post-arrival stages of cross-cultural transitions of international students?

The specific relationships as part of the hypothesized model that will be tested in this section of the study are:

- 1a. Use of CMC to communicate with home positively affects the degree of maintenance of home national identity and heritage.
- 1b. Use of CMC to communicate with home positively affects students' participation in the customs and traditions of host culture.
- 1c. Use of CMC to communicate home positively affects perceptions of social support.
- 1d. Level of home national identity positively affects socio-cultural adaptation.
- 1e. Level of host national identity positively affects socio-cultural adaptation.
- 1f. Level of home national identity positively affects psychological well-being.
- 1g. Level of host national identity positively affects psychological well-being.
- 1h. Perceived social support (from people at home via CMC) positively

affects psychological well-being.

- 1i. Level of socio-cultural adaptation positively affects academic adaptation.
- 1j. Level of psychological adaptation positively affects academic adaptation.

Additional analyses are conducted to get a more precise understanding of the effect of CMC use and acculturation strategies on adaptation in the post-arrival phase.

2. CMC to communicate with home influence psychological, socio-cultural and academic adaptation.
3. Acculturation strategies attained influence psychological, socio-cultural and academic adaptation.

Part Two: Pre- and post- arrival comparisons. The second group of hypotheses mainly deals with the longitudinal aspect of the acculturation process. Specific questions ask whether there are any changes in acculturation strategies, psychological well-being and use of CMC before and after moving to the U.S. The hypotheses tested are:

1. Students use CMC more after arriving in the U.S. than before.
- 2.1 Students will identify more often with their home country after they have spent time in the U.S. compared to before their arrival.

- 2.2. International students who go through a cross-cultural transition will have higher host national identity after spending some time in the U.S., compared to their previous host national identities.
3. The psychological well-being of international students will decline after arriving in the U.S.

Method

Participants

Three groups of international students served as participants in this study. The first group only responded to the pilot study. The other two groups provided the data for the main study.

Pilot Study

The participants were international students registered at the University of Texas at Austin, during the Spring 2002 semester. They were invited to participate on a web-survey through an announcement put on the university's international office's electronic newsletter in March 2001. Two hundred forty eight students responded to the web survey. Approximately 150 students also wrote comments to four open-ended questions on the same survey.

Main study

Data were collected from two groups for the main study. Both groups were in-coming international students admitted to the University of Texas at Austin for the 2002-2003 Academic year. They were recruited through a list of incoming students obtained from the University's International office.

The University of Texas at Austin has a high enrollment rate of international students. During the 2001-2002 academic year, there were 4,325 students making up 8.7% of all the university's student population and placing the university in the 6th

place in terms of international student enrollment nationwide (Institute of International Education, 2001). The top 15 countries international students come from are India, Korea, China, Taiwan, Mexico, Pakistan, Japan, Indonesia, Germany, Canada, Turkey, France, Brazil, Hong Kong and United Kingdom.

One group of students was contacted two times (first before they left their home countries and then two months after their move to the U.S.) and provided the data for the pre-post design. The second group of students was contacted only once after they moved to the U.S. at the same time of the post-arrival phase of the first group.

Sample for the pre-post analyses. In the pre-arrival phase, 1000 International students out of 1900 who had been accepted into the university were selected using a systematic sampling technique from a list of international students admitted to the University of Texas at Austin provided by the International office. Potential respondents were first sent a pre-notification message on the first week of June 2002 informing them about the study and that they would be receiving another message with the link to the research questionnaire in ten days time. Through the middle of June, a second e-mail was distributed, inviting students to take the online survey from the research website. In this message, students were also given a chance to let the researcher know that they would not be participating in the research project either because “they were not coming to the university” or simply because “they were not interested.” Approximately three weeks after the invitations were sent, a

reminder note was sent to the students who had not yet filled in the online questionnaire, followed by a thank you note to all the students who participated.

Those students who had participated in the first phase of data collection were contacted by e-mail for the post arrival data collection in October, using the same procedure in the pre-arrival phase.

Two hundred and sixteen students out of the 1000 responded to the pre-arrival phase questionnaire. The response rate is calculated to be 32%, after correcting for those who indicated that they would not be coming to the university even though they were admitted to the university, due to various reasons such as choosing another college, financial and visa problems, or simply not registering as of Fall '02 semester. In the second phase (post-arrival phase) of the data collection, 95 students participated. Twenty-three students out of the initial 216 replied back saying that they are not attending and 98 never replied back. A second check of the registered students list indicated that 36 of these 98 were not registered at the time of the data collection. The response rate in the second phase of the data is 61%. T-test analyses on age, gender, psychological well-being and home and host national identification scores were done to compare whether there were any differences between the participants who responded the two phases and the ones who participated in the first phase only. The only significant difference was on age ($t_{(232)} = 3.282, p < .01$). The students who responded to both pre and post arrival phases

were younger than those who responded only the pre-phase (M =25.28 and M=26.85 respectively.)

A total of 90 students who participated in both phases formed the sample for the pre-post analyses. The details of the descriptive statistics of this sample is given in the sample characteristics section.

Sample for the post only analyses. An additional 900 international students who were not contacted in the pre- arrival phase were contacted at the same time as the second phase (post-arrival) data were being collected from the longitudinal group using the identical procedure and 198 of them agreed to participate. Fifty-four of them replied back saying they were not available, 62 of them were not registered at the university. The final response rate was 25%.

This second group of students completed the identical questionnaires as the sample for the pre-post analyses. In order to get a big enough sample for the analysis of structural equation model, the post group data of the longitudinal group and this second group were combined. To do this, we first needed to ascertain that the two groups' responses in the post-arrival phase were not statistically different from each other. Accordingly, their scores on the dependent variables were compared. An independent sample t-test on home and host nationalization identification scores, perceived social support, psychological well-being, socio-cultural adaptation and academic-adaptation scores in the post-arrival phase did not yield any significant differences between the two groups [$t_{(278)}=1.255, p > .05$; $t_{(278)}=.428, p > .05$; $t_{(278)}$

=.615, $p > .05$; $t_{(278)} = .104$, $p > .05$; $t_{(278)} = .323$, $p > .05$; and $t_{(278)} = .086$, $p > .05$; respectively].

Accordingly, 90 students of the pre-post group who responded to the second phase and 198 students from the second group were combined to make up the sample used to test the SEM. Five participants were excluded from the analyses. The first group of hypotheses was tested based on the responses of these 280 participants because the aim of the present research is to investigate the factors affecting initial transition to a new culture and these participants did not belong to the population in question. One did not answer more than half of the questions, one indicated that even though his status was as an international student, he had been living in the U.S. for more than ten years, two said their parents and whole family were living in another part of the U.S., and one was a transfer student from another university.

Instruments

The instruments used in the two phases of data collection are described here. A copy of the scales can be found in Appendix A1-A8. The reliability information of these instruments for the present sample is summarized in the ‘psychometric properties of the instruments’ section of the Results chapter.

Demographics

Demographic information was collected from all participants in this study. Specific variables included age, gender, and marital status, reason for coming to the U.S., and comfort with English use (see Appendix A1 for the questions).

General CMC Use (Pre-Arrival Phase)

Only those students who were contacted in the pre-arrival phase were asked about their habits of Internet usage in general. This information was used to make comparisons of CMC use in the pre- and post- arrival phases (see Appendix A2 for the questions).

CMC Use to Contact Home (Post-Arrival Phase)

CMC use was measured as the degree to which the individual used Internet technology (WWW, email, chat-rooms and alike) to communicate with their co-nationals who are not locally present, including parents and friends back at home, as well as the ethnic media and other informational and entertainment resources available online. (See Appendix A3 for the particular items).

Acculturation Index

Acculturation strategies were assessed by using the Acculturation Index (AI) by Ward (1999). The scale contains 21 cognitive and behavioral items. Respondents are asked to consider two questions about their current life-styles asking to compare their experiences and behaviors to those of people from their country of origin and

to those of members of host culture. Similarity is rated for both co-nationals and host nationals on a 7-point rating scale (not at all - very much similar). Scores range from 0-126 on each subscale. This approach results in two independent similarity scores measuring co-national (home) identification and host national identification. When used in conjunction with a bipartite split, this technique also allows the investigation of the four modes of acculturation comparable to Berry's four modes of acculturation strategies (Ward & Rana-Dueba, 1999). High host-high conational identification represents integration, high host-low co-national identification indicates assimilation, low host-high co-national identification points to separation and low host-low co-national identification signifies marginalization (Ward, 1999). Tests of internal consistency via Cronbach alpha have demonstrated that both host and co-national identification scales are reliable, with alphas ranging from .87 to .97 (Ward & Kennedy, 1994). Only 19 items of the scale are used in this study. The two items, *perceptions of co-nationals* and *perceptions of Americans* were not used because they were confusing (See Appendix A4 for the particular items).

Perceived Social Support

Based on the information gathered from the pilot study, an eight item perceived social support scale was developed to capture the social support from people at home via CMC. Each item is rated on a 5-point Likert scale, ranging from (1) strongly agree to (5) strongly disagree. Sample items include; *CMC has been useful*

for keeping up with my family and the Internet has helped me maintain my social network. (See Appendix A 5 for the particular items).

Psychological Adaptation

Psychological adaptation was assessed by using the Hudson's (1982) Generalized Contentment Scale (GCS). GCS is a 25-item self-rating instrument, which measures affective, physiological and cognitive components of depression. This scale is developed to be used with people who had non-psychotic depression. The reliability of the GCS has been found to range from .89 - .96 with a mean of .92 (Hudson, 1982). Studies on criterion validity indicated correlation of .85 and .76 with the Beck Depression Inventory and .92 and .81 with the Zung's Depression Inventory (Fischer and Corcoran, 1994). They also demonstrated that the GCS to has a good construct validity, correlating poorly with measures which it should not correlate and correlating at high levels with measures which it should. Participants respond to each statement on a 5-point rating scale from none of the time (1) to all of the time (5). Based on the pilot study, a 18- item version of the GCS scale is used in this study. A value of 1 – 5 is assigned to a response depending upon whether the item is worded positively or negatively, with higher scores indicative of greater well being. Some sample items include: *I feel powerless to do anything about my life*, *I have a great deal of fun*, and *I feel that people really care for me*. (See Appendix A6 for the particular items).

Socio-Cultural Adaptation

To measure socio-cultural adaptation, Ward and Kennedy's (1999) Socio-cultural Adaptation Scale (SCAS) was used. This instrument was originally developed as an assessment of intercultural competence with emphasis on behavioral domains. It is originally a 41-item instrument that can be easily modified according to the characteristics of the sojourning sample (Ward and Kennedy, 1999). In a number of studies, the scale's alphas ranged from .75 to .91 ($\bar{X} = .85$). Studies on construct validity with various sojourning groups indicated correlations ranging between .20 and .62 with the Zung's Self-Rating Depression Scale. A 15-item short version tailored for the specific population in question was used in the current study. The respondents were asked to indicate the amount of difficulty experienced in a number of areas, such as transportation, language and food, using a 5-point scale from no difficulty (1), to extreme difficulty (5) higher scores indicative of greater social difficulties and socio-cultural adaptation problems. (See Appendix A7 for the particular items).

Academic Adaptation

Based in the information gathered from the pilot study, a ten item scale has been created to assess the students' level of perceived academic adaptation and satisfaction with their performance. Each item is rated on a 5-point Likert scale, ranging from (1) strongly agree to (5) strongly disagree. Sample items are: *I am*

satisfied with the level at which I am performing academically and I feel that my grades are an accurate measure of my academic ability. (See Appendix A8 for the particular items).

Procedure

The following section describes the procedures followed to collect the data from the three groups of the study.

Pilot Study

The online questionnaire was made up of some close-ended questions and some open-ended questions. The close-ended questions asked about the kinds of CMC tools used, parties communicated with most often, and the frequency of usage. The open-ended questions asked about the students' experiences with CMC tools, both as communication tools and social support sources

Additionally, to get an in-depth understanding of the phenomenon, one-hour semi-structured interviews were conducted with four international students from the same student population. The questions used in the interviews also inquired about the students' experiences with CMC tools and their ideas on the efficiency of those tools. (see Appendix B1 and Appendix B2 for the pilot questionnaire and the interview questions).

Main study

In the main study, identical instruments were used to collect data from the two groups. Table 3 summarizes the type of information gathered in each phase from each group (the scales are presented in Appendix A1-A8).

Table 3

Data Collection in the Two Phases

	Phase	
	Pre-arrival (conducted in June 2002)	Post-arrival (conducted in October 2002)
Sample for Pre-Post Analyses (n=95)		
Demographics	X	X
General Internet use	X	-
Use of CMC to communicate home	-	X
Acculturation	X	X
Perceived social support	-	X
Psychological well - being	X	X
Social adaptation	-	X
Academic adaptation	-	X
Sample for Post Only Analyses (n=280)		
Demographics	-	X
General Internet use	-	X
Use of CMC to communicate home	-	X
Acculturation	-	X
Perceived social support	-	X
Psychological well - being	-	X
Social adaptation	-	X
Academic adaptation	-	X

Note. There is overlap between the two samples of the main study.

Data were collected by online questionnaires in both phases. The first page of the questionnaire provided information about the study. In the pre-arrival phase, the web survey included a background questionnaire of Internet usage habits along with some demographics questions, the acculturation index, and the psychological

well-being scale. Information gathered in the pre-arrival phase was used to test hypotheses that involved changes over time.

The post-arrival survey included a series of questions on CMC use to contact home after moving to the U.S., the acculturation index, and the perceived social support scale, in addition to the instruments on psychological well-being, socio-cultural and academic adaptation. These data were combined with the post-arrival data from the pre-post sample to test the model of adaptation presented in this dissertation.

Results

First, the results of the pilot study are presented. Next the description of the demographic characteristics of the samples used to test the model and hypotheses are presented followed by an explanation of the psychometric properties of the instruments used in the study. Finally, the results of the structural equation model analyses are presented, followed by the findings of the hypothesis testing.

Pilot Study

The pilot study aimed to answer the question of whether the international students at the university were using computers to communicate with their family and friends at their home cultures and the native social/cultural life in general (the pilot questionnaire is presented in Appendix B1).

Sample characteristics: Two hundred forty eight students participated in the pilot study. Thirty four percent of the respondents were females and 66% were males. The mean age was 25 years old. Most of the students were married (N=179). Twenty seven percent were at the university for a college degree and 67 % were graduate students. The mean time they have been in the U.S. at the time of the data collection was 28.7 months, with a range of 2-117 months.

Additionally, four international graduate students, who did not respond to the quantitative web-survey, were interviewed for the purposes of the pilot study. To get a more complete picture of the process of international students' CMC usage

habits, the interviewees were chosen from different age groups, different countries, who are in the U.S. under different conditions. Please see Table 4 for information about the interviewees.

Table 4

Demographics of the Four Interviewees

	Gender	Age	Country of origin	Program	Time in the U.S.
Interviewee #1	Female	24	Turkey	Public Policy	8 months
Interviewee #2	Male	20	Indonesia	Business Administration	25 years
Interviewee #3	Male	25	Mexico	Public Policy	8 months
Interviewee #4	Female	32	Mexico	Curriculum Instruction	2 years

Findings:

A series of questions investigated the International students' habits of CMC use. The findings indicate that:

- All students used email and Internet at least once a day.
- Average frequency of reading online (native) newspapers, magazines, watching TV or listening to native radio ranged between once a day to once a week.
- The most frequently e-mailed parties were: girl/boy friend or spouse, followed by, colleagues in the U.S., and family at home.

- 95% of the respondents indicated that it was very important to keep in contact with their families during their studies in the U.S. This number was 75% for friends at home and 54% for social/cultural life at home.
- The most frequently used CMC tools were: email and chat programs such as ICQ/Yahoo or MSN messenger.
- On average, students spent 1-2 hours per day emailing home and reading native newspapers online.
- However, still, the phone was the primary communication tool, followed by e-mail. Letters, on the other hand, were not used.

Duration of stay was significantly related to the respondents' friendship choices. Participants who had been living in the U.S. for a longer time were more likely to have American friends whereas those who were newer were mostly friends with co-nationals locally present ($r=.266$, $p<.05$). Time of stay was also significantly and negatively related with using CMC tools to communicate with people home. Those who had been in the U.S. longer were less likely to use CMC tools compared to the newcomers ($r= -.149$, $p < .05$). The most common reason cited as a low frequency of usage by the long timers was that CMC tools were less available when these students had first come to the U.S. (which could have been as long as 10 years ago). Age was another factor that was significantly and negatively related to CMC use. The younger students were more likely to spend more time daily for chatting

with people at home ($r=-.138$, $p<.05$) and also to listen to native online radios ($r=-.170$, $p<.05$). However, it should be noted that age of the student and the length of time they spent in the U.S. were found to have a bivariate relationship, and that one's effect on CMC use might be due to a spurious relationship through the other. None of the comparisons yielded any significant gender differences.

Review of the narrative responses to the open ended questions and the interviews shed light on the international students CMC usage preferences (the interview questions are presented in Appendix B2). As expected, this kind of communication has both advantages and disadvantages for the users. The most often cited reasons why students would select computer-mediated communication tools, such as e-mail, chat, videoconferencing or various list-groups, over traditional communication tools such as telephone or letter were: the inexpensiveness and the instantaneity and spontaneity of this kind of communication.

As long as one has a computer with Internet access, communication is either very cheap or even sometimes free. In their responses, students mostly made comparisons between calling home and sending e-mails or chatting via computers. All students have unlimited and free Internet service through the university. However, calling home is not free-of-charge and the expense depended on the country. CMC was also attractive because students could read the native newspapers, watch TV, or listen to radios online. Here is what some of the students said about this issue:

CMC is the best thing that has happened to us. Without the Internet and computer, we would have been spending so much to communicate through phone. To keep in touch...but now, due to the instant messenger and e-mails... I communicate with them EVERY DAY for NO COST.

I also have been able to keep up with the news of my home country much more easily than I could before online news was available. I get email news digests daily and go online to check the online versions of my home town's papers. I can even listen to the radio (which makes me feel really as if I am home).

As they [phones] are more expensive, you feel compelled to limit your talk. At that point, it also limits your emotions, because you just cannot say whatever you wish to say because you don't have that much of a time period to get the necessary feedback, or to tell whatever you are feeling at that point. So you cannot do it as frequently as you can by emails or like chatting.

Using CMC tools can be both instantaneous and spontaneous. Depending on the connection one uses, e-mails can travel long distances in just seconds.

Chatting is done simultaneously. Furthermore, to communicate via CMC, it is not necessary for both parties to be in front of the computer. One can write about his/her feelings at anytime they want to without delaying or finding a time that is best for the receiving party. The time difference is especially a problem for people whose friends/families are far away. With some countries there are up to 12 hour differences in time zone and calling people is simply not practical. Some students verbalized this matter as:

I have definitely found it easier to keep in touch with more people using email. It's available to me at home and at school, which means that I can communicate with people more often, rather than having to be home at a particular time to make phone calls. There's more spontaneity (and instant gratification) as opposed to writing letters.

Letters are more condensed, where everyday details are usually left out. On the other hand, messages exchanged on ICQ are mostly random thoughts at that moment, just like talking on the phone. Therefore, chatting on ICQ makes me feel my friends are just close by. As for email, one important advantage it has over telephone is that there's no need to worry about time difference. My mother can send me an email any time she wants to, without worrying about whether I'm home to pick up the phone or whether the phone will wake me up in the middle of the night.

Another benefit of using CMC tools as mentioned by these students is the possibility of communicating in *multiple ways*, such as sending photos while emailing at the same time, or seeing each other using web cams while chatting. Below are some typical comments the students made about this issue:

Because my girlfriend and my family are at home, it is great to see their faces and facial expressions instead of just hearing their voices. I would become sad and frustrated if I hadn't CMC.

I can even send pictures, birthday cards, etc free and fast. I also keep in touch with my grandmother back home. The people at home will give her the hard copy of my emails.

These students, on the other hand, seem to prefer using more traditional communication tools when such means of communication are affordable and efficient, when they want to share more personal issues, feelings or problems, and

when communication with home via CMC is not an option either because these tools are not available at home or when the parties involved do not know how to use these devices.

Finally, necessity of use of CMC tools to contact home decreases immensely when: 'home' is close enough to visit frequently (such as Mexico or Canada), there is native community available locally (such as when there is native food available, native language is spoken and there are native TV programs, books or newspapers available locally) or there is a strong social network available in the host culture.

With my family, I don't use it at all. Because, I believe, they are very close. I can drive there in seven hours. And my parents come and visit, too, quite often as well... so that might be a reason. But they also come and visit me very frequently. Whenever I go back home, it is the same. It is the same thing.

It is so close to home. And I think it is very different for me. For example, if I go too East Austin, I can find very decent Mexican food there. It has to be different the fact that I can talk to most of the waiters in Spanish. And when you do so, they are very nice to you... I think it would have been very different if I was living in a place far away, in London for example.

If those are academic problems or work related problems, I don't usually talk to my parents or friends at home. Because they don't know what is going on. They don't know my reality here. They don't know my school. It is very difficult to explain them to whole deal. And then, well... you know the situation and here is my problem... no... so usually, with academic or work-related problems, I talk about them to people here. But for personal problems, I talk to them.

In general, most of the frequent users of this technology indicated that constant contact with home via computers helped them feel better especially during the initial phases of cross-cultural transition and whenever they had some problems or difficulties.

I think it is very useful, because, especially when I was feeling alone or depressed here, I found consolation in communicating with my parents, with my friends. They made me feel much better about myself. And I felt that people cared about me. It just made me feel better and that helped me to deal with the problems that I am facing here in a much better sense.

CMC is very useful in the fact that it allows me to be aware of what's going on overseas, even if I'm not physically there. Because I'm here doesn't mean I'm not with them anymore. In a sense, I'm still with them, and that's a great benefit.

The findings of the pilot study supported the idea that computer-mediated communication tools are widely used by international students to contact people at home. Furthermore, CMC is and can be used as a social support mechanism and affects the psychological well-being of sojourners. As indicated by the data, there seemed to be enough variation in terms of reasons and frequency of CMC usage that made it worthwhile to study its role in cross-cultural transition. The qualitative data collected in the pilot study was used to create the Perceived Social Support and the Academic Adaptation scales used in the main study.

Main Study

The following section summarizes the findings of the main study. First the sample characteristics for both the pre-post and the post-only analyses are outlined, followed by the psychometric properties of the instruments used in the study. Then, the results of the structural equation model analyses and the findings of the hypotheses testing are presented.

Sample Characteristics

Sample for the pre-post analyses. Ninety students who responded to the pre and post arrival questionnaires form this group. Sixty-two percent of them were males. The ages of the respondents ranged between 20 years to 36 years, with a mean of 25.3 years. Most of the participants were males and almost all were single. A summary of the demographic characteristics of the pre-post group is presented in Table 5.

Table 5

Demographic Characteristics of the Sample for the “Pre-Post” Comparisons (n=90)

	Percentage
Marital Status	
Single	80.0
Married	14.5
Length of time in the U.S. at the post-arrival phase	
1-2 months	35.6
3-4 months	55.6
5-6 months	1.1
More than 6 months	7.8
Reasons for coming to U.T.	
Graduate degree	93.3
Post-doc/ Research	6.7
Comfort with the English language	
Speaking in English	76.7
Reading in English	56.7
Writing in English	47.8

Sample for the post-only analyses. The 280 students constituting this group came from 58 different countries. The biggest group of students came from India, followed by China, Korea, Germany and Taiwan. The distribution of nationalities of the participants is very much comparable to the distribution of the international students in the University of Texas at Austin. The ages of the respondents ranged between 17 to 37 years, with a mean of 24 years. Slightly more than half were males. A summary of the demographic characteristics of sample is presented in Table 6.

Table 6

Demographic Characteristics of the Sample for the “Post-Only” Analyses (n=280)

	Percentage
Marital Status	
Single	83.9
Married	10.0
Length of time in the U.S. at the post-arrival phase	
1-2 months	25.0
3-4 months	51.1
5-6 months	2.5
More than 6 months	16.4
Reasons for coming to U.T.	
ESL	.7
Exchange	16.4
Undergraduate degree	22.5
Graduate degree	56.7
Post-doc/ research	3.7
Comfort with the English language	
Speaking in English	77.5
Reading in English	60.7
Writing in English	58.9
Country of origin ^a	n
India	57
China	25
Korea	19
Germany	15
Taiwan	13
France	12
Turkey	12
Mexico	10
Spain	9
Japan	8
Brazil	7

^aNote: Only countries with more than 5 students are listed here. 95 students come from 47 other countries.

Additionally, in order to determine if demographic variables influenced the students' adjustment, correlation analyses were conducted between demographic variables and the variables of interest to this study for the post-only group (see Table 7 for Pearson Product Moment correlations). These analyses yielded some significant findings. Age was found to be negatively and significantly correlating with host national identification and socio cultural adaptation. On the other hand, age was positively associated with more passive uses of CMC tools such as surfing the Internet or reading online newspapers to contact home culture. This finding is consistent with the claims made by previous researchers that younger sojourners have less difficulty in acculturating to the new culture (Ady, 1995). In the literature, proficiency with host language is identified as another important variable mediating acculturation success of sojourners (Meloni, 1986). The Pearson correlations suggest that, in this sample, those students who were more comfortable with their English had significantly higher host identification scores, and better adaptation. The results further indicate that the presence of relatives in the U.S. as well as the time spent in the host culture were both associated with the acculturation experience. Students who had relatives and who had been in the U.S. longer, were less likely to rely on CMC tools to contact people at home. Furthermore, over time, individuals' home national identification diminished. On the other hand, those students who had people from their family present in the U.S. had higher socio-cultural adaptation scores. These findings are in line with the premises that the longer people live in the

host culture, the fewer problems they have (Berry, 1986). In addition, as others (Adelman, 1988) have reported, the presence of social support sources ease the process of acculturation. These results confirm the findings of the previous acculturation studies and suggest that our sample and measures will yield findings that are in line with previous research.

Table 7.

Pearson Product Moment Correlation Coefficients Between Demographics Variables and Adaptation Variables.

	CMC use – active	CMC use - passive	Home identification	Host identification	Perceived social support	Psy. well-being	Socio- cultural adaptation	Academic adaptation
Age	.13*	-.10	.04	-.19**	-.04	-.08	-.13*	-.03
Gender	.02	.05	-.01	.01	.05	-.06	-.10	-.07
Comfort in writing in English	-.18**	.15**	-.03	.24**	.02	.30**	.49**	.25**
Comfort in reading English	-.11	.16**	.09	.22**	.07	.30**	.39**	.27**
Comfort in speaking English	-.08	.20**	.13*	.09	.02	.32**	.37**	.26**
Time in US	-.03	-.22**	-.17**	.11	-.16**	.02	.12	.01
Have any relatives in the US	-.23**	.06	-.15**	.11	-.01	.12	.16**	.00

** Correlation is significant at the 0.01 level.

* Correlation is significant at the 0.05 level

Psychometric Properties of the Instruments

The first step in analyzing the data was to run reliability and validity analyses on the instruments used in the data collection to ensure that they measured what they were intended to measure. This information is essential in evaluating whether the data collected was the best representation of the theoretical constructs intended to be measured.

Before creating the subscales, first the appropriate items were recoded and reverse coded such that bigger numbers indicated a “more positive” value of the variable in question (e.g. better psychological well being, better socio cultural adaptation). Then, a descriptive statistics and frequencies were run to understand the data and identify for any miscodings or patterns of missing data. The analyses revealed no outliers. The skewness of the variables ranged between [-3.09 and .51] and the kurtosis ranged between [-1.03 and 2.55], all in acceptable ranges. Consequently, the data did not require any transformations. An analysis of missing values yielded no more than 1 % of missing values for any of the variables. All the missing values, except for the demographics variables were imputed using a single imputation procedure in using SAS PROC MI (www.sas.com). In this method, each missing value is replaced by an imputed value, based on a regression-like method, in which values for cases with incomplete data on Y are predicted from a set of reasonable, known X values that contain complete data. Subsequently, reliability analyses were run on each scale and items which had low correlations with the

overall scale, indicating a low psychometric quality were deleted. Below, the reliability analyses for each of the analyses are described, followed by a confirmatory factor analyses on the scales created for this study.

Reliability of the scales. To determine the reliability of each scale, a Cronbach's alpha, which correlated performance on each item with overall score was run. This analysis also provided an alpha value for the whole scale, which is like a correlation coefficient. The closer this number is to alpha, the higher the reliability estimate of the instrument (Cronbach, 1951).

Six variables measuring frequency of using CMC tools to communicate home culture were used to create a *CMC use* score. The specific items are:

- CMC 1. Since your first days in the U.S. how often have you emailed people at home?
- CMC 2. Since your first days in the U.S. how often have you used the Internet to access home sites?
- CMC 3. Since your first days in the U.S. how often have you read online newspapers of your native language?
- CMC 4. Since your first days in the U.S. how often have you listened to online music broadcasted from your home country?
- CMC 5. Since your first days in the U.S. on average, in a week, how many times you communicated with your parents via CMC tools?
- CMC 6. Since your first days in the U.S. on average, in a week, how many times you communicated with your friends via CMC tools?

An exploratory factor analyses with direct oblimin rotation method on these six items yielded two factors: one suggesting an *active* use of communication via computer, such as sending emails or chatting (items CMC 1, CMC 5, CMC 6), and the other more of a *passive* use of CMC such as reading online newspaper, listening to

online radios, or watching online TV (items CMC 2, CMC 3, CMC 4.) The two factors were correlated .361. I chose to use factor scores rather than simply coming up with scale scores because the items belonged to two separate sets of questions and one was rated on a 4- point Likert scale whereas the other was rated on a 5-point Likert scale with the same direction. Using factor scores takes care of such scaling differences between the items and provides a person's relative spacing or standing on a latent factor. Factor scores of these two factors were used as indicators of a latent variable of CMC use in the SEM model.

The Cronbach's alpha for the *Acculturation Index* in the whole group was found to be .90. Even though in most acculturation studies using this Index, an acculturation strategy is created by the bipartite split of the host and co-national identification scales, these two scales are analyzed individually in this research since most hypotheses query their specific effects. The Cronbach's alpha values for both home and host national identification scales were .90 in the pre-post sample. In post-only sample, these alpha values were .91 and .89 respectively.

An eight item scale was created to measure *Perceived Social Support* from contact with people at home via CMC tools. The original items created to measure this construct are:

- SS 1. CMC has been useful in keeping up with my friends.
- SS 2. CMC has been useful in keeping up with my friends at home.
- SS 3. CMC has been useful in keeping up with my home culture.
- SS 4. I feel relaxed when I talk to my friends online.
- SS 5. Confiding in friends through CMC makes me uncomfortable.
- SS 6. I rely on my friends and family at home for emotional support more than my friends in the U.S.
- SS 7. The Internet has helped me maintain my social network.
- SS 8. I prefer to be with my local friends rather than spending time online.

The Cronbach's alpha analysis suggested that three of the items (SS 5, SS 6 and SS 8) were not consistent with the scale. A careful examination of those items confirmed this inconsistency. These three items seem to be measuring a more general comparison between the support mechanisms at home and those that are locally available. The other items mostly focus on satisfaction with use of CMC to contact home. Consequently, a Perceived Social Support scale was created by using the remaining five items (SS1, SS2, SS3, SS4 and SS7) and had a Cronbach's alpha of .70.

Both the *psychological well-being* and the *sociocultural adaptation scales* were highly reliable. The Cronbach's alpha for the General Contentment Scale (Hudson, 1982), measuring psychological well-being, was found to be .82 in the pre-post group and .88 in the post-only group. Fifteen items were chosen from the 41- item Socio-Cultural Adaptation Scale. This shortened version had a Cronbach alpha of .87 for the sample for the post-analyses. The decision to use the 15 items out of 41 was supported by this high reliability alpha.

Finally, a ten item *Academic adaptation scale* was created to measure the international students' perceptions of their academic performance. The items originally used to measure this construct are:

- AA 1. I am satisfied with the level at which I am performing academically.
- AA 2. I am pleased about my decision to come to U.S.
- AA 3. Being unable to concentrate on my studies troubles me.
- AA 4. I am quite confident that I will be able to deal with future challenges here at U.T. in a satisfactory manner.
- AA 5. I would rather be at a college at home rather than here.
- AA 6. So far, my experiences in the program met my expectations.
- AA 7. I have good communication with faculty.
- AA 8. I have good communication with my class mates.
- AA 9. I am as skilled academically as the average undergraduate/graduate student.
- AA 10. I feel that my grades are an accurate measure of my academic ability.

An initial inter-item analysis suggested that two items (AA 3 and AA 5) were not consistent with the rest of the scale. A careful reading of these items indicated that AA 3 had two negatives, making it difficult to understand and AA 5 was measuring a preference beyond satisfaction with academic performance. Accordingly, they were dropped from the analyses. The remaining eight items formed the Academic Adaptation Scale and had a Cronbach's alpha of .82.

Subsequently, six scale scores were created by adding up the items designed to measure the hypothesized construct. The psychometric characteristics of the scales, including the number of items, mean, standard deviation, possible range of scores, and Cronbach's alpha separately for the two groups can be found in Table 8.

Table 8.

Descriptive Statistics for the Scales for the Sample for Pre-Post Analyses (n=90) and the Sample for Post-Only Analyses (n=280).

Scale	Sample	<u>M</u>	<u>SD</u>	Possible Range of Scores	Cronbach's Alpha	
Home National Identity Scale	Pre- Move Phase	Pre-post	96.70	16.02	1-133	.90
		Post-only	-	-		
	Post- Move Phase	Pre-post	96.64	16.63	1-133	.90
		Post-only	94.61	18.64	1-133	.91
Host National Identity Scale	Pre- Move Phase	Pre-post	67.22	18.96	1-133	.90
		Post-only	-	-		
	Post- Move Phase	Pre-post	70.60	16.98	1-133	.89
		Post-only	69.93	17.95	1-133	.89
Perceived Social Support	Post-Move Phase	Post-only	21.51	2.85	1-25	.70
Psychological Well-Being	Pre- Move Phase	Pre-post	51.57	8.83	1-90	.82
		Post-only	-	-		
	Post- Move Phase	Pre-post	47.83	8.29	1-90	.84
		Post-only	47.75	9.57	1-90	.88
Socio-Cultural Adaptation	Post-Move Phase	Post-only	58.99	9.34	1-75	.87
Academic Adaptation	Post-Move Phase	Post-only	29.66	4.80	1-40	.82

Further confirmation of scale construction. Next, using the data from the sample for the post-only analyses, a confirmatory factor analyses (CFA) was conducted to check the validity of the two newly created scales: Perceived Social Support Scale and Academic Adaptation Scale; and the one modified scale: the Socio-Cultural

Adaptation Scale. All SEM analyses were conducted by using the EQS program. Using a confirmatory factor analysis method, 28 items were designed to measure three latent constructs, of “perceived social support”, “social adaptation” and “academic adjustment.”

In this CFA model, all factor variances were set to 1 in order to get a significance test for each loading. Finally, all hypothesized loadings were set free to be estimated and no errors were correlated. (An EQS representation of the Confirmatory Factor Analyses is presented in Appendix C). Additionally a Lagrange Multiplier (LM) test was run to detect whether the model would benefit from any modifications by correlating any residuals. The LM procedure approximates the amount by which the model’s overall fit as measured by the Chi-square (χ^2) decreases if a particular parameter was freely estimated (Kline, 1998). It was expected that co-varying the errors of variables measuring similar underlying constructs (both inter- and intra- factors) would improve the fit of the model. However, they would not be added to the model, unless there was a theoretical reason. For instance, in the socio-cultural adaptation scale and the academic adjustment scale, there are items measuring academic behaviors (such as *difficulty in expressing your ideas in the class* and *difficulty in understanding what is required of you at the university*) and also some items related to language use or comfort in communication (such as *difficulty in making yourself understood, difficulty in understanding jokes, I have good communication with the faculty*.) Especially because for international students, the university is the major socialization

environment, many items in the social adaptation scale and academic adjustment scale were expected to overlap. Correlation paths would be added to the model in case the LM test suggested an improved fit.

In this CFA model, a total of 59 parameters were estimated, including 28 error variances, 28 factor loadings loading on three factors (five on Factor 1, 15 on Factor 2 and eight on Factor 3), and three co-variances between the factors. Because the missing values in the data set were all imputed and the skewness and kurtosis of the items ranged within acceptable limits, the data set required no specific transformations and a maximum likelihood estimation was used. The goodness of fit measures indicated that this initial model did not adequately reflect the data (please see Table 9 for goodness-of-fit statistics.). Hu and Bentler (1999) propose a 2-index presentation strategy in evaluating the fit of a model; a combination of CFI \geq .96 and SRMR \leq .10 or a combination of RMSEA \leq .06 and SRMR \leq .10. Another commonly used tool to evaluate the fit of the model is the 90% confidence interval accompanying the RMSEA. A model is defined to have a good fit if the confidence interval is below .05 level or straddles it (MacCallum, Browne, & Sugawara, 1996).

By examining the LM indices, 19 correlations among measured-variable residuals were added to the model one by one. Many of these correlations were between items measuring language usage, friendship, and adaptation to local culture as determined as theoretically appropriate before running the LM modification test. Including these residual correlations to the model improved the fit of the model to

the data significantly. The resulting goodness of fit indices are summarized in Table 9. A change of Chi-square test between the initial and final model revealed a significant improvement in the model [$\Delta\chi^2_{(df=19)} = 264.811, p < .001$] favoring the addition of these 19 residual correlations. The other error correlations suggested to be included in the model did not have any theoretical or empirical support, so the model was left as it is.

Table 9.

Summary of Goodness of Fit Indices for the Confirmatory Factor Analysis

	χ^2	df	CFI	SRMR	RMSEA
Initial CFA Model	721.66 (p<.001)	347	.782	.086	.076
Final Confirmatory Model	456.85 (p<.001)	328	.924	.069	.046
Competing Model	497.80 (p<.001)	325	.899	.074	.053

SEM tests model fit and a good fit indicates that there is no good evidence that the particular model tested is false, thus it fails to reject the hypothesis. However, it is customary in SEM analysis to systematically consider rival hypotheses (models) and search for alternative explanations of the phenomena (Bagozzi, 1984). Accordingly, an investigation of the pattern of residuals suggested to be correlated by the LM test yielded that most pairs were related to language use. Hence, a *competing model* in which eight variables measuring language use loaded to a fourth latent construct (Language Use) was developed and tested against the initial CFA model.

The fit of this model was tested against the original three factor model. The indicators of the “Language Use” factor were:

- L 1. making friends
- L 2. making yourself understood
- L 3. expressing your ideas in the class
- L 4. understanding jokes and humor
- L 5. understanding what is required of you at the university
- L 6. understanding the local accent/language
- L 7. I have good communication with faculty.
- L 8. I have good communication with students.

The initial confirmatory factor analysis of this competing model yielded a similar misfit to the data and suggested the same residual correlations to be included in the model. So the same 19 residual correlations were added to the model. The goodness of fit indices of the final confirmatory model of this competing model are summarized in Table 9. Because these two models are not hierarchically nested, a comparison of model AICs is required to determine which model is a better fit. AIC values are used to select which model is most parsimonious in terms of providing an adequate description of the data with the smallest number of model parameters. According to Lebreton et al. (1992), lower AIC values indicate “better” models and an AIC closer to negative infinity indicates a better fit in invariance testing.

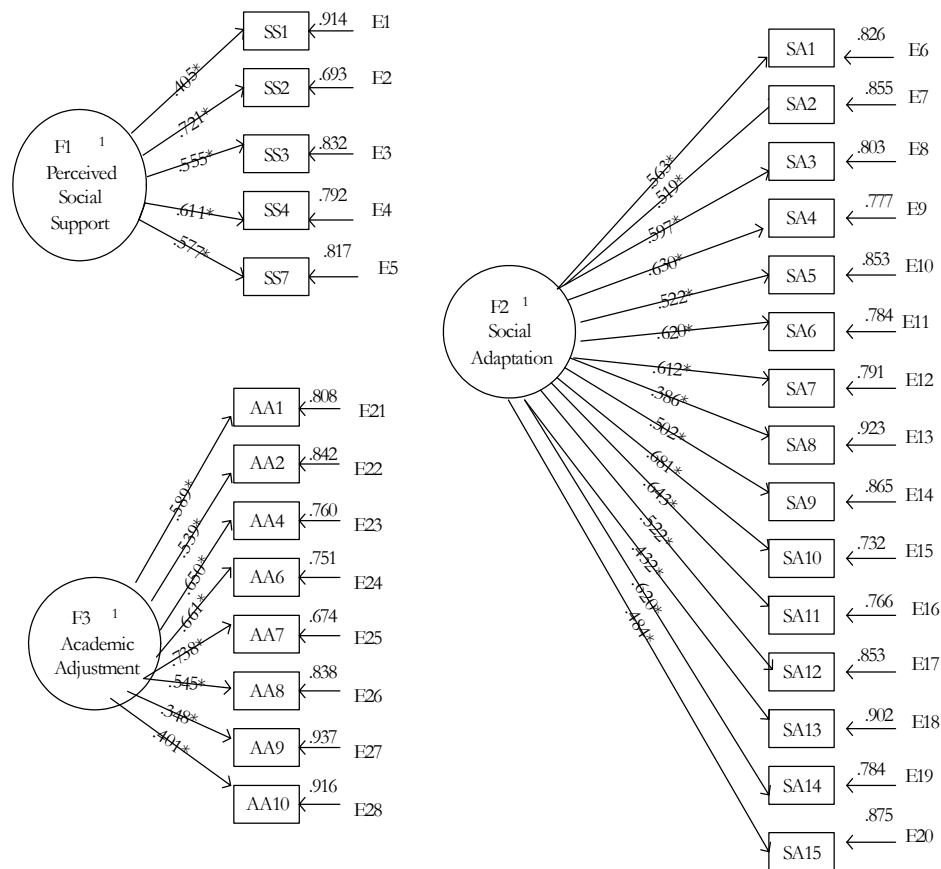
A comparison of model AICs of these two models [$AIC_{(3 \text{ factor})} = -195.14$ and $AIC_{(4 \text{ factor})} = -150.19$] revealed a better fit of the three factor model. All 28 loadings are significant in both models. A comparison of path values across these two competing models indicated very comparable results. Even when the loadings of the

eight variables to the new 4th factor are compared with those of the two factors in the three factor model, the biggest difference in path values is found to be .070. This shows that the fourth factor did not improve the fit of the model to the data. To ensure parsimony in the whole SEM model, the three factor model was selected as the final model.

As a final check of the model, a Wald test on the three factor model was run to see if a simpler model could be achieved by deleting some of the paths. This statistic estimates if the amount the model's overall χ^2 would increase when a particular free parameter is fixed to zero (Kline, 1998). The results of the Wald test suggested that only the covariance paths between F1 and F2 and between F1 and F3 could be dropped to without significantly decreasing the fit of the model. This result was expected because, in the actual structural model, no direct relation between these factors is expected.

As revealed in Figure 3, all of the loadings in the final model are significant. A calculation of construct reliability based on the loadings revealed high reliability for each of the three scales; $H = .72$ for the Perceived Social Support scale; $H = .87$ for the Socio-cultural Adaptation scale and $H = .79$ for the Academic Adjustment scale. (Hancock & Mueller, 2001). The good fit of the CFA model suggests that the scales created adequately measure the three latent constructs and can be used in the structural equation model. The SEM model is created by scale scores instead of

individual items because sample size limitations would not allow to model the latent variables within the SEM analysis.



Note: 19 pairs of residuals are correlated and are: E4, E6; E21, E28; E19, E12; E24, E22; E26, E25; E11, E8; E26, E6; E21, E16; E2, E1; E9, E7; E12, E11; E18, E8; E22, E16; E22, E23; E19, E11; E26, E11; E27, E16; E28, E11; E15, E13 (all significant at the $p = .05$ level)

Figure 3. Path values of the confirmatory factor analyses model

Testing the Structural Equation Model

Step one

A preliminary descriptive statistics analysis was run to investigate the CMC usage behavior of 280 students who provided the data for the model. The summary of descriptive statistics is presented in Table 10. In general these international students used at least one kind of CMC tool everyday. Almost half of the students surfed home-related Internet sites daily since moving to the U.S. and slightly fewer number of them e-mailed people at home and read online native newspapers at least once a day . Very few of them had written any letters to people at home since their move. CMC was the foremost medium they used to communicate with friends, although many of them also communicated with their families via computers.

Table 10.

Use of Computer-Mediated-Communication Tools and Traditional Communication Tools During Cross-Cultural Transition (n=280)

	<u>M</u>	<u>SD</u>
Minutes spent on surfing the Internet daily	74.3	73.67
Minutes spent on e-mailing daily	33.7	25.62
Minutes spent on chatting daily	32.1	45.98
	Percentages	
Family at home have computer with Internet access	92.1	
E-mailed people at home at least once daily	38.6	
Accessed home related Internet sites at least once daily	45.3	
Read online native newspapers at least once daily	27.8	
Phoned people at home at least once daily	10.0	
E-mailed parents at least once in a week	71.8	
Phoned parents at least once in a week	88.6	
E-mailed friends at least once in a week	93.6	
Phoned friends at least once in a week	43.9	

Step two

The next step was to perform a structural equation model analysis to test the framework developed for understanding role the of CMC use in cross-cultural transition. The EQS software was used in this analysis. The structural equation model is presented in Figure 2.

The model consisted of one latent variable of CMC use with two indicators (passive and active use of CMC to contact home) and six composite variables (home

and host national identification, perceived social support, psychological well-being, socio-cultural adaptation, and academic adaptation). The correlation matrix along with the scale descriptives are presented in Table 11.

Table 11.

Correlation Matrix and Descriptive Statistics of the Eight Constructs

	1	2	3	4	5	6	7	8
1. Home identification	-							
2. Host identification	.17	-						
3. Perceived social support	.32	.15	-					
4. Psychological well-being	.14	.21	.17	-				
5. Socio-cultural adaptation	-.01	.39	.04	.52	-			
6. Academic adaptation	.09	.14	.04	.52	.43	-		
7. Active CMC use	.22	-.03	.25	-.02	-.13	.06	-	
8. Passive CMC use	.21	.12	.40	.14	.06	.131	.23	-
<i>M</i>	94.6	69.9	21.5	47.7	58.9	29.6	0	0
<i>SD</i>	18.30	17.38	2.85	8.05	4.58	8.90	0.90	0.80
Skewness	-0.56	0.39	-1.83	-0.56	-0.39	-0.27	0.40	0.2
Kurtosis	0.13	-0.10	7.14	0.53	-0.52	0.17	-0.29	-0.37

The demographic variables age, gender, English use, length of time in the U.S., and whether or not a relative is present in U.S. were partialled out from the correlation matrix to guard against any confounding effects. Table 12 reports the covariance matrix for the eight constructs after these factors were partialled out.

Table 12.

Covariance Matrix

	1	2	3	4	5	6	7	8
1. Home identification	334.92							
2. Host identification	63.70	302.38						
3. Perceived social support	16.60	7.04	8.18					
4. Psychological well-being	-3.57	47.35	.84	64.83				
5. Socio-cultural adaptation	-.72	7.68	.48	12.76	20.98			
6. Academic adaptation	20.94	23.10	4.43	30.31	18.84	80.65		
7. Active CMC use	2.97	.44	.62	-.32	.37	.35	.71	
8. Passive CMC use	2.93	1.29	.91	-.25	.33	.54	.19	.65

The measurement model. The first step in a structural equation model is to impose a measurement model to assess the adequacy of the hypothesized measurement model structure (Hoyle, 1995). The measurement model tests the measurement assumptions, relating the indicators of the structural equation model to the latent variables. A misfit of this model indicates that the structural model will not fit satisfactorily until the proper measurement of the latent variable is achieved (Mulaik & James, 1995). In a measurement model all factors are permitted to co-vary to ensure a just-identified model at the construct level so that the analysis will address only the fit of the measurement model (Hoyle & Panter, 1995). In this

measurement model, the factor variance was set to 1, in order to get a significance test for the factor loading of each indicator. All hypothesized loadings were left free to be estimated. Finally, all composite variables and the latent factor were co-varied.

Since the skewness and kurtosis of the variables ranged within acceptable limits, the data appeared to meet the normality assumptions, and a maximum likelihood estimation method was used. For this model a total of 31 parameters were estimated, including six composite variable variances, two error variances, two factor loadings, and 21 covariances. With eight observed variables, there are 36 pieces of information known in this model (if v =number of observed variables, pieces of information known = $\frac{v \times (v + 1)}{2}$, Klein, 1998). As can be seen in Table 13 all goodness of fit indices met the 2-index criteria by Hu and Bentler (1999) as described in the CFA section. The fit of the measurement model indicates that the latent factor is represented by the two indicators and that those indicators are not related to other constructs in the model above and beyond the relationship of the latent factor with the composite variables. (Table 13 contains fit indices for this measurement model as well as subsequent SEM and the alternative models).

Table 13.

Summary of Goodness of Fit Indices of the Structural Equation Model

	χ^2	df	CFI	SRMR	RMSEA	90% confidence interval
Measurement Model	10.37 (p=.41)	10	.999	.024	.012	.000 - .066
Structural Model	18.16 (p=.25)	15	.989	.034	.028	.000 - .066
Alternative Model	195.78 (p=.01)	60	.753	.077	.090	.076 -.104

The structural equation model. The structural model was designed to explain the role of CMC as a communication tool, and a social support source positively influencing the cross-cultural adjustment was imposed on the sample partial covariance matrix. A maximum likelihood estimation method was used to estimate a total of 21 parameters including eight error variances, ten direct paths, two factor loadings, and one covariance. The overall χ^2 was not significant at an alpha level of .05 suggesting a good fit of the model (Kline, 1998). Furthermore, as can be seen in Table 13, the model meets all additional joint criteria of goodness-of-fit as addressed earlier. The Wald test suggested that only the direct path between home national identification and psychological well-being could be dropped to obtain a more parsimonious model. However, a positive link of home national identification to the psychological well-being was one of the basic hypotheses tested on this model based on the suggestions of previous literature on sojourner acculturation. There was no theoretical basis for dropping this path: thus it is kept intact. Consequently, it is

concluded that this is a plausible model in explaining initial stages of cross-cultural transition and the path estimates for this model are shown in Figure 4.

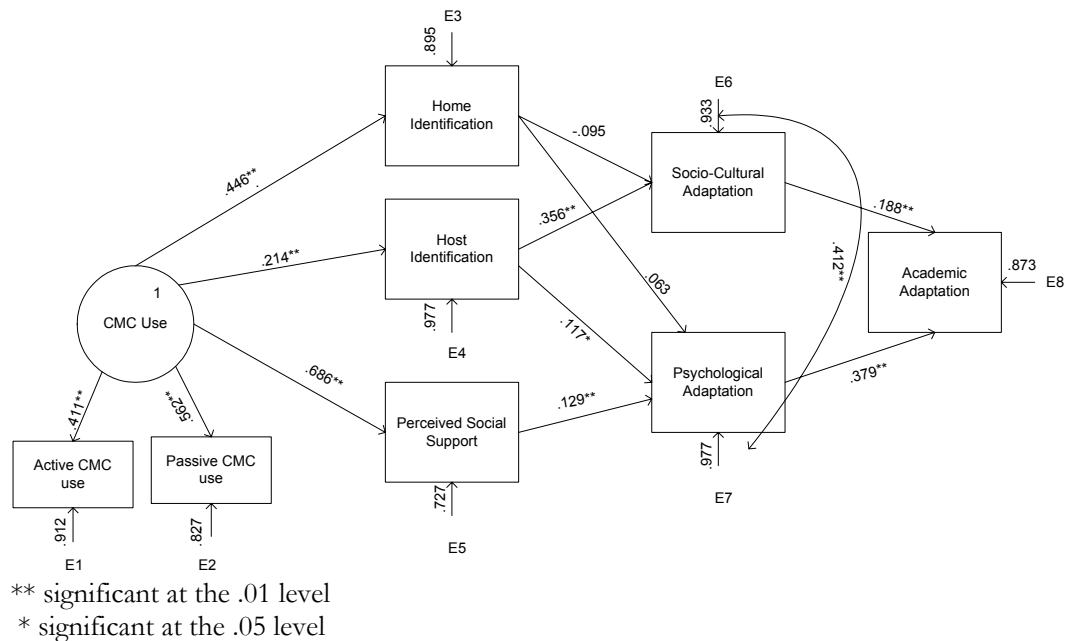


Figure 4. Path values of the structural equation model.

An overview of the path values indicates that the factor loadings of the two CMC use indicators are significant suggesting that the latent factor is reflected efficiently in the scores of the indicator variables (Kline, 1998). The construct reliability of the CMC use variable explained by the two CMC use factor scores is 39%. However, it should be noted that this number is low based on the Hancock and Muller (2001) criteria (recommended minimum size for a good construct reliability is .70).

The particular path values give information about the specific hypotheses tested as part of this model. All path values and the error covariance were significant and in the expected direction except for two non-significant paths between home national identification and psychological well-being and home national identification and socio-cultural adaptation. As can be seen in Figure 4, the magnitudes of statistically significant standardized path coefficients ranged from .117 to .686. Standardized parameter estimates are transformations of unstandardized estimates that remove scaling information and therefore allow for informal comparisons of parameters throughout a model (Hoyle, 1995). They index the number of standard deviations change in the dependent variable per standard deviation change in the independent variable, controlling for other predictors. Standardized path coefficients with absolute values of less than .10 indicate a “small” effect, values around .30 a “medium” effect; and those greater than .50 a large effect (Kline, 1998). The effects decomposition based on the standard solution is presented in Table 14. The strongest relation was found to be between the latent CMC use factor and the perceived social support construct. One standard deviation of increase in CMC use yielded a .686 standard deviation of increase in the perceived social support score. Based on the criteria suggested by Kline (1998), the effects of CMC use on home identification score and the psychological well-being on academic adaptation were large (.45 and .38 respectively). The two weakest significant effects were those of

host national identification and the perceived social support on psychological well-being (.117 and .129, respectively).

Table 14

Effects Decomposition of the Structural Equation Model

Causal Variables	Endogenous Variables					
	Home	Host	SS	SA	PSY	AA
<u>CMC use</u>						
Direct effect	.446**	.214**	.686**	-	-	-
Indirect effect	-	-	-	.034	.142**	.060**
Total effect	.446**	.214**	.686**	.034	.142**	.060**
<u>Home national identification (Home)</u>						
Direct effect	-	-	-	-.095	.063	-
Indirect effect	-	-	-	-	-	.006
Total effect	-	-	.-	-.095	.063	.006
<u>Host national identification (Host)</u>						
Direct effect	-	-	-	.356**	.117*	-
Indirect effect	-	-	-	-	-	.111**
Total effect	-	-	.-	.356**	.117*	.111**
<u>Social Support (SS)</u>						
Direct effect	-	-	-	-	.129*	-
Indirect effect	-	-	-	-	-	.049*
Total effect	-	-	-	-	.129*	.049*
<u>Socio-Cultural Adaptation (SA)</u>						
Direct effect	-	-	-	-	-	.118**
Indirect effect	-	-	-	-	-	-
Total effect	-	-	.-	-	-	.118**
<u>Psychological Adaptation (PSY)</u>						
Direct effect	-	-	-	-	-	.379**
Indirect effect	-	-	-	-	-	-
Total effect	-	-	.-	-	-	.379**
Variance explained (R ²)	.20	.05	.47	.05	.13	.24

The effects decomposition table indicates that in addition to the direct effects as shown in Figure 4, the CMC use factor has an indirect significant effect on both psychological and academic adaptations. Moreover, host identification and perceived social support also have significant indirect effects on the academic adaptation via the other two adaptation constructs.

The amount of variance explained (R^2) in the six endogenous variables was modest ranging from .05 (host identification and socio-cultural adaptation) to .47 (perceived social support). Overall, the present model has more than 90% power, with 15 degrees of freedom and 280 participants (Loehlin, 1998)

An alternative model. Alternatively, a second model was run, in which single CMC-use items rather than two factor scores were used as indicators of the CMC use latent factor. Except for the latent factor predicted by six separate indicators, this model was comparable to the structural model proposed earlier. A total of 31 parameters were estimated. The 13 observed variables yielded 91 pieces of known information in the covariance matrix. With 60 degrees of freedom, this alternative model had an overall χ^2 of 195.781, significant at an alpha level of .05, suggesting a non- fit. Additional goodness of fit indices are presented in Table 13. Consequently, the structural model described above is designated to be the final model explaining the role of CMC on cross-cultural transitions.

A Detailed Look at Adaptation Scores

As evident from the effects decomposition table, in addition to the direct effects described in the SEM model, CMC use and home and host identification variables had indirect effects on the three variables of adaptation. Thus, some additional ANOVAs on the same group of 280 students were run to test the specific effects of CMC use and acculturation strategy attained on the adaptation scores.

The first hypothesis explored whether high use of CMC to contact home would result in better adaptation. To this aim, first, a high – low CMC use dummy variable was created on each of the factor scores. Then, a one-way analyses of variance was conducted on the three adaptation scores as a function of CMC use.

The means and standard deviations of the three adaptation scores as a function of

two CMC use variables are summarized in Table 15. The results indicated that passive CMC use was significantly associated with better psychological well-being and active CMC use was significantly and negatively associated with socio-cultural adaptation [$F_{(1,278)} = 4.474, p < .05$ and $F_{(1,278)} = 4.273, p < .001$, respectively]. CMC use did not have any significant effect on academic adaptation.

Table 15

Means and Standard Deviations of Adaptation Scores as a Function of CMC Use
(n=280)

CMC Use	<u>Dependent variables</u>					
	Psychological adaptation		Socio-cultural adaptation		Academic adaptation	
	<u>M</u>	<u>Sd</u>	<u>M</u>	<u>Sd</u>	<u>M</u>	<u>Sd</u>
CMC use- Active						
High Use (n=152)	47.8	9.67	60.1	9.14	29.4	4.71
Low Use (n=128)	47.6	9.50	57.7	9.46	30.0	4.88
CMC use- Passive						
High Use (n=150)	46.6	9.20	58.6	9.57	29.2	4.82
Low Use (n=130)	49.0	9.86	59.5	9.08	30.2	4.87

Finally one-way analyses of variance (ANOVAs) were carried out on the three adaptation measures with the acculturation strategies as independent variables. The SEM model tested the individual effects of home and host identification scores on international students' acculturation. However, as addressed in the description of the Acculturation Index in the Instruments section, through a bipartite median split of these two identification scores, it is possible to determine one of the four

acculturation strategies immigrants adopt namely biculturalism, assimilation, separation, and marginalization (Ward 1999). The one-way analyses of variance on the three adaptation variables as a function of these four acculturation strategies would allow a test of any distinct effects of these four strategies on the students' adaptation to the new culture.

The means and standard deviations of the three adaptation scores as a function of four levels of the acculturation strategy are summarized in Table 16. The results indicated that mean psychological well-being and socio-cultural adaptation scores varied significantly as a result of the acculturation strategy one attains [$F_{(3, 276)} = 4.065, p < .05$ and $F_{(3, 276)} = 8.421, p < .001$, respectively]. Acculturation strategy did not have any significant effect on Academic Adaptation.

Table 16

Means and Standard Deviations of Adaptation Scores as a Function of Four Modes of Acculturation Strategies (n=280)

Acculturation Strategy	Dependent variables					
	Psychological adaptation		Socio-cultural adaptation		Academic adaptation	
	<u>M</u>	<u>Sd</u>	<u>M</u>	<u>Sd</u>	<u>M</u>	<u>Sd</u>
Bicultural (n=68)	50.4	7.71	61.6	7.78	30.1	4.15
Assimilated (n=71)	47.8	9.98	61.8	9.01	29.9	5.31
Separated (n=71)	47.9	8.25	56.6	8.71	29.5	4.81
Marginalized (n=70)	44.8	11.28	56.0	10.27	28.9	4.80

Post hoc Tukey's HSD test showed that mean psychological well-being of bi-cultural individuals was significantly higher than those of marginalized students ($M_s=50.43$ and 44.84 , respectively). In terms of socio-cultural adaptation, the analyses revealed that both bi-cultural and assimilated individuals were significantly better adapted than separated and marginalized individuals ($M_s=61.59, 61.82, 56.59, 56.04$, respectively). There were no further pair-wise differences between the four groups.

Pre-Post Arrival Comparisons

The final group of analyses tested the hypotheses on pre-post comparisons in acculturation.

Pre-post comparisons were undertaken on the data provided by the 90 students who responded to the web-survey before and after their move to the U.S. A preliminary analysis on acculturation status and general CMC use was conducted to understand the characteristics of the sample (see Table 17 for a summary of the descriptive statistics). Before coming to the U.S., a good number of students indicated that they would like to have many American friends during their studies and that they would like to participate in American organizations, implying a high expected contact with the American culture. Likewise, almost all participants also reported that it was very important to keep in touch with their family and with their friends. Students agreed that computers would be important for keeping contact with their families, friends, and news and social events back at home. In the pre-arrival phase, the average home-national identification score was 96.70 and the

average host-national identification score was 67.22. The host national identification score in the pre-arrival phase was significantly correlated with whether the student had been to the U.S. before ($r=.289$, $p<.05$).

Table 17.

Descriptive Statistics of the CMC use and Acculturation Strategies in the Pre-Arrival Phase (n=90)

	%
Would like to be friends mostly with Americans	91.1
Would like to participate American organizations	68.9
It is important to be in contact with:	
family at home	98.9
friends at home	91.0
social and cultural life at home	64.4
Computers are important in keeping contact with:	
family at home	76.7
friends at home	100
social and cultural life at home	82.2
Acculturation strategies	
bi-cultural	25.6
assimilated	23.3
separated	22.2
marginalized	28.9

The rest of the analyses focused on the second group of the hypotheses comparing pre- and post-arrival phases. Mean and standard deviations of related variables are presented in Table 18. A repeated measures ANOVA was conducted

on CMC use, acculturation strategies and psychological well-being variables to detect any changes the students had undergone in the initial stages of cross-cultural transition.

Table 18.

Comparisons of Pre- and Post- Arrival Phase Variables

	Pre-arrival		Post-arrival		F	p
	<u>M</u>	<u>Sd</u>	<u>M</u>	<u>Sd</u>		
Daily CMC use						
Minutes spent e-mailing	25	14.75	32	24.03	7.84	.06
Minutes spent chatting	12	17.27	29	27.95	9.94	.02
Minutes spent surfing the Internet	65	52.42	79	75.89	3.69	.58
National Identification Scores						
Home identification	96.7	16.02	96.6	16.28	.14	.97
Host identification	67.2	18.95	70.6	16.98	10.90	.00
Psychological well-being	51.6	8.83	47.8	8.28	18.46	.00

The first hypothesis predicted that CMC use in the post-arrival phase would be higher than that of the pre-arrival phase. The results of the one-way repeated measures of ANOVA test indicated that there was a significant increase in the daily average of minutes spent on e-mailing and chatting [$F_{(1,89)}=7.84, p< .05$ and $F_{(1,89)}=9.46, p< .05$, respectively.] The increase in daily average of surfing the Internet was not significant at the $\alpha=.05$ level [$F_{(1,89)}=3.69, p= .058$].

The second hypothesis tested the change in home and host national identities between the two phases. The results of the repeated measures one-way ANOVA

indicated no significant change in home national identity in the post-arrival phase [$F_{(1,88)} = .145, p > .05$]. However, there was a significant increase in host national identity score in the post arrival phase, after adjusting for whether one had been to the U.S. before [$F_{(1,88)} = 10.904, p < .05$].

A comparison of psychological well-being in the two phases suggested that students had lower psychological well-being scores in the post-arrival phase [$F_{(1,88)} = 18.467, p < .05$].

Discussion

The present study examined the role of computer-mediated communication (CMC) in international students' adjustment during the initial phases of the cross-cultural transition. Computers have brought many changes to the way international students make the transition to another country. As proclaimed by Kraut et al., (1998), communication dominates Internet use for a majority of its users. International students constitute one such group who benefits from CMC technologies enormously by being able to contact their family and friends and the social life at home.

This study contributes to our knowledge in four ways. First, it introduces Internet related technologies as a tool for maintaining home and host national identities and as a source for social support during the initial phases of the sojourn. This new focus is essential as computers have been used extensively by sojourning individuals, and researchers have not yet determined how these new information and communication technologies affect cross-cultural transitions. Second, this study represents an opportunity to investigate how continuous contact with home affects the process of acculturation. Previous research on acculturation mostly explored the ways in which sojourners acquired communication skills necessary for effective social interaction with people in the new culture, thus resulting in a better adjustment (Kim, 1978; Dawson, 1996 and Kim et al., 1998). Even in Berry's framework, which is based on the degree to which acculturating people attain host national identities

while maintaining their home national identities, the process of maintenance of original identities seem to be taken for granted. Some researchers approached this idea by studying the effect of continuous contact with co-nationals on acculturation. A few investigated the effects of “institutional completeness” or “ethnic culture available locally,” but the role of electronic contact with people back at home has not been studied extensively (e.g. Inglis & Gudykunst, 1982; Cui et al., 1998). Third, this study is one of the few that employs a longitudinal analysis to study the acculturation process. As Berry (1995) has stated, cross-cultural transition must be assessed when sets of data collected at different points in time are compared. However, in practice, longitudinal designs are not used very often by acculturation researchers because they are difficult and time consuming. Consequently, findings from this study have the potential to provide greater insight about the role of computer communication on the acculturation process international students go through. Fourth, the conclusions reached by this research will also contribute to the literature on new information and communication technologies, because this study investigates the impact of CMC use on social, psychological and academic adaptation.

The study approached the issue of international students’ acculturation from two different perspectives. The first perspective stems from the development of a model grounded in the theoretical and empirical research to explain the initial phases of the cross-cultural transition. The second perspective involves additional analyses

conducted to make pre- and post-arrival comparisons as well as to test some post-arrival relationships to further explain acculturation.

The findings of the study suggested that computers are being used by international students as tools for sustaining contact with family and friends at home as well as the native social and culture life. This continuous contact affects the sojourning individuals' maintenance of home identity and the acquisition of host identity, and their perceptions of available social support. All of these factors combine to affect the students' adaptation to the new culture. The results also support the notion that cross-cultural transitions result in behavioral and psychological changes in sojourning individuals.

The findings and their implications will be discussed in the next section. Then limitations of the study will be outlined. Finally suggestions for future research and potential applications will be made.

A Structural Equation Model of Acculturation

The results of the structural equation analysis confirm that the model developed and tested in this study is plausible in explaining international students' acculturation by CMC use, home and host national identifications, and perceived social support. The model was found to have a good fit to the data and the further analyses did not indicate any further modifications on the model to improve the fit of the data.

Effect of CMC Use on Home and Host Identification and Social Support

The results of this study indicate that, assuming that the model is correct, CMC use significantly predicts home and host national identification and perceived social support, as predicted.

Communicating with people at home and following the social and cultural life of the home culture via computers was found to result in the maintenance of home cultural values and preservation of national identity. Via CMC tools, international students can have continuous access to the home culture. It is very easy for them to reach their family and friends through Internet. They can hear or see each other via special programs (like net-meeting or messenger) and web cams. Moreover, having easy access to the media and other information and entertainment resources like online newspapers and TV broadcasts on the Internet enables these people to be in contact with the current issues at home as well as their cultures' values and daily life.

Additionally, the results of this study indicate that this kind of contact with home facilitates the way international students approach their American host culture. The findings suggest that students with continuous home contacts participate more in the customs and traditions of the American culture. Many researchers have demonstrated that a solid social network may simultaneously ground an individual in parts of his/her home culture and also facilitate the acquisition of the new culture, thus reducing the negative effects of being a stranger in a foreign land (Palinkas,

1982; Furnham & Bochner, 1982; Kim, 1977). Feelings of belongingness to the home culture provides the necessary moral support for these students to feel safe and secure in the new context, encouraging them to interact with the host people.

The direct effect of CMC use on perceived social support in the model indicates that computers facilitate the preservation of existing social networks as support mechanisms even when these support sources are not physically present. The path between CMC use and perceived social support is the strongest in the model. This finding supports the idea that computers are used as efficient tools to contact already existing social networks and that such contact is a means of enhancing social support.

CMC as a social support mechanism has been studied mostly in problem populations, in terms of a stress-coping framework, where people with similar problems establish a support group and communicate only via computers. Such online support groups or mutual aid groups in the health care system usually take the form of a listserv or a mailing service whereby members communicate with each other around a specific health related topic (White & Dorman, 2001). The benefits and disadvantages of such online support groups have been studied and are usually compared to face-to-face support groups. In general, the literature about these online support groups indicate that they have positive effects on their members. They provide opportunities for emotional validation and support, information and

encouragement especially for those people who live in rural areas or have restricted mobility (Colon, 1996; Dunham et al., 1998).

International students are similar to these populations in the sense that they are isolated from their existing relationships and the culture they were raised in. The present study confirms that computers are used as means to continue relationships between people who are not physically at the same place. As proposed by Krishihan (2000) and LaFromboise (1983), such enduring contact with home culture helps these students to feel related and as belonging to their home. This feeling should be particularly important for international students who do not have social support accessible locally. As Inglis and Gudykunst (1982) assert, because acculturation is an interactive process, the ethnic environment as well as the host environment should influence the acculturation patterns of immigrants. However, immigrants are different from international students such that they usually migrate in larger groups and have some kind of an ethnic identity available locally. International students may find few of their co-nationals in the university or broader community in the U.S. These people might lose all their connection to home unless they personally seek information and communication with their home culture.

It is probably more important for international students to stay in touch with their home culture because they plan to return home at the end of their studies. As one participant in the pilot study mentioned:

I feel that I am kind of keeping in touch, though my friends and I don't really

talk very much via e-mail. But at least we hear from each other and won't be total strangers when I return.

Few researchers have explored the value of maintaining home identity in terms of its effect on the ease of returning to home. For instance, Brislin (1983) argued that sojourners who had more friendships with host-culture nationals would have more difficulty with "reverse culture shock" when they return home than those who never become integrated in the host culture at all, and relied on long distance home country support instead. Cox (2001) studied 101 missionaries returning to the United States from 44 different countries. His findings supported that both frequency of and satisfaction with communication with home country while overseas assisted in cultural reentry adjustment. These findings suggest the positive affect of preservation of home cultural values during the sojourn.

Perceived social support is defined here as the degree to which a person's basic social needs are gratified through interaction with others (Thoits, 1982). Perceiving certain interactions as supportive is based on the subjective definition of the situation as well as on the individual's expectations with respect to that situation. The scale developed to measure perceptions of social support via computers here is based on actual tangible relationships and the results of this study indicate that the measures developed for this study was adequate to capture the support one received from sources that are physically distant.

Various studies on CMC has contrasted cyber relationships with face-to-face relationships and tried to explain how online relationships carried over to the off-line world. The present study is original in the sense that it investigates an expansion of face-to-face relationships to the cyber world. Moreover, this transference is more of a necessity than a preference. In the literature on international students, only host nationals, co-nationals, and other international students locally present are recognized as possible sources of social support. The present model adds to this list, and suggests that existing social network can still act as a social support mechanism even when the parties are not physically together and their contact takes place online.

Effects of Home and Host Identification and Social Support on Adaptation

Ward and Kennedy (1994) were the first researchers to argue that more cross-cultural research was necessary in order to explain the relationships between acculturation modes and acculturation outcomes. With a series of studies, they demonstrated that co-national identification had a primary bearing upon psychological well-being during cross-cultural transitions; in contrast, host national identification exerted the major influence on socio-cultural competence (Ward & Kennedy, 1993; Ward & Kennedy, 1996; Ward et al., 1998). These findings substantiated the necessity of independently examining the two underlying dimensions of acculturation. Accordingly, the present model hypothesized differential effects of home and host national identification on the adaptation levels of international students.

Assuming that the model is correct, the findings of the present study confirmed that host national identification significantly predicts both socio-cultural and psychological adaptations. Individuals who have higher participation in the customs and traditions of the host culture and who have better relationships with the host society were found to be better adapted socially and psychologically. This finding adds to Ward and Kennedy's (1994) suggestion that host national identification only influences socio-cultural adaptation. However, contrary to expectation, the model did not indicate any significant direct effect of degree of maintenance of home identification on any of the adaptation measures. This is an interesting finding that runs contrary to the suggestions of previous research (Ward & Kennedy, 1994; Ward & Kennedy, 1999). This finding might reflect the fact that not enough time had passed for these students to start defining themselves in terms of their ethnic identity. In addition, research on ethnic identity has suggested that individuals are less likely to identify with their national group when they belong to the majority group in their own society. In a study with white Americans, Singh (1977) demonstrated that members of majority (dominant) group do not use ethnic label and may in fact be unable to identify their country of origin. In another study, Verkuyten and Thijs (2002) showed that youth from ethnic minorities identified more strongly with their ethnic group than did majority group members. It is also possible that the findings about home identity and adaptation may be caused by the selected nature of the participants. There is possibility that this group of students

may be made up of individuals who are stable in their home identity, who are cognizant that they are foreigners and plan to return home, thus do not need to feel “ethnic” in the U.S.

Additionally, we should not forget international students diverge from other immigrating groups due to the voluntary and the goal-oriented nature of their sojourn. They constitute a rather homogenous group: they are very well-educated, more open to different cultures, and willing to experience living in a culture other than their own for educational purposes (Furnham & Bocher, 1982). There is a possibility that these students might be separating themselves from the rest of the members of their own culture. During data collection, a number of participants explicitly commented that they were not a typical member of their native culture. For example, one of the participants sent a note stating that “... I am not as orthodox/conservative thinker as many Indians around me are.”

A final possible explanation is that it is the host national identification component of the acculturation strategy that has an effect on international students’ acculturation, rather than the home national identification. Further research is needed to examine the distinction between international students and other immigrant groups.

This model further suggests that perceived social support significantly predicts psychological well-being together with the effect of host national identification. Research on social support indicates that support networks provide

feelings of affiliation, belonging, affirmation of self-worth and psychological security (e.g. Lazarus & Folkman, 1984; Adelman, 1988; Fontaine, 1986). Social interactions reduce stress and provide referent groups through which the new environment can be interpreted (Caligiuri & Lazarova, 2002). These feelings help overcome anxiety and powerlessness, easing feelings of being inadequate and out of place (Adelman, 1988). Prior research has demonstrated that presence of a solid social network, one that grounds an individual in parts of his/her home culture while facilitating the acquisition of new culture, sharply reduces the negative effects of acculturation (Palinkas, 1982). In a state of turmoil, such as the transition to a new life in a new culture, individuals rely on people whom they know, who can clarify the situation, remove self-doubts and give the strength to reaffirm the home values and decrease the possible homesickness and disorientation that accompanies the adjustment process. Such sustained contact provides the emotional support one needs, forming a validation of self worth, affirmation of personal relationships and creating a sense of belonging. In this context, computers serve as the central medium where people meet, share and support each other. Similarly, LaRosa, Eastin and Gregg (2001) demonstrated that Internet communication with people we know can alleviate depression, at least among socially isolated and moderately depressed populations, such as college students, who may tend to rely on social technologies to obtain social support.

The source of social support has been a controversial issue in the acculturation literature (Ward & Rana-Dueba, 2000). Social support may come from a number of sources. Researchers have been debating whether continuous contact with co-nationals has a positive or negative impact on acculturation, and whether sojourners should be friends with co-nationals or host nationals for a better adjustment (e.g. Kleinberg & Hull, 1979; Inglis & Gudykunst, 1982; Furnham & Alibhai, 1985; Berry et al., 1987; Myambo & O’Cuneen, 1988; Zheng & Berry, 1991; Ward & Kennedy, 1993; Cui et al., 1998). For example, studying 98 international employees in a New Zealand company Ward and Kennedy (1994) demonstrated that co-national group is the most salient source of interaction and support and provides a base from which to operate when the individual lacks the skills to appropriately understand and function in the new society. However, relying on co-nationals can also have detrimental affects on adaptation to the new culture. As Furnham (1987) suggests, establishing friendships primarily with other home-culture nationals living in the host country is initially relatively easy, but can produce more difficult long-term adjustment if the person is dependent on the host culture for resources

The present research approaches the problem from another perspective and explores whether continuous relationships with home social network can have a positive effect on sojourning individuals’ psychological well-being. The findings of this study indicate that computers facilitate the maintenance of home social networks as support mechanisms even when these support sources are not physically present

and this perception significantly contributes to the individuals' psychological well-being. This finding extends those of others. For example, Furukawa, Sarason and Sarason (1998) were one of the few researchers who studied how social networks prior to starting a new life in the U. S. affected Japanese students' acculturation using a longitudinal design. Their findings were quite interesting in that they found that students who had satisfactory social support provided to them before their move to a new culture, had great difficulties and were more depressed after they entered the completely new environment. The students were more vulnerable to the new conditions, because they knew that such support was no longer available. The present study adds on to this research by demonstrating that international students can maintain their already existing social support mechanisms at home while they are in the new culture, and that this social support affects their acculturation.

The positive role of acquiring host national values and building relationships with host nationals on acculturation is undeniable and has been steadily supported by various research (Kim, 1978; Kleinberg & Hull, 1979; Dawson, 1996). Interestingly, the role of contact with family and friends at home has not been subject the any studies on this topic until the present study was conducted. Even though the models of acculturation and adaptation have assumed home identification as a key dimension in the acculturation strategy, the maintenance of home identity has only been studied in terms of availability of ethnic culture and co-nationals.

Note that the analyses explained only a small variance in psychological well-being, leaving most of the variance unexplained. As Ward et al. (1998) state, psychological stress is likely to be influenced by a multitude of environmental and transitional factors which makes it a difficult construct to be predicted with a few factors. Selby and Woods (1996) verified that students' psychological adjustment fluctuates in line with changes in the academic calendar. Furthermore, cross-cultural research indicates that symptoms of depression may be manifest differently and occur with varying frequencies across cultures (Marsella, 1987). The present study takes a more challenging path, and tries to explain psychological well-being of students from different cultures. Even though perceived social support and host national identification explains a part of how psychologically well off the students are, it is far from giving a complete picture. Evidently, there are other factors that affect the psychological well being of the sojourning individual besides their contact with home.

Relationships between the Three Adaptation Scores

Another important path in the model is the correlation between socio-cultural adaptation and psychological well-being. These two adaptation scores were found to be significantly and positively correlated. As proposed by Ward et al., (1998), these two components of adjustment follow somewhat different sequences over time and the pattern of relationship between these them fluctuate over the course of the cross-cultural transition. A significant relationship between them

during the relatively early stages of acculturation indicates that interaction with host nationals result in better psychological well-being. However this relationship could also be interpreted as better psychological functioning encouraging sojourners to operate better in the host culture, be more open to the new experiences, thus result in better socio-cultural adaptation.

Finally, the results indicated that the two adaptation scores significantly predicted academic adaptation. In this research, academic adaptation is measured in terms of one's self-evaluations of academic performance. The results suggest that both socio-cultural adjustment and psychological well-being are important components of the academic performance of international students. Even though academic success has been subject to previous studies (e.g, Chiu, 1995; DeVerthelyi, 1995; Ryan & Twibell, 2000), this study is unique in relating academic adaptation to two basic adaptation categories.

Effects of CMC Use and Acculturation Strategies on Adaptation

This study also examined the specific effects of CMC use and acculturation strategies on adaptation.

The first hypothesis focused on how frequency of CMC use affects the adaptation scores. The results of the analyses of variance on the three adaptation scores by high and low levels of CMC use indicated that passive use of CMC

positively affected the students' psychological well-being and active use of CMC negatively affects socio-cultural adaptation.

Passive use of CMC, as measured in this study, included surfing the Internet, reading online newspaper, listening to online radios and alike. It is more directed towards gathering information about the everyday life at home culture and does not require direct communication with people at home. Thus, it does not necessarily intervene with the sojourners' becoming friends with local people and going out and socializing in the host culture. To the contrary, it is more likely to provide the students a connectedness to the life once they belonged to and has a positive effect on their psychological well-being. It would be more detrimental, only if this passive use of CMC was utilize as an alternative to building relationships with local people.

The negative effect of active CMC use on socio-cultural adaptation precisely indicated this impeding consequence of continuous contact with people at home on acculturation. An excessive use of CMC by e-mailing or chatting with people who are physically far away may prevent building friendships in the host culture. It suggests that, such students relied on their friends and family at home and lived in the cyber world of computers rather than spending time with local people and adapting socially. The analysis did not yield any significant effect of CMC use on academic adaptation. This differential effect of use of CMC to contact home as a *supplementary to* or a *preference over* being socialized in the new culture might explain the long debated controversy of whether co-nationals or the host nationals are the most

favorable sources of social support in the acculturation literature. The findings of this study suggest that as long as relationships with co-nationals do not hinder acquiring a new life in the host culture, they seem to be functional in the acculturation process.

The SEM model examined above presented the independent effects of the two underlying dimensions of acculturation, home and host identification, on adaptation. This approach differs from that used by previous researchers where relative standing on maintenance of home and host identity values were used to determine one of four acculturation strategies immigrants adopt, namely biculturalism, assimilation, separation and marginalization (Berry, 1984). Most studies on immigrants contrasted how these four strategies influence acculturation in addition to the independent effects of home and host identification and tried to determine which strategy was more effective in a successful adjustment (Ward & Kennedy, 1994; Aycan & Berry, 1995; LaFramboise et al., 1997). Accordingly, in this study, additional analyses were run to investigate the effect of four modes of acculturation strategies on adaptation and the findings distinguished biculturalism and integration as more effective acculturation strategies. In terms of psychological well-being, bicultural students, those who had high home and host identification scores were significantly better compared to the marginalized individuals, those who did not identify with neither of the cultures. In terms of socio-cultural adaptation, both bicultural and assimilated students were better adjusted than separated and

marginalized students. The results also indicated that, neither continuous contact with people and culture at home via computers nor the resulting acculturation strategy had any direct affect on the academic performance of the students. Academic adaptation was only explained by the psychological and socio-cultural adaptation as substantiated in the structural equation model.

Although there are controversies in the acculturation literature in terms of the most effective acculturation strategy, it is generally accepted that biculturalism and assimilation are more likely to result in better adaptation and intermediate acculturation stress and it is agreed upon by the majority that marginalization is the most problematic strategy (Berry et al., 1989). Several researchers suggested that detrimental effects of acculturation could be ameliorated by encouraging biculturalism (Taft, 1977) and that individuals who have the ability to effectively alternate their use of culturally appropriate behavior may well exhibit higher cognitive functioning and mental health status than people who are mono-cultural or assimilated (Garcia, 1982; Rogler et al., 1991; Martinez, 1987). Empirical studies with immigrant students verified that maintaining a bicultural environment had a positive impact on the academic achievement resulting in higher GPAs, more effective study habits, and even a stronger commitment to using resources for academic success. (Schiller, 1987; Porte and Torney-Purta, 1987). LaFromboise et al., (1996) also confirmed that maintaining a bicultural environment had a positive effect on academic achievement and level of depression of immigrant children. This view

suggests that biculturalism makes possible for an individual to become a socially competent person in a second culture without losing that same competence in the country of origin. Some other research favored assimilation, rather than integration to be the most efficient strategy. For example, Ward and Rana-Dueaba (1999) suggested that sojourners who adopted an integrated (bicultural) style would experience significantly less psychological distress than did others. By contrast, those who preferred assimilation reported less social difficulty. Berry et al., (1989) also contented that assimilationist responses, by contrast, are strongly linked to decrements in socio-cultural adaptation problems. Researchers agree that the two types of identity (home and host) contribute differently to the acculturation process (Ward & Kennedy, 1994). This implies that each acculturation mode, created as an interaction of the two identity scores, influences adaptation outcomes differently. The findings of this study confirm that acculturation strategies have different effect psychological and socio-cultural adaptation.

Pre-Post Arrival Comparisons

The present study also investigated the changes cross-cultural transition brings to a sojourner's life. Leaving one's culture and starting a new life in a new culture necessitates adjustment to changes. Researchers studying acculturation have approached this process from different points of view and tried to reveal and further explain some of such intervening factors (e.g. Berry and colleagues, 1987, 1989, 1996, 2002; Ward and colleagues; 1994, 1996, 2002; Ady, 1995; Cui, van den Berg &

Jiang, 1997; Piontkowski et al., 2000). All of this previous research had a common objective; to create an awareness of the acculturation process and prepare individuals for this experience. In addition, this research aimed to provide information regarding how best to support and guide individuals in making an international transition.

In the literature, some of the most commonly cited factors influencing sojourner acculturation, and confirmed by the present findings are age, time spent in new culture, ease with the host language and presence of social support mechanisms (Hull, 1978; Kagitcibasi, 1978; Church, 1982; Kealey, 1989). In the present study, younger students seemed to have an easier transition. Specifically, they were found to have higher host national identification scores and less difficulty in adapting socially. In general, younger people are more open to new experiences, are more risk taking and possibly have less established relationships they leave behind that would interfere with their daily lives in the new culture. Moreover, the findings suggested that the longer students spent time in America, the less they relied on their relationships at home and had lower home identification. This might also be an indication that over time students build new friendships in America, either with Americans, with their co-national or other internationals, and they get used to their new life. The same is true for students with relatives or other friends in America whom they contact frequently. The presence of relatives at U.S. was associated with lower home identification scores and better social adaptation. However, this does not mean that after they spent enough time in the host culture, sojourners quit all

their home values and their relationships with their family members or friends. As one participant in the pilot study said:

I also have been able to keep up with the news of my home country much more easily than I could before online news were available. I get e-mail new-digests daily and go online to read my home town's papers. I can even listen to the radio (which makes me feel really as if I am home.)

Finally, the findings suggested that students who were more comfortable with reading, writing and speaking English had higher host identification scores and were adapted better overall. They probably could easily socialize with host nationals and did not have to deal with language problems on top of the overwhelming hassles of starting a new life in a new culture.

No differences between males and females' adaptation processes were observed in this study. There is controversy about the role of gender on acculturation. Even though some earlier studies suggested that female students had greater acculturation problems than males (Marville, 1981), later it has been suggested that female international students are less prone to traditional sex roles and that they are as well prepared for an overseas transition as are male students (Ying & Liease, 1991). Kim (1988) cautioned that sex differences in cross-cultural adaptation may be confounded with socioeconomic and marital status.

In this study, it was expected that there would be an increase in CMC use among international students after they moved to the U.S., simply because they would want to communicate with their family and friends back home. The results of

this study confirmed that international students e-mailed and chatted significantly more after they moved in the U.S. than before. However, the findings indicated that increase in average time spent daily on surfing the Internet was not significant. Internet use is a more passive way of using CMC tools and can be done for various purposes, such as getting news, visiting sites, listening music/radios, entertainment, shopping etc. Most of these uses do not involve other people. It is very probable that participants of this study might have been using the Internet to get information about U.S., for their work, school or various other reasons even when they were at home. That is, they might have been regular Internet users even before arriving in the U.S. Several participants in the pilot study commented on how their CMC use changed after they moved to the U.S. Here is what some of them said:

I use Internet much more frequently than I did before I came to the US, because I need e-mails to communicate with family and friends, and read online news about what happened in my country.

I never used chat programs before I came here and thought it was waste of time. Today I am hooked to it.

I did not use the Internet as a tool for communication, but now, that is the way I keep in touch with people and communicate any time.

At home ... I basically used my computer to do schoolwork and for entertainment. Now I use it for school and for communicating with my friends and family at home.

In addition, the present study investigated whether there would be any changes in the degree of maintenance of home and host values as a function of this cross-cultural transition. The repeated measures analysis did not yield any significant increase on home identification scores in the post-arrival phase. This finding can be explained by the view that ethnic identity is a dynamic construct that evolves and changes in response to developmental and contextual factors (Marcia, et al., 1993). It may not be a defining characteristic when one is a part of the dominant culture, but it becomes salient as part of the acculturation process that takes place when immigrants come to a new society (Phinney et al., 2001). The exact timing when this change occurs is difficult to determine. Individual differences, contextual situations, country of origin and the country of contact, all intervene on this process. In the present study, the post-arrival data is collected fairly early during cross-cultural transition, only 3-4 months after the pre- testing. If we assume that most students moved to the U.S. in August, at the time the post arrival data was being collected in October, the students had been in the U.S. for only about 3 months. This period might not be enough for one to become aware that within the U.S., he or she could adopt an ethnic identity. Thus, the international students in this study may not have had sufficient time in the U. S. to develop an ethnic identity.

On the other hand, there was a significant increase in host identification scores in the post-arrival phase after controlling for whether one had been to the U.S. before. Half of the students in the pre-post group had already traveled to the

U.S. before enrolling at the University of Texas at Austin. This finding supports the idea that international students acquire a more Americanized identity early in their transition to the U.S.

The results also indicated that international students were psychologically challenged after they moved to the U.S. Their emotional well being declined significantly in the post-arrival phase. Psychological well-being is one of the most important and most frequently studied constructs in the field of acculturation research. In fact, the process of acculturation has been mostly interpreted within a stress and coping framework with emphasis on the negative psychological and psychosomatic consequences of cross-cultural contact and change (Acevedo, 2000; Landale, et al., 1999). There is not much consensus on the pattern of changes that sojourners experience. Various studies have tried to determine how psychological well-being of sojourners changed during acculturation (e.g. Lysgaard, 1955; Oberg, 1960; Gullahorn and Gullahorn, 1963; Ward et al., 1998). Earlier, the dominant idea in the acculturation literature was that the initial phase was relatively easy and immigrants had better well-being resulting from enthusiasm and fascination with the new culture, followed by a period of crises and distress. Lysgaard (1950) called the entry period of acculturation as the 'honeymoon stage.' However, more recent empirical research did not support this honeymoon stage and rather suggested that psychological distress rather than euphoria characterized entry to a foreign milieu (Klineberg & Hull, 1979; Kealey, 1989 and Nash, 1991). A more recent study by

Ward et al. (1998) put these former theories to a test by conducting a longitudinal study on sojourners' acculturation. Their findings indicated that adjustment problems were the greatest at entry point and decreased over time. Ying and Liese (1991) also examined pre-to-post arrival changes in emotional well-being of a group of Taiwanese students in the U.S. Their findings indicated that over half of the students experienced a decline in emotional well-being, while the remainder reported no change or improved well-being. Change in emotional well-being from pre-departure to initial arrival was explained in terms of three factors: pre-departure mood level and preparation; continuation of pre-departure relationships; minimal interpersonal and academic problems in the U.S. The present study supports the idea that international students have significantly worse well-being within the first four months of their arrival to America.

Conclusion

The findings summarized in this section indicate that international students are frequent users of computers and that computers are effective tools for international students to maintain home cultural values, acquire host cultural values and participate in their old social networks. All of these factors combine to affect the students' adaptation to the new culture. Nonetheless, there are large individual differences. We cannot expect all sojourning students to experience the same results. One of the respondents conveys this profoundly:

I think it depends on people. People who don't communicate well using

traditional ways of communication generally also do not communicate well with new technologies. CMC is a new interface between people, and it opens up new possibilities. As long as you understand the strengths and weakness of each tool, you can utilize them to best serve your needs. Every kind of tool has its own problems, but it doesn't quite matter.

Moreover, it should not be forgotten that computers in the present research are just tools; essentially, it is the continuous contact with family, friends and social life at home that matters.

Limitations and Implications

As discussed above, the present study brings a new perspective to the study of international students' acculturation process. However, it is not without limitations. In the section below, the limitations concerning the sample and measurement are acknowledged along with suggestions for further research. The final section points out some potential applications based on the outcomes of the present research.

Limitations of the Study and Suggestions

The limitations of the present research can be grouped into two basic categories: procedural and measurement issues.

Procedural issues. The initial contact with the participants of this study was done via e-mail for two reasons; firstly, there were constraints on reaching a thousand students from all over the world by traditional methods during the pre-

arrival data collection phase. Secondly, due to privacy concerns, this was the method of contact approved by the International Students Office at the University of Texas at Austin. E-mail was the preferred communication tool used by the university and the international office to communicate with applicants, so it was assumed that most of the students would be accessible through this means. However, it is possible that this initial contact might have biased the sample towards including students who are frequent CMC users to begin with. For example, in the pre-arrival phase, only 450 students replied back, either by participating in the study or saying that they would not participate for various reasons. Seventy-seven of the e-mails were undeliverable to begin with and half of the students contacted in the first place did not respond. It is not possible to know whether the non-respondents received the invitation e-mails and chose not to participate, or simply never heard about the study. The low response rate is an indication that less frequent CMC users might have been excluded from the study from the onset.

Another related issue is that, originally the study was planned to include three data collection phases; one pre-arrival phase, and two post arrival phases. In addition to the data collected in October, a third wave of data would be collected through the end of the second academic semester to explore the change in students' acculturation by time. Unfortunately an attempt of the third phase of data collection resulted in only approximately 5% response rate. Thus, this phase was dropped from the data collection.

These response bias issues necessitate caution in generalizing the results of this study to all international students. It is possible that some students have different experiences and this study was unable to assess them because they were not included in the sample.

Measurement Issues. There are a couple of measurement issues that should be mentioned.

Three scales were created for use in this research: CMC use, perceived social support and academic adaptation. Two of these, the perceived social support scale and the academic adaptation scale have relatively good reliabilities. However, the construct reliability of the CMC use scale is lower than the acceptable minimum limit. The CMC scale was used as a latent factor in the model, with its two indicators measuring passive and active uses of computer-mediated technologies. The low reliability of this scale indicated a reduced certainty in the magnitude of constructs in the sample (Hancock & Muller, 2001). Hence, there is the possibility that the relationships of constructs related to this factor might fluctuate with different samples. However, the results of the SEM model suggested that CMC use has significant direct effects on home identification scores, host identification scores and perceived social support scores and significant indirect effects on the three adaptation scores. Therefore its influence on the cross-cultural transition of international students is apparent; nonetheless literature will greatly benefit from developing a more reliable scale of CMC use.

The next important measurement problem is with the measurement of acculturation strategies. In the literature, there is controversy about the appropriate measurement of acculturation. Some researchers propose a unidimensional measurement in which one's acculturation is measured as high or low (e.g. Gordon, 1964; Ruiz, 1981; Sung, 1985) and some others propose a two dimensional model which gives the possibility of being high or low in home identity and the host identity at the same time (e.g. Berry, 1984; Ogbu, J. U. 1979 ; LaFromboise et al., 1993). Nonetheless, it is generally accepted that acculturation is a complex process that changes depending on the personal and contextual situations, as well as time spent in the host culture (Berry, 1989). The presence of a large number of factors affecting acculturation adds to the complexity of finding an appropriate scale for measuring acculturation. Various researchers have created scales to be used in particular cultures such as in white-dominant societies (Sodowsky & Plake, 1991), with Asian populations (Suinn et al., 1987), and with Mexican populations (Cuellar, Harris & Jasso, 1980). The Acculturation Index used in this present study has also been commonly used in the literature (Ward & Kennedy, 1994; Ward & Rana Dueba, 1999, Aycan, 1997). However, it has its own faults. The technique used to generate the four acculturation modes by bipatriate splitting of the home and host identification scales results in a rather 'relative' categorization within one sample. There are no absolute scale cut-off points established to categorize people. Because of the drawbacks of this scale, and to get a better understanding of individual effects

of the two identification scores, the home and host identification scales are used separately in the SEM model.

The findings of the SEM model indicated that the variance explained in each construct was only in moderate range. This result could be explained by a variety of factors. For example, it is probable that the reason of the weak relationship observed in these constructs might be due to measurement problems described. Also, measuring psychological well-being of sojourning individuals represented another challenge. As addressed above, there are a variety factors affecting one's psychological well being in general. For an acculturating individual, who is going through a big change in a number of arenas at the same time, it is even more difficult. Thus, inclusion of additional measurements of psychological adjustment could have strengthened the model fit.

Overall, the present model explains some aspects of the acculturation process international students go through during the early stages in their cross-cultural journey. Still there is a lot left to explain. The literature will benefit immensely from additional research which approaches the acculturation process with a holistic view and attempts to synthesize previous research findings and provide parsimonious models that specify interrelationships among various factors affecting cross-cultural adaptation (Cui, van den Berg, & Jiang, 1996). The present study is one of few such examples in the area of acculturation. As substantiated in the pilot study, some of other factors that should be investigated in the model are: cultural distance

between the home and host cultures, presence of ethnic culture locally, quality of social network before leaving home, willingness to keep contact with people at home and home cultural life as well as willingness to acquire skills associated with the host culture. What's more, due to the dynamic nature of acculturation, the factors shaping acculturation as well as the relationships between them should be investigated. Various studies have tried to explain the pattern of acculturation with different theories such as the Oberg's culture shock theory, U-curve theory and W curve theory (Lysgaard, 1955; Oberg, 1960; Gullahorn & Gullahorn, 1963). However, none of them have fully explained the process. Accordingly, understanding the acculturation process requires more longitudinally designed studies and the present study offers one contribution. Furthermore, it should not be forgotten that structural equation models only provide correlational information regarding the relationships of the variables. Explaining causal effect requires the use of experimental designs.

Finally, it should be noted that this model attempts to explain only the initial phases of a cross-cultural transition for international students. However, international students are not the only sojourning group who experience cross-cultural transition. There are also other groups such as refugees, expatriates, guest workers, diplomats and missionaries who live through some forms of cultural transitions. Each of these groups has characteristics separating them from others and undergoes the acculturation process in different ways. The role of computers in

cross-cultural transitions would not be fully explained unless similar research is done with other groups.

Potential Applications

The positive effect of using computers as a communication and social support tool on acculturation places the present study among few other studies that offer a solution to the problems that foreign students may encounter during their sojourn.

International students undertake this highly demanding mission of overseas studies anticipating a successful experience. They are responsible to themselves, their parents, to people who support them financially and even to their countries and of course to people who have educated them. Their success is assessed by how much they adapt to their new life and how they perform in the school life.

One goal of this research is to develop an orientation program to be given to in-coming international students by the international students' offices of universities with high foreign student populations. An awareness of the acculturation process of international students would be useful to counselors, faculty, and student support services personnel who work with these students as well as the students themselves. By knowing what to expect, foreign students may understand their need to find and use support systems available to them. And by providing this kind of orientation to

the students who are going through a cross-cultural transition may guide such students to the appropriate resources.

As integration appears to be the most effective adaptation strategy, such orientation programs should foster good inter group relations with host nationals while simultaneously working to maintain a sense of identity with culture of origin. The findings illustrate that both host and home identification have substantial effects on acculturation and a bicultural approach facilitates adaptation during cross-cultural adaptation. Technology, on the other hand, can be introduced as a tool to assist these relationships. However, students should be explicitly guided through healthy uses of CMC tools to sustain their old relationships and should be warned against exploiting technology to create a virtual home in the foreign lands and preferring it over having a real life in the host culture.

One other related issue is the “brain migration”. A remarkable number of students, who go abroad for studies temporarily, end up not returning home or lose all their contact with home. If you ask international students whether they would prefer staying in the host culture if they had the chance, majority of them say they would. But on the other hand, most of those who choose not to go back, live a remote life in which they don’t feel that they belong to either of the cultures. In this manner, programs facilitating maintenance of cultural values might also guide these students in better evaluating their choices.

Finally, there is no reason to assume that international students would be the only targets of such programs. Not only cross-national sojourning groups but other people who end up living in cultures other than the ones they were brought up even within a culture can immensely benefit from such guidance. As the world continues to be a global land and the technology continues to be a part of this ever-changing world, it is obvious we need more and more studies like the one presented here.

Appendix A

Demographics Questions

Gender: _____

Age: _____

Marital status:

- single
- engaged
- married/ no children
- married/ with children
- divorced

What country are you from? _____

What is your major? _____

How long have you been in the US?

- 1 to 2 months
- 3 to 4 months
- 5 to 6 months
- more than 6 months

Have you been to the U.S. before?

- yes Which Year? _____ For how long? _____
- no

Before your current stay in the U.S., have you lived in a country other than your home country for more than a 6-months period?

- yes
- no

Do you have any relatives in the U.S. that you are in contact?

- yes
- no

Your main reason for coming to *[the university]*?

- English as a Second Language courses
- Exchange student
- College(undergraduate) degree
- Graduate degree
- Post-doc degree
- Research
- Instructor/professor
- Visiting student/ visiting professor
- Other

How comfortable are you in:

	not at all comfortable	a little comfortable	very comfortable
speaking in English ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
writing in English ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
reading in English ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please comment on the following:

During my study in the US:

	strongly agree	agree	neutral	disagree	strongly disagree
I would like to have many American friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I would like to spend time with other students from my own country	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I would like to spend time with other international students	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I would like to participate in the social activities of American organizations, associations or clubs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

During my study in the US, it is very important for me to be in contact with:

	strongly agree	agree	neutral	disagree	strongly disagree
my friends at home	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
my family	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
the social and cultural life at home	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
current events in my country	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix A 2

General CMC Use Questions – Pre-arrival Phase

The questions below are about your computer usage...

1. In a typical day, on average, how much time do you spend?

Surfing the Internet: _____ minutes

Emailing people: _____ minutes

Chatting online: _____ minutes

2. For me, computers are useful for keeping up....

	strongly agree	agree	neutral	disagree	strongly disagree
with family members	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
with friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
with music and entertainment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
with news	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
my hobbies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix A3

CMC Use Scale- (Post Arrival Phase)

The questions below are about your use of Computer-Mediated-Communication tools since your recent move to the U.S.

CMC- (*stands for **C**omputer-**M**ediated-**C**ommunication*): includes any kind of communication done via computers, such as Internet, e-mail, chat, video conferencing etc.

Traditional communication tools: any other forms of communication than computer mediated ones, including phones, letter, fax etc.

People at home: refers to people from your home country who are not in the U.S.

1. Which of the following communication tools have you used to contact people at your home country (*please check all that apply*).

- phone
- letter
- email
- ICQ
- yahoo messenger
- other chat programs
- net meeting
- web cameras
- other

2. Since your first days in the U.S. how often have you...

	never	once a month	once a week	more than once a week	once a day	more than once a day
e-mailed people at home?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
used the Internet to access home sites?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
talked on the phone with people at home?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
written letters to people at home?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
read on-line newspapers of your native language?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
read on-line magazines of your native language?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
listened to on-line music broadcasted from your home country?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
watched on-line TV of your home country?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. In a typical day, on average, how much time do you spend on:

Surfing the Internet: _____ minutes

Emailing people: _____ minutes

Chatting online: _____ minutes

4. Using the scale below, please indicate, on average in a week, how many times have you communicated with...

	never	1-3 times	4-6 times	7-10 times	more than 10 times
your parents via CMC tools	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
your parents via traditional communication tools	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
your friends at home via CMC tools	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
your friends at home via traditional communication tools	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
host-nationals (local people) via CMC tools	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
host-nationals via traditional communication tools	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. Does your family have a computer access with Internet?

- yes
- no

6a. About how many friends from home do you communicate on a regular bases?

- none
- 1-3
- 4-6
- 7-9
- 10 or more

6b. Of those how many do you communicate with using mostly CMC?

- none
- 1-3
- 4-6
- 7-9
- 10 or more

Appendix A4
Acculturation Index

Appendix A5

Perceived Social Support Scale

Please think about your communication with friends and family at home so far and comment on the following questions using the rating scale below.

	strongly agree	agree	neutral	disagree	strongly disagree
1. CMC has been useful for keeping up with my family.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. CMC has been useful for keeping up with my friends at home.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. CMC has been useful for keeping up with my home culture.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. I feel relaxed when I talk to my friends online.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Confiding in friends through CMC makes me uncomfortable.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I rely on my friends and family at home for emotional support more than my friends at U.S.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. The Internet has helped me maintain my social network .	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. I prefer to be with my local friends rather than spending time online.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix A6

Generalized Contentment Scale

For the items below, please think about how you have been feeling about yourself during the past few weeks and answer accordingly. They measure the degree of satisfaction you feel about your life and surrounding. Please choose the one that describes you best.

	none of the time	rarely	neutral	most of the time	all of the time
1. I feel powerless to do anything about my life.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2 I feel blue.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3 I am restless and can't keep still.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. I have crying spells.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. It is easy for me to relax.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I have a hard time getting starting things I need to do.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I do not sleep well at night.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. When things get tough, I feel there is someone I can turn to.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. I feel the future looks bright for me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. I have a great deal of fun.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. I feel that I am needed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. I enjoy being active and busy.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. I feel that others would be better of without me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. I enjoy being with other people.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. I feel it is easy for me to make decisions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. I get upset very easily.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. I have a full life.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. I feel that people really care for me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix A7

Socio-Cultural Adaptation Scale

For the items below, please indicate the amount of difficulty that you have experienced in the U.S., using the scale below:

	no difficulty	slight difficulty	moderate difficulty	great difficulty	extreme difficulty
1. making friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. using the transportation system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. making yourself understood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. finding your way around	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. going shopping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. expressing your ideas in the class	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. understanding jokes and humor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. getting used to the local food	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. adapting to local accommodation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. going to cafes/ bars/ restaurants	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. understanding what is required of you at the university	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. dealing with the bureaucracy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. dealing with the climate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. understanding the local accent/language	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. living away from family members overseas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix A8
Academic Adaptation Scale

Please think about your performance at U.T. so far, and comment on the following items using the rating scale below.

	strongly agree	agree	neutral	disagree	strongly disagree
1. I am satisfied with the level at which I am performing academically.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. I am pleased now about my decision to come to <i>[the university]</i> .	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Being unable to concentrate on my studies troubles me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. I am quite confident that I will be able to deal in a satisfactory manner with future challenges here at <i>[the university]</i> .	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I would rather be at a college at home than here.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. So far, my experiences in the program met my expectations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I have a good communication with faculty.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. I have a good communication with students.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. I am skilled academically as the average graduate student.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. I feel that my grades are an accurate measure of my academic ability.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix B1
Pilot Questionnaire

Please enter your birthdate as MM/DD/YY format:

1. Your reason for being at *[the university]*:

- English for a Second Language courses
- College degree
- Graduate degree
- Post-doc degree
- Research
- Instructor/professor
- Visiting student/ visiting professor
- My wife/husband is at *[the university]*
- other/please specify

2. Your major

3. How long have you been living in the United States?

months

4. What country are you from?

5. In the States, are you mostly friends with...

- Americans?
- other International students?
- other students from your own country?

The questions below are about the ways you communicated with your parents, friends and the general social life in your home country since the first days you have been in the United States :

(Note: CMC stands for Computer-Mediated-Communication)

1. Which of the following tools have you used to communicate people at your home country? *(please check all that apply)*

- phone
- letter
- e-mail
- ICQ/Yahoo Messenger
- chat programs
- Net meeting
- video conference and/or web cams.
- other (please specify)

2. How often have you:

2. 1. read on-line newspapers of your native language?

- more than once a day
- once a day
- more than once a week
- once a week
- once a month
- never

2. 2. listened to radios of your native language?

- more than once a day
- once a day
- more than once a week
- once a week
- once a month
- never

2. 3. read on-line magazines of your native language?

- more than once a day
- once a day
- more than once a week
- once a week
- once a month
- never

2. 4. watched TVs over the Internet?

- more than once a day
- once a day
- more than once a week
- once a week
- once a month
- never

3. Have you used E-mail?

- no
- yes

if yes, please answer these two questions:

3. 1. How often have you used e-mail?

- more than once a day
- once a day
- more than once a week
- once a week
- once a month

3. 2. With whom have you e-mailed most?

(please rank order from (1) the most to (8) the least)

- my friends at home
- my friends in America
- my girl/boy friend or spouse
- my family
- colleagues at home
- colleagues in America

4 . Have you used the Internet

- no
- yes

if yes, please answer these two questions:

4. 1. How often have you used Internet?

- more than once a day
- once a day
- more than once a week
- once a week
- once a month

4. 2. For what reasons have you used the Internet the most?

(please check all that apply)

- news
- shopping
- education
- general information
- TV
- music (MP3/Radio)
- entertainment
- other/specify

5. Please indicate how much you agree or disagree with these sentences:

5. 1. When I use the Internet, I mostly visit American sites more than sites of my native language/culture?

strongly agree agree neutral disagree strongly disagree

5. 2. I spend more time in using Internet and CMC tools now than I did before coming to the U.S.

strongly agree agree neutral disagree strongly disagree

5. 3. I feel that my close friends, parents, the loved ones at home, are still "with me" even though they are not physically here.

strongly agree agree neutral disagree strongly disagree

6. During your studies in the US, how important is it for you to be in contact with:

	very important	important	neutral	unimportant	not important at all
(a) your friends at home	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(b) your family	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(c) the social/cultural life	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7. Please indicate how much time per day on average do you spend?

	none	less than 1 hour	1-2 hours	more than 2 hours
Talking on the phone with people at home	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E-mailing people at home	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chatting people at home	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reading native newspapers and magazines on-line	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lisening to the online native radios/music	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Watching native TV online	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

I would like to learn more about your experiences and thoughts about using CMC to communicate your parents, friends, at home as well as the social/cultural life.

Please be detailed as possible.

1. Have you benefited from CMC in communicating with people back home.

How efficient do you think it is to use CMC for this aim? How different it is to communicate through CMC and more traditional communication tools like

(telephone calls, snail mail etc). If you think CMC is better, based on your experiences so far, could you please tell me more about why you think so.

2. Have you ever had problems in using the CMC as a communication tool. For example, do you think you truly understand each other with the people you are communicating via the computer? Or do you think there are any missing features of CMC, that would contribute to a smoother more efficient communication?

3. When you have personal problems in this new culture, such as when you think you are not understood well, or when you feel the need of a social support, or just want to share your personal thoughts or problems, with whom do you prefer to talk most?

- American people (friends/professors etc...)
- Local people from your home country
- Your parent, friends at home.⁷

If you prefer people at home, do you contact them by;

- phone letter CMC (email, ICQ, net meeting alike).

4. Can you talk more about, whether your Internet usage habits have changed -such as the various tools you use, the people you communicate with, the sites you log on to or the frequency you use CMC- since you came to the US for your studies compared to your typical usage when you were at home?

Last but not least:

Gender: female male

Age:

- less than 20
- 20 -24
- 25-29
- more than 30

Marital status:

- single
 - engaged
 - married/ no childrenIs your spouse here with you? yes no
 - married/ with children.....Is your spouse here with you? yes no
 - divorced
- Are your children here with you? yes no

Bottom of Form

Appendix B2
Pilot Interview Questions

The questions I have for you today are about your experiences in the United States as an international student. I would especially like to learn more about your experiences and thoughts about using CMC to communicate your parents, friends at home as well as the social life. If you prefer to talk about your friends in the States, or are not in close contact with your home, do talk about that, too. Please be explicit as possible.

1. Are you a frequent CMC user? With whom do you communicate most? Do your parents/friends at home have access to CMC? Do you read native newspapers, magazines or watch TV online? Are they available in your country?

2. In general, since the first days you have been to the States, have you benefited from CMC in communicating with people back home?

How efficient do you think it is to use CMC for this aim? How different it is to communicate through CMC and more traditional communication tools like (telephone calls, snail mail etc). If you think CMC is better, based on your experiences so far, could you please tell me more about why you think so.

Has your communication style (issues, frequency of contact, people you contact, etc.) changed since the first days you've been to the States?

3. Have you ever had problems in using the CMC as a communication tool. For example, do you think you truly understand each other with the people you are communicating via the computer? Or do you think there are any missing features of CMC, that would contribute to a smoother more efficient communication?

4. For what kind of problems/issues do you prefer to talk to your parents or old friends at home? Can you give me some examples? What about the things you share with your co-nationals present locally and other American friends you have? For what kind of topics do you prefer to talk to them?

When you have personal problems in this new culture, such as when you think you are not understood well, or when you feel the need of a social support, or just want to share your personal thoughts or problems, with whom do you prefer to talk most?

What about when you have academic problems?

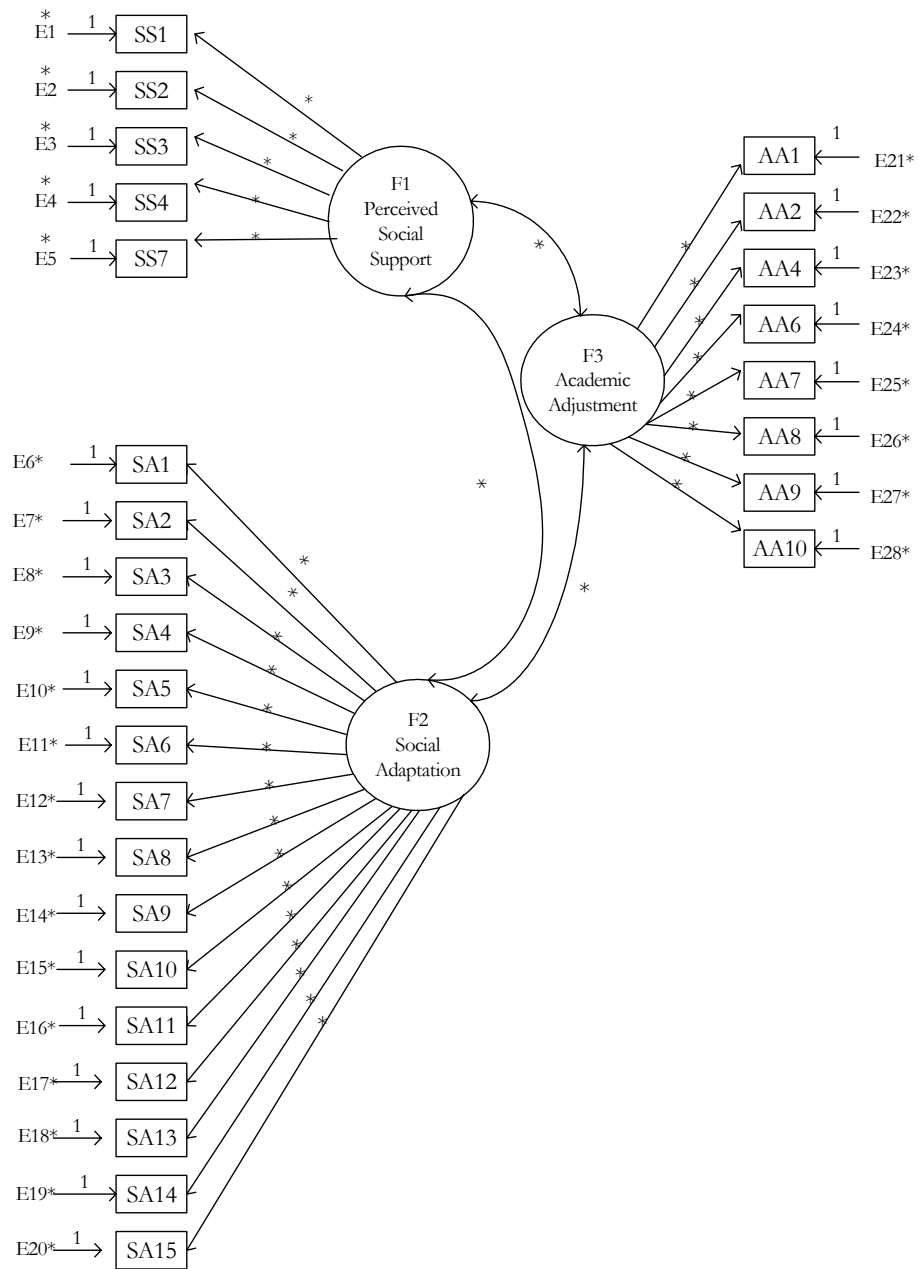
5. Can you talk more about, whether your Internet usage habits have changed -such as the various tools you use, the people you communicate with, the sites you log on to or the frequency you use CMC since you came to the US for your studies compared to your typical usage when you were at home?

6. Do you feel that your close friends, parents, the loved ones at home, are still “with you” even though they are not here physically?

7. In general how do you feel about “being here.”

Appendix C

EQS Representation of the Confirmatory Factor Analysis



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